FORECASTING SKILL NEEDS: METHODOLOGY ELABORATION AND TESTING

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Technical assistance
Věra Havlíčková
NO–NTF (National Observatory of Vocational Education and Training and Labour Market – National Training Fund)
Prague, Czech Republic

List of authors

Chapter l
Olga Strietska – Ilina – Project Leader
NO-NTF

Chapter 2
Daniel Műnich, Štěpán Jurajda, Jan Babeckij, Oleksandr Stupnytskyy
CERGE-EI (Centre for Economic Research and Graduate Education, Charles University)
Prague, Czech Republic

Chapter 3
Zbigniew Strzelecki
SGH (Warsaw School of Economics)
Warsaw, Poland
Witold Orlowski
GUS-PAN (Institute of Statistical and Economic Research)
Warsaw, Poland
Andrzej Karpinski
PAN (Polish Academy of Science)
Warsaw, Poland
Stefan Kwiatkowski
IBE (Institute for Educational Studies)
Warsaw, Poland
Eugeniusz Kwiatkowski
UL (University of Lodz)
Lodz, Poland
Mieczyslaw Kabaj
IPiSS (Institute of Labour and Social Studies)
Warsaw, Poland
Janusz Witkowski, Malgorzata Kalaska
GUS (Central Statistical Office)
Warsaw, Poland
E. Drogosz-Zablocka
UW (University of Warsaw)
Warsaw, Poland

Chapter 4
Olga Strietska – Ilina
NO–NTF
André Giffard
OREF Bourgogne (Observatoire régional de l'emploi et de la formation)
Rectorat/Dafco (Délégation académique à la formation continue de Dijon)
Dijon, France
Christine Guegnard
OREF Bourgogne (Observatoire régional de l'emploi et de la formation)
Céreq/Irédu (Centre régional associé au Centre d'études et de recherches sur les qualifications, Institut de recherche sur l'économie de l'éducation)
Dijon, France

Chapter 5
Josef Zelenka
University Hradec Králové, Faculty of Management
Hradec Králové, Czech Republic
Olga Strietska-Ilina, Věra Havlíčková
NO–NVF
Jaromír Beránek, Josef Říha
Magconsulting, s.r.o.
Prague, Czech Republic

Chapter 6
André Giffard, Christine Guegnard
OREF

Chapter 7
Mateja Karničnik, Dušanka Lužar
HRDF (Human Resource Development Fund)
Maribor, Slovenia
Suzana Geržina
NO–CVET (National Observatory, Centre for Vocational Education and Training)
Ljubljana, Slovenia

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■ EXECUTIVE SUMMARY

The project *Regular Forecasting of Training Needs: Comparative Analysis, Elaboration and Application of Methodology* (*LABOUR*atory) was a two-year survey and analysiss project funded by the European Commission under the Leonardo da Vinci programme.

The aim of the project was to investigate labour market information systems and methods used for forecasting education and training needs in four EU member states (France, Germany, Ireland and the Netherlands), and to compare them with the data availability and the methods applicable in three pre-accession countries (Czech Republic, Poland and Slovenia). The system of forecasting future manpower requirements used in the latter countries in the past was defined by the planned economy. The nature of the changes towards a market economy made such an approach largely inapplicable. There are several transition-specific issues which are usually considered a major barrier to implementing the forecasting models in these countries: using data on an economy in transition to forecast future developments is a drawback because of possible breaks in past employment trends. This is essentially a problem of short time-series and insufficiently detailed data availability. Thus, the final project aim was to elaborate an innovative methodology for forecasting training needs that could be applicable in the context of labour markets in transition economies, as well as to improve existing prognostic approaches in the EU member states.

Unemployment, and especially youth unemployment, is continuing to grow in the majority of transition countries. It is also an issue of major concern in the majority of EU member states. Countries in transition are experiencing the same trends as affluent western economies: rapid technological change and a demand for a highly skilled workforce, de-industrialisation and a shift to the service sector, a rapid change of job profiles and the disappearance of some professions. What form will future developments take? How can the transition economies catch up with these global developments? What type of labour market trends will arise out of the enormous rate of change as a result of the transition from planned economies alongside the global patterns of change? All these questions make forecasting both increasingly challenging and vital, introducing dilemmas into the work of analysts.

In order to adapt the methods of medium-term forecasting for their application in unstable economic conditions, the partners in **the first phase of the project** compared the existing methods of forecasting training needs in each partner country. The result of this comparison was the publication *Forecasting Education and Training Needs in Transition Economies: Lessons from the Western European Experience, Prague, NO-NTF, 1999*. The analysis in the first project phase compared different methods of the two main types, which were **conventionally defined as quantitative and qualitative**. The division between the two is in fact only symbolic or conventional, as each of the two approaches uses both qualitative and quantitative aspects to at least some extent.

The initial analysis laid the ground for the future work in the two main methodical components in **the second phase of the project**.

The **quantitative prognostic methods** were analysed with a view of the possible elaboration of synthetic models, with adjustable alteration and reconstruction tools, and in collaboration with the Centre for Economic Research and Graduate Education/Economic Institute (CERGE/EU, Czech Republic), the Economic and Social Research Institute (ESRI, Ireland), and the Research Centre for Education and the Labour Market (ROA, the Netherlands). These three partners made used of a combined method, aimed at analysing the labour market forecasts according to the type of education in the Czech Republic at the national level. Closely following the methodologies of ESRI

and ROA, comprehensive time-series data on past and on forecasted flows of new graduates by levels and fields of study have been acquired, and many of the existing discrepancies of the Czech system were in the process of being resolved by the partners. Through this new combined approach, the team selected and matched the new components to improve and adjust the methodology to the specific Czech situation. The result of this work is a proposal for the models and the set of labour market indicators, which is conventionally referred to as the **CERGE-ROA-ESRI approach** in one part of the publication *Regular Forecasting of Training Needs: Quantitative Models for the Czech Republic* (in *Forecasting Skill Needs: Methodology Elaboration and Testing, NO-NTF, Prague, 2001*). It describes how occupational forecasting models used in the Netherlands by ROA and in Ireland by ESRI were adapted to the needs of the Czech Republic, using limited time series for the period 1993–1999 to provide forecasts for the period 2000–2004 for 50 occupation groups and 59 education categories for expansion demand, replacement demand, and job openings.

The report shows how this information can be used to identify potential shortages or surpluses in the Czech Republic according to education categories, and how two key labour market indicators provide important information for individuals on future labour market prospects, and for firms on the prospects of being able to recruit labour of the kind they are likely to be looking for. Enough detail is provided on the data and forecasting methods used to enable those who will be responsible for producing industry, occupation, and education forecasts for the Czech Republic to replicate the forecasts contained in the final report and to produce new forecasts in the future. The report also suggests how the output from the forecasts could be developed in the future to provide an information system for education and for the labour market in the Czech Republic, which would be similar to that used in the Netherlands, in order to help students and other people looking for a job to assess medium-term labour market prospects for a wide range of occupations and types of education. The team also used expert opinions for verification of the input data and their structures.

The Polish team brought together different databases that are used to provide projections for the demand for labour one year ahead, five years ahead, and ten years ahead. They have shown that, even with the data limitations that exist in Poland and in spite of major reforms associated with the transition from a planned to a market economy, it is possible to produce occupational forecasts for different time horizons for the demand side of the labour market. The approaches used to produce occupational forecasts for Poland are closer in spirit to those used in the United States and Australia than to those in the Netherlands. The Polish team also attempted to produce a forecast at the regional level, using thus far a somewhat simplistic approach, in which no qualitative research tools at the regional or sectoral level and no expert opinions were used for data verification. In this regard, some suggestions were made for the future work of the Polish team. The result of the work of the Polish researchers in collaboration with the *LABOUR*atory partnership is the report on elaboration, and some results from the pilot application of the Polish methods (see the Polish report in *Forecasting Skill Needs: Methodology Elaboration and Testing, NO-NTF, Prague, 2001*).

Several teams worked in parallel on the elaboration and testing of **qualitative research tools** for anticipation of labour market needs at regional and sectoral levels. The teams paid particular attention to the individual environments of countries and the existing systems of information collection. The qualitative approach was implemented by five partners of the consortium: the two National Observatories of the Czech Republic and Slovenia, Human Resource Development Fund in the Slovenian region Podravje, L´Observatoire Régional de l´Emploi et de la Formation – Bourgogne, and another French institution, Quaternaire. These partners built on French experience of sectoral and regional prospective studies, but enriched the approach by attempting to combine semi-quantitative and "soft" qualitative methods. The elements of their qualitative methods were

piloted at a regional level in one well-developed sector in all three countries, Czech Republic, Slovenia and France – the tourism sector. The Czech and the French partners also concentrated on verifying **to what extent the results of nation-wide quantitative forecasting can be interpreted at the regional and sectoral levels**, and what are the limitations and the advantages. As a result the Czech National Observatory produced a number of recommendations for the future modification of data sets and structures with the view of interlinking qualitative and quantitative forecasts. The results of the pilot research in the sector of tourism in the three countries are presented and discussed in the relevant chapters, including the cross-country summary of results, in *Forecasting Skill Needs: Methodology Elaboration and Testing, NO-NTF, Prague, 2001*.

Both quantitative and qualitative results were widely discussed with the social partners, policy makers, experts and practitioners, verified and eventually adjusted. Each of the partner produced **a set of recommendations for enrichment and adjustment of data sets, data structures, improvement analytical methods and mechanisms of data collection**. One of the added value of the project was strengthening of international links between researchers and institutions in the field of forecasting and anticipation of skill needs throughout Europe and increase of mutual awareness of existing methods.

This project made a major breakthrough into the field of forecasting skill-specific labour-market needs in unstable economies with relatively limited data inputs and short time-series. We mapped the main European quantitative and qualitative methodologies and made them operational in other environments. This involved handling many large individual and aggregate data sets, grasping, modifying and implementing the methodology, conducting questionnaire surveys, presenting examples of results, involving expert estimations, and confronting data with opinions of practitioners. The project led to a number of results:

1) we collected and processed input data necessary for occupational and educational forecasting and we presented practical results based on a subset of techniques;
2) we programmed and tested state-of-the-art techniques with real data; this has allowed us to provide illustrations of the techniques even when their results cannot be used in practice yet due to input-data limitations;
3) we tested the methods, which allowed us to identify the bottlenecks in educational and occupational forecasting and to outline the future research needed in the field;
4) we conducted the underlying computing and programming work, which will allow gradual implementation of the methods and eventual presentation of the results for public use;
5) we conducted the regional surveys in one selected sector that helped us to identify the strengths and weaknesses of questionnaire surveys, focus groups, extrapolation of global trends, and assisted identifying limitations of quantified nation-wide econometric forecasts for a regional/sectoral level;
6) we produced a number of recommendations on how to enrich the data inputs for future work and how to verify and extend the results of national quantitative forecasts with the help of qualitative research;
7) we suggested the future system for national and sectoral forecasting.

The approach tested in the Czech Republic by CERGE and NO-NTF combined various methods, and it is possible to state that these results in principle **can be applied in other countries** where economic transformation has not been completed or where economic stability is altered.

■ CONCLUSIONS AND RECOMMENDATIONS

Our main conclusions and recommendations fall into four main categories: recommendations for relevant institutions and actors, for researchers, for data collectors, and finally, with regard to the future interpretations of forecasting, recommendations for the dissemination of the results. Hereinafter we present our recommendations accordingly.

Institutional level

It is essential to support the creation of **inter-institutional and supra-ministerial agreements for the regular projection of labour market needs** in the countries where such a system has not yet been established. A system of co-operation between various government agencies should involve:

- ■ dividing responsibilities for producing and publishing a fresh five-year forecast every second year;
- ■ updating the input data on an annual basis to allow for overlap and corrections of the previous forecast;
- ■ identifying and allocating tasks among relevant partner institutions for data input and further interpretations of results;
- ■ establishing accountability for the regular announcement of sectoral and regional studies on skill needs in accordance with immediate and forthcoming priorities and in active collaboration with and among the governmental bodies (e. g. among the ministries – labour, education, industry, regional development – and regional administration or self-government) and social partner organisations (e. g. tripartite bodies, branch organisations);
- ■ identifying financial mechanisms and budgetary needs for financing national regular five-year quantified forecasts of demand by occupation and education, and for conducting regional and sectoral analyses (i. e. reserving a budget in the central state budget, ministerial budgets, regional budgets, and negotiating co-financing from branch organisations of employers, trade unions, etc.).

At the European and international level we recommend supporting networks of researchers in the field of skill needs forecasting that involve both quantitative and qualitative methods. Mutual learning will not only contribute to a better awareness of methods in use but also will also help to overcome the barrier between the qualitative and quantitative approaches in forecasting which currently persists in analytical circles.

Research level

The work on **national mid-term forecasting will remain an on-going process** that will demand permanent attention from researchers in order to improve the models, data structures and inputs. One of the segments of future work entails producing reliable forecasts of labour-force participation by occupation-cohort and education-cohort groups. The forecasters will need to systematically update their research in accordance with the newest methodological findings and the newly available or modified data. An important tool appears to be the ex-post verification of the accuracy of forecasts and assumptions, based on an analysis of actual labour market data.

At a sectoral and regional level forecasting of trends on the labour market cannot be based on a quantitative model alone, but must **be augmented and corrected by qualitative analysis**. The mechanical and quantitative relations between requirements and qualifications must give way to

a new approach, which seeks adjustment points between those two components. Likewise a unique indicator cannot summarise the complexity of a given situation. Indicators are only means, questioning instruments designed to concentrate the active reflection of regional actors. The use of different sources of information, by matching or confronting them, offers a better understanding of the situation in real terms, e. g. the local hiring practices of employers, a certain misbalance between the structure of the professions and education and training, changing job contents, etc.

Sectoral studies (regional or national) need to be based on **a comprehensive methodological approach**. Questionnaire surveys as the sole method of investigation are of limited importance and validity. Such surveys need to be combined with other data and information. This not only concerns statistics but also and especially soft information (e. g. global trends, trends in developments in other countries, types of skills demanded, job profiles, etc.). In order to obtain greater participation from businesses in surveys, allowing for samples with the desired structure according to business size, geographical distribution, and types of companies, it is useful **to collaborate with employment services or to run surveys through state statistics agencies**. Furthermore, by **involving branch organisations** and securing a more active role for professional associations, more extensive co-operation can be gained from businesses, and perhaps also on a more regular basis.

Apart from linking and comparing such studies to the results of the quantitative model, business surveys and the assessment of standard statistical data, the most important analytical element and research instrument here **is the identification of the views of professionals from the world of practice**. The creation of thematic **focus groups** and the identification of expert opinions on an ad hoc basis proved to be the most effective source of information in a situation characterised by low interest among businesses in participating in the questionnaire survey, shortcomings in the databases in the sector, the emergence of new "hybrid" occupations and the resulting lack of new definitions (e. g. definitions of individual occupations and qualifications).

The prospective approach must be based on existing resources but also on a confrontation of the viewpoints of different actors. This confrontation is all the more important, as **the diagnosis and the forecasting scenarios are shared**. **Participative scenario-building** implies the greater commitment of all actors (including social partners and policy makers) to the visions, conclusions and recommendations, and therefore to their implementation in the future.

Data collection and data availability

Here we suggest some improvements to existing systems of information collection and data availability for the inputs for forecasting models. The following drawbacks mostly concern the partner countries of Central Europe, but in many cases they are also applicable to other countries.

In the countries where **macroeconomic forecasts of sectoral employment** are missing, it is essential to make such forecasts available, as these constitute essential data input for skill needs forecasts.

One of the common problems in many countries across Europe is **a lack of data on participation in continuing training and qualifications obtained by adults**. The situation appears ever more alarming owing to the increasing role occupied by learning throughout life. If this data insufficiency persists, it may cause significant forecast distortions in the future, when the participation of adults in training will increase.

Labour Force Survey (LFS) is a major source of information on qualification needs' forecasts. It is therefore essential that LFS has sources and an option to enrich the data, capturing lifelong learning after initial education, ensuring data validity at the regional level, securing information on labour mobility, and, finally, ensuring that the educational structure of LFS is adequate for the structures of the educational forecasts of student flows based on national classifications.

In the midst of a rapidly changing educational system, and as projections for occupational supply and demand cannot be made without **good information on student flows**, we strongly recommend that appropriate reporting systems are maintained as a part of any reform of the administrative system.

One of major difficulties in our research was **Standard Classifications of Occupations** of the countries involved. In many instances, occupations are defined in a manner too broad or too vague. The work on updating the definitions cannot follow the fast developing world of work and changing organisation of work. More detailed four and five-digit classifications are certainly more useful for skill needs analyses, but data validity for such detailed definitions is rare. This problem persisted in the clustering of occupations when even larger occupation groups needed to be constructed for the sake of data validity. This resulted in significant limitations on the future interpretation of results. For the future we recommend that researchers try to produce their own definitions and clustering of occupations, based on more detailed Occupational Classification, and "tailor-made" for the research needs in the given sector or industry.

In general there is a large room for improvements and work on the **harmonisation of various classifications**, with particular attention to data validity and its potential "interpretability" for different target groups. Data often come from various sources and are not directly comparable and integrated. We strongly recommend **harmonising the activities of different data collectors** and integrating data structures at the national, regional and, possibly, European level.

One important obstacle is also the time difference between the collection of data and the publication of data. Results are often presented with a significant delay when their usefulness is already largely outdated. Delays in data publishing are especially true for state statistical agencies, and for international surveys through Eurostat or other agencies under EU, OECD or World Bank contracts. Without questioning the importance of data checks, we still believe it is necessary **to find a solution for cutting the time gap between data collection and its usage** by researchers, for the sake of efficiency and timely conceptual development.

Interpretation and dissemination of the results

The national forecasts of qualification needs should be published annually or every second year. Interpretation must be targeted to different types of users (e. g. students, guidance services, decision makers,) and therefore must be produced by various research institutions, and published and disseminated by various relevant agencies. Interpretations should appear in the form of soft and very carefully formulated labour market prospects in terms of education and occupations.

Maintaining a website with up-to-date information, and free access for all the organisations and individuals interested in the topic appears useful. In the Czech Republic such a database should be harmonised with the Integrated System of Working Positions, which provides a platform for discussion and information on the content of work and demands for the worker, including the qualification level. In the future the System shall include a module on employment prospects, which should be built on the results of our project.

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Country specific recommendations are presented in detail in the relevant chapters of the book *Forecasting Skill Needs: Methodology Elaboration and Testing, NO-NTF, Prague, 2001*. The project has also brought about the added value of preliminary results on labour market prospects by occupation and education, and information on skill needs in the sector of tourism in the selected regions of three countries. These results come in addition to the initial project objectives. They are also presented in the relevant chapters of the aforementioned publication, which can be obtained from the Czech National Observatory. It is however important that the reader understands that these results are preliminary ones, and should be seen rather as a testing tool than as ready-made answers.

REGULAR FORECASTING OF TRAINING NEEDS: Quantitative models for the Czech Republic

Daniel Münich

Štěpán Jurajda

Jan Babeckij

Oleksandr Stupnytskyy

ABBREVIATIONS USED IN THE TEXT

CERGE-EI Center for Economic Research and Graduate Education-Economic Institute
CNB/ČNB Czech National Bank
CSO/ČSÚ Czech Statistical Office
ED Expansion Demand
ESRI Irish Economic and Social Research Institute
F-C Fixed Coefficient (Model)
LFS/VŠPS Labour Force Survey
MPSV Ministry of Labour and Social Affairs
MŠMT Ministry of Education, Youth and Sport
RCM Random Coefficient Model
RD Replacement Demand
ROA Dutch Reseaarch Centre for Education and the Labour Market
UHK University of Hradec Králové
ÚIV Institute for Information in Education
VÚOŠ Research Institute of Vocational Schooling
VÚPSV Research Institute of Labour and social Affairs

■ INTRODUCTION

The Czech Republic, one of the post-communist economies, is entering the second decade of an economic transition from central planning to a market economy. This transition entails dramatic changes in the composition of output and rapid technology adoption. Furthermore, this transition occurs in an era of rapid technological change, while the EU accession is looming.

It is clear that this extensive reallocation process must entail a transformation of the skills base of the labour force and tailoring of the education system to the needs of the future economy. Identification of future skill needs is therefore critical for the success of the EU accession. In order to avoid high and stagnant unemployment and to successfully respond to future technological changes, workers' education and training must reflect knowledge of medium- and long-term demand for specific skills.

It is the purpose of the present project to develop and implement a methodology for forecasting skill-specific demand on the Czech labour market. Our work stems from the existing methodological advances made in a set of EU-member countries. We take account of sectoral, occupational, and educational factors, which influence supply and demand for skills in the labour market. Regular implementation of our methodology, which covers the whole Czech economy, will extend the time horizon of decision makers beyond the current economic cycle and allow for better adjustment of the Czech labour market to changing economic circumstances.

In this final report we describe the key elements of the methodology we developed and illustrate its implementation with examples of empirical real-data based outputs. Our methodology builds heavily on the recent experience of the European Union in this area. The Synthesis Report (Munich, et. al, 2000) serves as the major source of background for our project and should be considered an integral part of the project outcome, complementary to this Final Report. The Synthesis Report surveys existing methodological approaches from a number of EU and pre-accession countries as well as available data resources in the Czech Republic; furthermore, it provides motivation for our choice of forecasting techniques (quantitative versus qualitative, etc.).

Our methodology is quantitative at heart and, given natural input-data limitations, applicable at an economy-wide basis.[1] It was developed in close co-operation with the Dutch Research Centre for Education and the Labour Market (ROA) and the Irish Economic and Social Research Institute (ESRI).[2]

The methodology aims to provide quantitative information on future prospects of individuals with different educational and professional backgrounds on the Czech labour market. Further, the resulting forecasts provide information on expected future developments in specific labour-market segments from the perspective of individual workers or firms. While the core of the method is quantitative and based on "hard" data, it also reflects qualitative and expert-based information.

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[1] The economy-wide applicability has to do with the size of the Labor Force Survey (see Part I).Extensive new data collection would be necessary to implement the methodology at regional level.

[2] ROA (Researchcentrum voor Onderwijs en Arbeidsmarkt) is a research institute attached to the faculty of Economics and Business Administration of Maastricht University, Netherlands. See http: //www. fdewb. unimaas. nl/roa/ for more information on ROA and http: //www. esri. ie/ for ESRI.

Our work builds on rich quantitative statistical information drawn primarily from the Labour Force Survey. We further rely on data and/or forecasts on macroeconomic sectoral employment, school graduates, and the demographic structure of population. Qualitative inputs are mostly limited to cases where quantitative information is not completely available or is not sufficiently reliable, and consist for example of expert feedback on occupational and educational clustering.

The core of our methodology consists of a **manpower-requirement and demand model** built on the experience and know-how of ROA. This methodology allows us to produce **5-year projections of labour-market indicators by education or occupational categories**, which are to be updated every two years. However, we also provide miscellaneous additional quantitative tools, based on our co-operation with ESRI; these additional statistics provide valuable information complementing that provided by our ROA-type model. Specifically, we implemented ESRI-type employment decompositions as well as the occupational and educational similarity indices (see the Synthesis Report, 2000, for details on these methods). Finally, we also propose a list of additional indicators that should be considered as supplementary information to be provided on a regular basis. In this report, we put most focus on the ROA-type model, but discuss the other methods as well.

The results of our project, we believe, provide an important pillar for the more complex task of regular forecasting of training needs in the Czech Republic. It is assumed that the method (which required extensive programming) will be implemented and operated on a continuing basis to provide regular updates of the forecasts. It is also expected that the methodology will be extended and modified over time as users gain experience, as the quality and structure of the input data improves, and as the environment and forecasting needs develop over time.

This summary Final Report is organised as follows: In the first part of the report we provide a general overview of the models we built and discuss the experience amassed when designing the models. Part I therefore mixes description of methodology with details of its implementation. In the second part we give a general description of illustrative results and suggestions for future work on extending the existing model. The presentation of the results is intended for informed users such as educational and labour market administrators. Developing a user-friendly interface is envisaged to make the results available to the general public.

Detailed descriptions of algorithms and input data, instructions on how to operate the model, as well as detailed selected illustrative results are provided in the Final-Report Appendices as well as on an CD-ROM, which includes the collection of all programs, data inputs, reports, and results.

■ PART I:
METHODOLOGY AND IMPLEMENTATION

1. ROA-CR Model

In this section we build on ROA's extensive experience with a manpower-requirement and demand model to develop its specific version for the Czech Republic. In what follows we refer to this model as ROA-CERGE-EI or simply ROA-CR model.

■ 1.1 Model Overview

While there is considerable complexity and sophistication in the implementation of the quantitative forecasting model we use, its fundamental structure is quite intuitive: Essentially, the model compares the forecast of demand for workers by education or occupation with the projected supply of workers by the same categorisation. There are two types of demand for workers considered: First, there is the so called **expansion demand** which has the usual interpretation of total employment by occupation or education demanded by firms on the labour market. The forecasts of expansion demand are based on predictions of a medium-term macroeconomic model (of industry-specific employment) and hence depend acutely on its quality. Second, the need to replace those workers who will leave the labour force (retire) in the forecast period is captured by the so-called **replacement demand**. This type of demand forecast is mainly based on the age structure of the present workforce and, except for the need to reflect individual or cohort-specific labour-supply decisions, consists of simple workforce accounting; hence, these second forecasts should be fairly robust and stable. Finally, the **supply forecasts** are based on the size of the existing labour force and further include the (short-term) unemployed and the (predicted) flow of school graduates. Comparing the demand and supply projections then allows us to calculate various indices of labour-market prospects of particular occupations or types of education.

Let us now review the model at a slightly more detailed level. The whole structure of the model is illustrated in the stylised flow diagram of Figure 1:[3]

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[3] See Appendix A for a version of Figure 1 translated into Czech: Figure A.1.

Figure 1: ROA-CR Model

Expansion demand by industry (2000–2004) – Vector of Employment (E) by 15 Industries (IND)

Expansion demand by occupation (2000–2004)
a) Vector of E by 10 occupations (OCC)
b) Vector of E by 50 OCC

Expansion demand by education (2000–2004)
– Vector of E by 59 education categories (EDU)

Replacement demand by occupation (2000–2004)
a) Vector of E by 10 OCC
b) Vector of E by 50 OCC

Replacement demand by education (2000–2004)

– Vector of E by 59 EDU

Job openings by occupation (2000–2004)
a) Vector of E by 10 OCC
b) Vector of E by 50 OCC

Job openings by education (2000–2004)

– Vector of E by 59 EDU

Labour market indicators by education, 2000–2004:

– Indicator of future labour market prospects (IFLM)
– Indicator of future recruitment prospects (IFRP)

Short-term unemployment by education (1999)

– Vector of unemployment (U) by 59 EDU

Inflow of school leavers by education (1999–2004)

– Vector of E by 59 EDU

First, the model relies on **macroeconomic forecasts** of expansion demand (that is target employment), ideally available for a reasonable number of industrial sectors, say one-digit NACE, that is 15 industries.[4] shares of each industry's employment) are then used to decompose these macro-based sectoral forecasts into **expansion demand** forecasts for each category of occupation and education. The classification of occupations and education types is an important part of this analysis and we will return to this issue below.

Second, **replacement demand** accounts for the need to replace workers leaving the labour force for retirement. The inclusion of replacement demand forecasts means that estimates can be made of the total number of job openings there are likely to be available in the target year, which is, of course, crucial for training purposes. Given the scale of retirements and withdrawals for other reasons from the labour force, replacement demand for many occupations and types of education can considerably exceed expansion demand. Hence, the total demand for particular types of education and vocational training can be greatly in excess of the demand indicated by expansion demand forecasts. In order to generate replacement-demand forecasts by occupation and educational qualification, considerably more data is required than for forecasts of expansion demand. In particular, it is necessary to generate information on age-specific labour market flows. Calculation of replacement demand completes the demand side of the forecasts.

On the supply side, starting from the bottom of Figure 1, models of the **inflow of school-leavers**[5] and of the **unemployed**[6] are used to project the number of individuals from each source with different types of education who are expected to come onto the labour market in the target year. Summing the expected inflows from each source provides an estimate of the total number of individuals by type of education who are expected to be seeking employment in the target year. This completes the supply side forecasts.

The demand and supply forecasts are then brought together to identify which types of education are likely to be in **excess supply or demand in the target year**. This quantitative assessment then enables the analyst to form also a qualitative view of labour market prospects by type of education in the target year: we calculate **indices of labour market prospects from the point of view of workers and firms**.

The empirical results based on the ROA-CR model are presented in Part II and those readers not interested in technical details are advised to go directly to Part II as the above intuitive model description should be sufficient to understand the results. For other readers, however, we detail the empirical implementation of the model below.

■ 1.2 Detailed Model Implementation

The (description of) model implementation is data dependent. Our primary data source is the Czech Labour Force Survey (LFS). We use data from the 1993–1999 period for calibration and fine-tuning; next, we produce forecasts for the period 2000–2004. Throughout the section we will refer the reader to appendix descriptions of data inputs.

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[4] As will become clear later, this is presently the major forecasting bottleneck in the Czech Republic.

[5] Here, the model relies on past and future flows of school leavers formed in collaboration with the Czech Institute for Information in Education (ÚIV).

[6] Following the EU practice, we use the simplifying assumption of using the present stock of short-term unemployed to predict target year supply. Omitting long-term unemployed corresponds to their weaker labour force attachment.

1.2.1 Expansion Demand

The expansion-demand forecasts are ideally based on a medium-term macroeconomic model predicting the total employment by (one-digit) industry. The underlying assumption is that industry-specific developments are the most important factors driving change in labour demand structure. However, as we explain in detail in the Synthesis Report no such model has been developed to date in the Czech Republic. We therefore base the demand input information on the best sectoral macro model available: the HERMIN model built by CERGE-EI and the Czech National Bank with assistance from ESRI.[7] The Czech version of the model has four sectors classified according to the NACE classification: Manufacturing, Market Services, Agriculture, and Non-market Services. The developments in the later two are, however, treated mainly as exogenous or driven by a simple time trend; the model treats employment, and unemployment in Manufacturing and Market Services as endogenous. The primary purpose of the model is not regular forecasting but simulation of experimental scenarios contingent on the future development of the exogenous variables in the model driven by domestic or external (EU) fiscal and trade interventions. The expansion-demand forecast is therefore the weakest part of our present-day implementation of the ROA-CR model. This is so for reasons that are outside the scope of our project: the HERMIN macroeconomic model is not sufficiently detailed at the industrial level to supply the sensitive demand information and it is not a standard forecasting model. We use its predictions to illustrate the implementation of our methodology. **It is crucial, however, to keep in mind that no results of our methodology will be fully valid in the sense of practical usefulness until an appropriate macro sectoral model is developed to provide our model with the demand inputs.** Keeping this problems in mind, let us proceed to explain the detailed construction of expansion demand which is performed at three levels: industrial, occupational and educational. So, the whole model consists of three components: sectoral, occupational, and educational.

Expansion Demand, Step 1: Industries
In the sectoral model (Figure 2) we disaggregate the HERMIN macroeconomic projections for four sectors (agriculture, government public services, traded manufacturing goods and non-traded market services sectors) into employment projections for 15 industries. We use past (linear) trends in shares of our 15 industries on each of the 4 HERMIN-model sectors to project the industry shares in the future. Multiplying the projected share with the forecasted HERMIN employment gives the desired time series for 15-industry employment.

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[7] HERMIN-type models have been designed and used to analyse the convergence and structural changes during integration of EU-periphery countries (Greece, Ireland, Spain, Portugal). The model relies on the assumption that the economy being modelled is past a critical threshold of reform steps. This allows for a use of standard macroeconomic approaches and economic theories. See Kejak and Vávra (1999) for more details on the model.

Figure 2: Expansion Demand by Industry
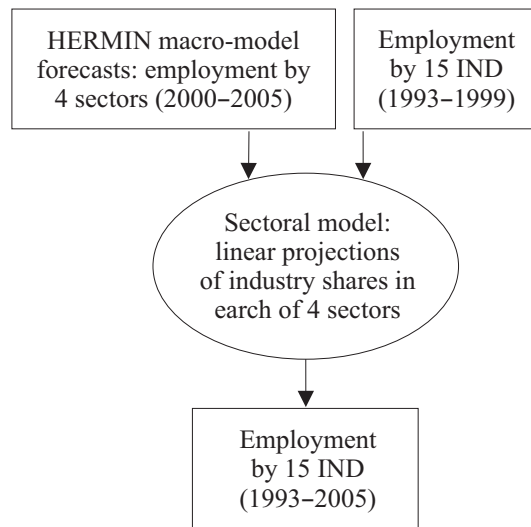
See the appendix Table A.1 for the classification of industries. Note that if we had a sufficiently detailed sectoral macroeconomic model, step 1 in the projection of expansion demand could c be skipped. Let us also note that in Part II we will work with alternative macro scenarios based on the HERMIN predictions.

Expansion Demand, Step 2: Occupations

We follow a similar strategy to decompose the employment forecasts for 15 major industries into occupational forecasts (see Figure A.2 in the Appendix A). Specifically, we use Industry times Occupation (IND x OCC) employment matrices based on the 1993–1999 LFS data sets as inputs for constructing matrices of occupational **shares** by industry and project these by means of linear extrapolation (linear OLS) for the years 2000–2005.[8] Simple multiplication of employment forecasts from a sectoral model (from Step 1) and projected occupational shares gives the predicted IND x OCC employment matrices, which are then converted into vectors of employment by occupation.

Depending on the level of occupational aggregation we use 10 large occupational groups or 50 occupational clusters. Table 1 shows the 50 occupational clusters we use. These are derived from the three-digit level groups in appendix Table A.2, which also provides information on the 10 major occupational groups as well. Further, see Appendix A, Section A.1 for a detailed discussion of the clustering methodology used in defining the occupational categorisation. In short, we determine the optimal clustering structure using a method that reflects the effect of the size of the smallest cluster (in terms of employment) on the statistical reliability of the predictions. We feel that our expert input comes in the form of handling statistical inference as opposed to field knowledge about occupational clustering. We believe that our method should be used as a starting point for extensive expert-based modifications. Section A.1 of Appendix A further elaborates on the comparison of expert-based and statistical clustering.

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[8] There are various possible extrapolation methods. We chose linear extrapolation since this method is the best to fit for short- to medium-term forecasts according to the experience of ESRI (see Corcoran et al., 1993), which has been confirmed in our preliminary analysis with the Czech data.

Table 1 Clustering of Occupations (50 clusters from 119 three-digit groups)

Cluster	Cluster Title
1	Armed forces
2	Production managers, finance and sales associate professionals
3	Other managers, computer professionals, inspectors, etc.
4	Small firm managers
5	Architects, engineers and related professionals
6	Health professionals (except nursing)
7	Secondary education teaching professionals
8	Legal professionals
9	Physical and engineering science technicians
10	Life science technicians and related associate professionals
11	Modern health associate professionals and nurses
12	Administrative associate professionals
13	Secretaries and keyboard-operating clerks
14	Numerical clerks
15	Material-recording and transport clerks
16	Cashiers, tellers and related clerks
17	Housekeeping and restaurant services workers
18	Other personal service workers
19	Protective services workers
20	Shop salespersons and demonstrators
21	Forestry and agriculture workers, operators in production of plastic, paper, food, railroad laborers
22	Market-oriented animal producers and related workers
23	Building frame and related trades workers
24	Building finishers and related trades workers
25	Painters, building structure cleaners and related trade workers
26	Metal moulders, welders, and related traders workers
27	Blacksmiths, toolmakers and related trades workers
28	Machinery mechanics and fitters
29	Electrical and electronic equipment mechanics and fitters
30	Food processing and related trades workers
31	Wood treaters, cabinet-makers and related trades workers
32	Textile, garment and related trades workers
33	Metal-processing and mineral plant operators
34	Textile, fur and leather products machine operators
35	Assemblers, porters, mining and construction and transport labourers
36	Locomotive engine-drivers, motor vehicle drivers
37	Agricultural and other mobile plant operators
38	Domestic and related helpers, cleaners and launderers
39	Manufacturing labourers
40	Business professionals
41	Social sciences and related professionals
42	Business services agents and trade brokers, office clerks
43	Customs and tax government associate professionals, library and mail clerks
44	Legislators, senior government officials, directors and CEOs, municipality managers
45	Physicists, chemists, mathematicians, life science professionals
46	Various associate professionals, personal care workers
47	Various craft workers
48	Power production, railroad construction and glass production workers
49	College and higher education teaching professionals, writers
50	Primary and pre-primary education teaching associate professionals

Expansion Demand, Step 3: Education Types

The education dimension is projected in similar fashion (see appendix Figure A.3): Using Industry *x* Education (IND *x* EDU) employment matrices for 1994–1999 we define matrices, which contain educational shares and project these shares by a linear regression for the years 2000–2004. Multiplying the employment forecasts by industry and projected educational shares we obtain IND *x* EDU employment matrices for 2000–2004. Summing by type of education gives employment by education.

Throughout the project, we use 59 different categories of education, which are listed in Table 2 below. Again, see Appendix A, Section A.1 for a detailed discussion on classification of types of education. In brief, we had to construct a classification of education types that would work with all data inputs and outputs. Since the LFS is the major source of statistical information, we largely stick to its educational structure, which allows for 59 educational categories.[9]

Table 2 Extended Educational Classification

Project code	Education	Apprenticeship	Field	Specialization
1	Without school education	–	–	No
2	Primary (9 years)	–	–	No
3	Grammar school with GCE	–	–	No
4		1	–	Machine control and operation
5		2	–	Mechanical engineering, metallurgy
6		3	–	Electrical engineering, transport, communication
7	Apprenticeship	4	–	Chemistry, food industry
8		5	–	Textile, clothing industry
9		6	–	Wood processing, shoe industry
10		7	–	Construction
11		8	–	Agriculture and forestry
12		9	–	Trade, services
13		10	–	Other

[9] This is substantially less than the approximately 800 educational codes and 137 educational clusters used in the Netherlands. Since the number of educational types in the Czech Republic is low, there is no need to compress them into fewer clusters. Note also that in order to incorporate inputs on school graduates into the analysis, we have to transform the data on school graduates to fit with the LFS educational structure. See Section 1.2.4 for the development of the Schooling Structure Bridge between educational structures used by Ministry of Education and ÚIV and those used by the Czech Statistical Office in the LFS.

Table 2 Continued

Project code	Education	Apprenticeship	Field	Specialization
14		–	1	Natural sciences
15		–	2	Mechanical engineering
16		–	3	Electrical engineering
17		–	4	Construction
18		–	5	Other technical subjects
19	Secondary vocational	–	6	Agriculture, forestry
20		–	7	Health
21		–	8	Economics, trade, services
22		–	9	Law
23		–	10	Teacher-training
24		–	11	Other social subjects
25		–	12	Other sciences and disciplines
26		1	–	Machine control and operation
27		2	–	Mechanical engineering, metallurgy
28		3	–	Electrical engineering, transport, communication
29		4	–	Chemistry, food industry
30		5	–	Textile, clothing industry
31	Apprenticeship with GCE	6	–	Wood processing, shoe industry
32		7	–	Construction
33		8	–	Agriculture and forestry
34		9	–	Trade, services
35		10	–	Other
36		–	1	Natural sciences
37		–	2	Mechanical engineering
38		–	3	Electrical engineering
39		–	4	Construction
40		–	5	Other technical subjects
41	Secondary vocational with GCE	–	6	Agriculture, forestry
42		–	7	Health
43		–	8	Economics, trade, services
44		–	9	Law
45		–	10	Teacher-training
46		–	11	Other social subjects
47		–	12	Other sciences and disciplines
48		–	1	Natural sciences
49		–	2	Mechanical engineering
50		–	3	Electrical engineering
51		–	4	Construction
52		–	5	Other technical subjects
53	Higher education	–	6	Agriculture, forestry
54		–	7	Health
55		–	8	Economics, trade, services
56		–	9	Law
57		–	10	Teacher-training
58		–	11	Other social subjects
59		–	12	Other sciences and disciplines

1.2.2 Replacement Demand

Replacement demand, capturing the part of demand related to replacing mostly retiring workers, is computed for each type of education and for each occupation. To streamline the presentation of the method, consider only the occupational dimension. To predict replacement demand, we use demographic data together with the current age composition of the workforce. Essentially, we first divide each occupation into cohorts and calculate the past employment growth for each group of workers. Next, these employment growth rates are used to predict future employment changes: First, we adjust the past growth rates to past business-cycle effects and to forecasts of the labour-force participation rate (the latter comes, in part, from the demographic predictions). Second, we multiply the future cohort-occupation-specific growth rate by current cohort-occupation size. Finally, we aggregate the predicted cohort-specific employment back into occupation-specific future employment. The structure of the replacement demand model is presented in Figure 3.

We implement two different methods: (i) the Fixed Coefficient projection (F-C), which essentially replicates the simple description given above, and (ii) the Random Coefficient Model (RCM), which is a regression-based technique. Detailed algebraic expressions used in the calculations can be found in the Appendix Section A.2.

Figure 3: Replacement Demand Model
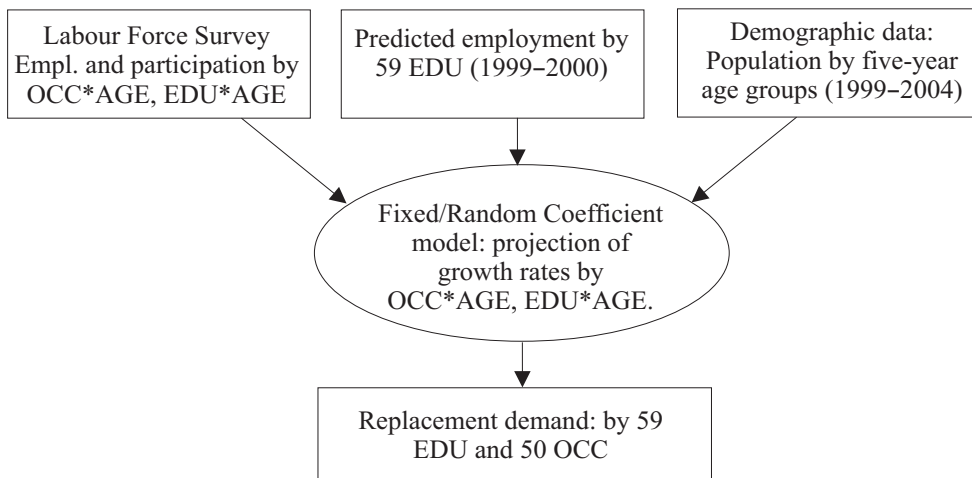
Below, we will explain the model in more detail. But first, we need to establish the elements of the model: For computational purposes, working population is divided into five-year age intervals. We are following the same cohort of people over time. The cohorts in 1999 are: 25–29, 30–34, 35–39, 40–44, 45–49, 50–54, 55–59, 60–64, 65–69 years old. Several assumptions are made: First, we do not consider first two age cohorts (15–19 and 20–24). We assume that there is no replacement demand due to the outflow from these age cohorts. Second, in case of zero cells in the employment matrices, due to data imperfection, we assume the employment growth for these cells is zeros.[10]

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[10] Note that this does not affect the results of the random coefficient model, because these observations are given zero weight when weighted by the square root of the employment level, which equals zero.

To predict replacement demand we first estimate the future growth rates of employment of each OCC/EDU group within each cohort. We use two different types of models to do this. First, we use the so-called Fixed Coefficient Model (see Section A.2.1). We predict that the growth rate of employment of a given category will be the same during the next five years as it was in the last five years, after correcting the observed past growth rate for business cycle effects and for future changes in the participation rate. Predicting changes in participation rates requires that forecasts based on past growth rates of labour-force participation (calculated off the LFS data) be corrected by the demographic forecasts of population growth.

Second, we use annual employment growth rates over 1994–1999 as data to estimate the Random coefficient model (RCM), described in detail in Section A.2.2. The RCM is a Bayesian extension of a simple regression model allowing the group-specific parameter estimate to be updated based on the economy-wide parameter. The basic idea of RCM is that we should look at the average[11] coefficient of other groups when the group-specific coefficient in question is imprecisely estimated. Again, we use the estimated coefficients and the forecasts of participation to predict future employment for each occupational or educational category.

One last qualification is that we predict replacement demand using the RCM model, which uses data from the 1990s when employment was shrinking. Yet, as we note in Part II, macroeconomic forecasts do not expect further decreases in employment. Hence, we must appropriately adjust the RCM predictions to reflect our knowledge of total employment by type of education. To do so, we used the total level of employment from our expansion demand forecasts for the years 1999–2004. Using this method the replacement demand depends on the future macroeconomic situation.

1.2.3 Job Openings by Occupation and Education

Job openings are constructed as a sum of expansion and replacement demand. If expansion demand is negative, the corresponding figures are replaced with zeros.[12]

1.2.4 Inflow of School Graduates and Unemployed by Type of Education

Next, we turn to the supply side of the economy. Only data on education-specific supply are available so from here on (in the rest of the model tree) we will focus on education only.

In order to calculate the inflow of school graduates into the labour market we use data on school graduates from the Ministry of Education of the Czech Republic constructed in collaboration with the Institute on Information in Education (ÚIV). The data cover the period 1994–1999 and include a forecast of school graduates **by school types** till the year 2004.

One problem with using this data, however, is that the coding of education types does not correspond to that imposed by the structure of the LFS (see Table 2). Therefore, the data on school graduates are transformed into the LFS-type education classification using a coding ÚIV-LFS bridge kindly provided by Jiří Vojtěch of VÚOŠ. (See Tables A.11 to A14, in Czech, for this link across two education codebooks.)

A second complication with using the school-graduates data arises because many school graduates (especially from upper-secondary level) do not directly enter the labour market: A significant fraction of secondary-school graduates enrol in higher education programs and

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[11] The average is weighted to reflect the precision of each group-specific parameter.

[12] We do not add the negative part of expansion demand because that has already been included in replacement demand.

some stay out of labour market for other reasons. We therefore need to correct the available forecasts of graduates for the expected flows into higher education (see Figure A.6 for a flow chart of the Czech schooling system). In order to find the share of graduates who continue studying at universities we use an extensive administrative data set on applicants to universities allowing us to distinguish different types of applicants' education.[13] Detailed description of the procedure is provided in the Appendix A, Section A.3.

1.2.5 Short-term Unemployed

The counts of short-term unemployed (those unemployed for less than one year) by educational category are based on the Labour Force Survey data from 1999. As discussed above, we adopt the ROA simplifying assumption of no change in the total number of short-term unemployed. The focus on those with less than one year of unemployment is justified by lower labour-force attachment of long-term unemployment.

1.2.6 Labour Market Indicators by Type of Education

Combining our predictions of job openings (demand) with the projected labour-force inflow of school graduates and the number of short-term unemployed (supply) allows us to provide two types of output: One is the simple summation of demand and supply by education, which answers the quantitative question about excess supply or demand. The other consists of two key labour market indicators, which are important from the point of view of individual firms or workers. The two indicators are:

■ Indicator of future labour market prospects (IFLM); and
■ Indicator of future recruitment prospects (IFRP).

Both of these indicators are cumulative for the period 2000–2004.

The IFLM indicator shows the labour market situation from the point of view of supply side-individuals looking for a job. The IFLM indicator is constructed as the ratio of labour supply over labour demand:

$$IFLM_e = \frac{E_{e99} + INS_{e99-04} + U_{e99}}{E_{e99} + \max(0, ED_{e99-04}) + RD_{e99-04}}.$$

Labour supply consists of current employment (E), inflow of school-leavers (INS), and short-term unemployed (U). Labour demand consists of employment (E), positive values of expansion demand (ED), and replacement demand (RD). The reason workers should be interested in this indicator more than in the difference between supply and demand is that the IFLM more closely corresponds to the probability of finding a job for persons with the given education level.[14]

The IFRP indicator, on the other hand, shows the labour market situation from the point of view of the demand side. It shows the possibility for a firm to recruit workers with a given education. The IFRP indicator is constructed as

$$IFRP_e = \frac{E_{e99} + INS_{e99-04} + U_{e99}}{E_{e99} + ED_{e99-04} + RD_{e99-04}}.$$

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[13] We used the latest available data for the year 1997.
[14] To give an example: excess supply of 10,000 may not be as damaging in a large education group of, say, 100,000 workers, as excess supply of 1,000 in a group of 5,000.

Here, both negative and positive values of expansion demand are taken into account. In case of negative expansion demand, firms need to reduce number of workers. It is possible, however, to achieve this reduction by restricting (replacement) inflow, so that fewer people have to be dismissed.

Initially these indicators are meant to be used by the labour-market administrators. After a trial period they can be presented to the general public (schools, students). However, they should be presented in a simplified form where the continuous indicator, ranging from 0 to 2, is replaced by 3 to 5 categorical statements about the occupation's or education's labour-market prospects, for example: very good, good, neutral, bad, very bad.

One could extend the output to cover indicators of the business-cycle sensitivity of the demand for particular occupations or education types. However, given the short history of the Czech economic transition (with only one recession observed so far) we argue that this issue is of importance for implementation only in the future.

2. ESRI Methodology

2.1 ESRI-type Forecasts

The ESRI-type forecasts are essentially a simplified version of the ROA-type projections. These forecasts are produced in two stages which are brought together at the end of the procedure. In the first stage a macroeconomic model's employment forecast for a small number of sectors is disaggregated into 15 sub-sectors by projecting the trend of each sub-sector's share of employment within each sector. In the second stage the trend in the share of each occupation in each sub-sector is examined and projected to the target year using linear, logarithmic, or semi-logarithmic equations. One then selects from among alternative projection methods using (i) experience and judgement to select the projection which appears most reasonable in the light of what is expected about labour market developments during the projection period, or (ii) a statistical measure of the forecasts' accuracy based on comparing past forecasts to current actual data realisations (see the Appendix Section A.5 for the underlying methodology). In this second stage, therefore, each cell of the matrix of employment by occupational and industrial sub-groups (IND x OCC) is projected to the target year.

We perform the ESRI-type forecasts applying two specific methodologies described in Corcoran (1993): Single cell and Matrix occupational projections (see the Appendix Section A.4). The ESRI projection methods represent a less sophisticated approach compared to the ROA model,[15] ignoring, importantly possible changes in the replacement aspect of demand coming from spikes in the age distribution of certain occupation or education groups. This relative simplicity is however an advantage in that it imposes a much lower computational burden and fewer input data requirements.

2.2 Shift-Share Analysis

The purpose of the ESRI shift-share methodology is to provide insightful information on the changing pattern of occupational and sectoral employment and to identify possible variations in skill requirements across broad occupational areas of the economy.

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[15] Only data from LFS are required to produce employment forecasts of industry x occupation matrices.

Shift-share analysis enhances our understanding of employment trends in terms of the Industry x Occupation (IND x OCC) structure by **decomposing past employment trends** into various components.[16] In particular, shift-share analysis attributes employment changes to a **scale effect**, arising from general economic growth or decline, an **industry effect**, due to shifts in employment between industries, an **occupation effect**, arising from changes in occupational structure within industries, and an **interactive effect** among these three factors. The scale effect is the change which takes place if employment in each industry simply expands (or contracts) in line with aggregate employment and reflects macroeconomic developments. The industry effect reflects changes in expansion or contraction of employment in each industry; it is influenced by technological change, product development, and changes in relative prices. The occupational effect results from organisational changes in the use of workers by occupation and from job restructuring; this effect results primarily from technological change. The interactive effect is the residual change which is not accounted for by any of the three preceding factors (see Silvestri, 1993, p. 81).

The quantification of these effects allows us to interpret predicted changes in employment structure in terms of the underlying trends that are driving the change in the level of employment in different occupations.[17] A detailed description of the effects and the algebra involved in the method are provided in Section A.4 of Appendix A.

The set of auxiliary indicators based on the shift-share analysis supplements the basic ROA-CERGE-EI model outputs.

3. Auxiliary Indicators

On top of the methods presented above, we also consider an array of auxiliary indicators on the skill dimension of the Czech labour market. The algebraic expressions for these are provided, when necessary, in the Appendix Section A.6.

▪ 3.1 Gini-Hirshman Index and Similarity Index

The **Gini-Hirshman index** provides information on whether a given type of education is specific to few or many occupations. The index therefore provides some information on how flexible a given education is. For example, if the ROA-CERGE-EI model is forecasting an optimistic future prospect in a given educational segment, it should be understood as an aggregate forecast. If, for example, this type of education is tied mostly with one occupation, and if there is variation in demand for this occupation across regions and spatial mobility of labour is low, then individuals in some regions can still face problems.

Similarity indices are indicators that characterise the occupational domain of types of education; the index compares pairs of education groups with respect to their occupational structure. For a detailed description of these indicators see Heijke et al. (1998) and Section A.6 of the Appendix.

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[16] Shift share analysis is used extensively by Corcoran et al. (1992). The methodology has been successfully employed in Ireland for over a decade.

[17] Note that both the ROA and ESRI methodology start with the industrial composition of employment. This is so because historically changes in the industrial structure of employment have a more widespread influence on occupational/educational employment than changes in the organisation of work, as, e. g., Corcoran, Hughes, and Sexton (1993, p. 36) point out.

■ 3.2 Age Structure of Employment

Age cohorts are not equally distributed across occupational, educational and industrial groups. Since retirement is the most important factor influencing replacement demand, there is substantial variation in forecasted replacement demand across groups. The age profile of most recent employment within individual groups, which is a by-product of the ROA methodology, can provide valuable easy-to-interpret information.

■ 3.3 Miscellaneous Other Indicators

When presenting quantitative results of the ROA-CERGE-EI model to final users, the indicators we present below in Part II should be accompanied by other indicators provided in collaboration with other institutions like ÚIV/MŠMT, MPSV, ČSÚ. As an example, the following indicators should be considered: unemployment rate, youth unemployment rate, long term unemployment, wage, and wage growth. If possible, these indicators should be provided in industry/occupation/education structures identical or similar to those used in the ROA-CERGE-EI quantitative model.

■ PART II: RESULTS

1. Input Data

■ 1.1 Individual Data

Our employment analysis is performed mainly using the LFS data. We weight the data by weights provided by the Czech Statistical Office (CSO) so that the results are representative of the Czech workforce as a whole. In case of multiple job holding we consider the primary job characteristics only.

There were two major changes in employment structure in our data-input period of 1994–1998. First, there was a large decline in the Agriculture/Forestry/Hunting industry during 1994–1998 which effected almost all occupational clusters. This decline has continued during 1998 and 1999 but it has been surpassed by the decline in the Mining and Quarrying and the Electricity/Gas/Water distribution industries. Second, employment in the Services/Hotels/Trade industry expanded significantly during 1994–1998, although it declined slightly afterwards, due to the recent recession. See Section 3.2 for Tables with further details on this.

The past employment trends should be viewed from the perspective of an extensive structural transition from a planned system to a market economy. This is why our analysis only uses data starting in 1994. In future work, it would be desirable to move further away from using early transition data as these are unlikely to be informative about future labour-market developments. Another important economic event was the recession of 1997. Appendix B, section B.1 provides a brief discussion of this recession and other recent economic developments important for interpreting the observed employment patterns, including the future ageing of the population which underscores the importance of replacement demand. Tables B.1 to B.3 illustrate the input data on employment by age group, unemployment, and the input demographic information.[18]

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[18] We use data on past and future educational structure of the whole population provided by the CSO. The data allow us to compute population by five-year age groups for the years 1993–2005.

1.2 Macroeconomic Data[19]

The ROA-CR model relies heavily on macroeconomic forecasts of sectoral employment. However, no institution in the Czech Republic is operating a macroeconomic model producing sectoral employment forecasts. The only sectoral model available is the HERMIN model developed by a team of researchers at CERGE-EI. This is however not a forecasting model but instead serves as a tool for evaluating alternative macroeconomic scenarios. Therefore, it is important to stress that all of our results based on the ROA-CR model (with the exception of replacement demand) are meant to serve as examples of outputs, illustrations, but should be taken very carefully – they are not based on a standard forecast of sectoral demand.

We believe, that until a true sectoral model is developed, the best operational practice is to combine the HERMIN projections with simple observations about past employment trends in the Czech Republic and in the EU to come up with projections for the 4 main sectors of the HERMIN model. One can then use past trends in the (15) one-digit NACE industry shares on the four broad sectors of the HERMIN model to decompose forecasts of employment in these 4 sectors into 15 industry employment time series (see Section 1.2.1 of Part I). We build the macroeconomic input of the ROA-CR model around the 4 sectors of the HERMIN model because we want to allow future users to exploit the HERMIN model's ability to coherently evaluate the impact of different economic policies-the ROA-CR model then extends the evaluation to the skill dimension.

The 4-sector forecasts we used in our implementation of the ROA-CR model came either from the HERMIN model or from scenarios we constructed based on past employment trends (i) in the Czech Republic during 1993–1999, and (ii) in the EU during the last two decades. In our scenarios, we assume that employment in the Agriculture and Public Service sector will be stable during the forecast period of 2000 to 2004. For the other two sectors we consider a neutral and an optimistic scenario: The neutral scenario freezes the 1999 employment levels. The optimistic scenario assumes that employment trends will be similar to those observed during the Czech economic expansion period of 1993–1995. The optimistic scenario assumes stronger employment trends compared to average trends of the EU during the last two decades. As mentioned above, we also used employment scenarios provided by the HERMIN model.[20] For the most part, however, our presentation of the ROA-CR results in Section 2 below is based on the neutral scenario. We consider this scenario to be most likely and we also conserve space in this report by presenting only one set of full results together with the sensitivity of the final results with respect to the underlying scenario.

Please see Appendix B, Table B.4 and Figures B.1 to B.3 for the source data and graphs of the HERMIN-model forecast as well as for our alternative scenarios. Figures B.4 to B.10 present selected EU employment trends we used in our deliberations.

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[19] Most of the information we present here is based on consultations with external experts and a special workshop focusing on Macroeconomic inputs, held at CERGE-EI. See points 1–3 of Section B.2.

[20] The third scenario is based on forecasts produced by CERGE-EI version of HERMIN model: "The forecasts give an optimistic view on the prospects of the Czech economy. The optimism is based on a balanced and sustainable wage bargaining process and a favourable development of labour productivity. These assumptions are reflected in a low inflationary pressure throughout the whole forecasting period. The principle risks surrounding these findings are quantification of pass-through of external inflation, and proposed institutional changes in the social security system affecting the labour market. Further uncertainty surrounds the evolution of budgetary policy." (Vávra and Cincibuch, 1999). We would like to thank David Vávra and Michal Kejak for their kind provision of the forecasts.

2. ROA-CR Results

We use data from the 1994–1999 period to calibrate and fine-tune the ROA-CR model; next, we produce **an example of a forecast for the period of 2000–2004**. See Part I for the model methodology. Appendix Table B.5 lists the set of most numerical results presented in this section. The benchmark results are based on our neutral employment scenario (see Section 1.2 of Part II) and rely on the Fixed-Coefficient Replacement Demand methodology (see Section 1.2.2 of Part I).

■ 2.1 Educational Forecasts

In this subsection we present forecasts by education type. Each education type has an identifying code, which corresponds to the coding of Table 2 of Part I.

2.1.1 Expansion Demand

Figure 4: Expansion Demand by Type of Education, 2000–2004
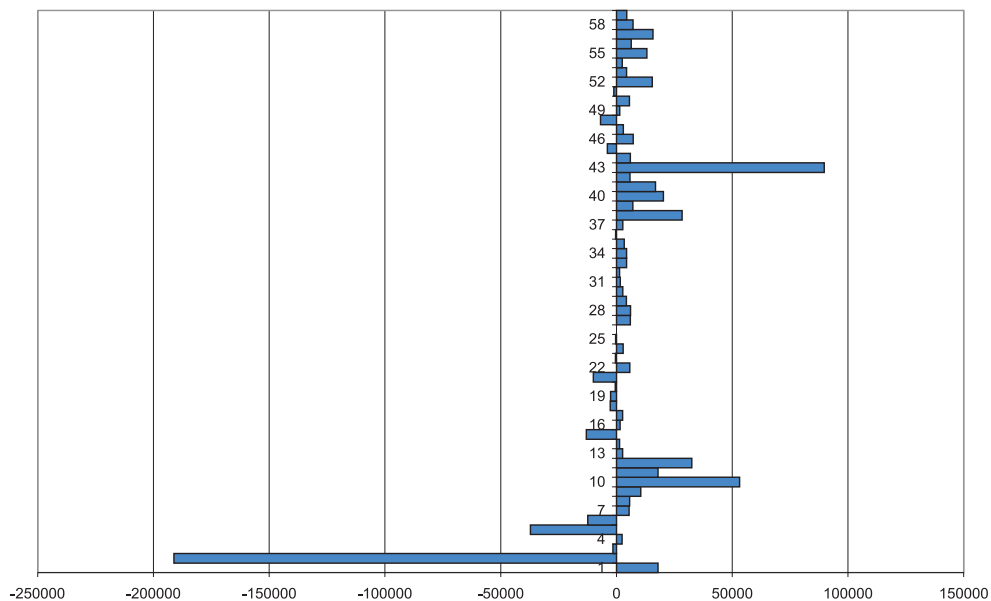
Figure 4 presents the projected expansion demand based on the neutral employment scenario. Keep in mind that expansion demand is the part of the ROA-CR model that is least reliable (see Section 1.2 above). We see a large decrease in employment of primary-educated workers [2] between the base year of 1999 and the target year of 2004, while the future employment of, e. g., apprentices in construction [10] or secondary-school workers with economics background [43] is rising.

Note that this does not necessarily mean that workers with education [10] or [43] will find it easy to find an employer. First, it may be that the positive expansion demand is but a tiny fraction of employment in this educational category.[21] Second, we need to look at supply too. Before we do so, however, we also consider the demand generated by the need to replace retiring workers.

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[21] Recall that the educational clustering is largely dictated by the structure of the LFS data; hence, the variance in employment of each group is substantial.

2.1.2 Replacement Demand

In the empirical work presented below, we illustrate the use of our model with a simplified version of the Fixed Coefficient model, where the future employment rates are not corrected for business-cycle and participation-rate effects.[22] This is a simplified version of the model, but should still allow for a useful approximation of replacement demand.[23]

Figure 5: Replacement Demand by Type of Education, 2000–2004
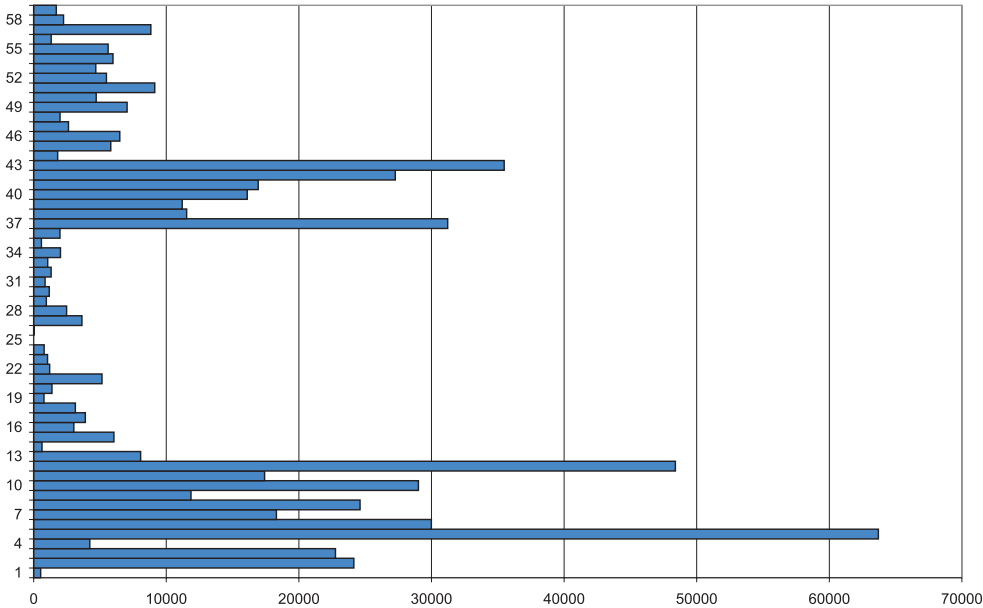
The results in Figure 5 (the figure refers to cumulative values for the period 2000–2004 and is expressed in the number of jobs) suggest that the highest replacement demand during 2000–2004 will be for those workers with apprenticeship education in mechanical engineering [5], electrical engineering [6], construction [10], and trade and services [12]. Replacement demand will also apparently be high for workers with secondary vocational education in the field of mechanical engineering [37], health [42], and economics [43]. The replacement demand for workers with elementary education would be extremely high if it were not for the

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[22] In our application, we face a problem in applying the Random Coefficient Model (RCM) and the Fixed-Coefficient (F-C) model (see Section 1.2.2 above and Section A.2 in the Appendix) that has to do with predictions of labour-force participation rates. These have to be based on the participation rates from the mid 1990s, which turn out not to be good forecasts. In the programs available on the CD-ROM, we have implemented both the F-C and the RCM model using the simplifying assumption of an equal growth of labour force participation and that of the population for each separate cohort. This is clearly an unrealistic assumption, especially for the older age cohorts, but it allowed us to program these most sophisticated procedures and make them operational. In future work on accurate predictions, which could be used in practice, more, recent data should be used to predict the participation rates (which then need to be updated by population forecasts we used) and to bring the RCM and F–C model to life. There are, therefore, two hurdles to be passed in bringing the whole ROA-CR model to practical use: using a sectoral macroeconomic model to forecast industry-specific expansion employment and using data from later stages of transition to forecast labour-force participation rates.

[23] We have also compared this simple version of the F–C model with the outflow from the labour force observed over the previous five years (see Section A.2.3). The comparison is presented in the Appendix Figure B.11.

large negative expansion demand for these workers, which lowers the need to replace strong retiring cohorts of workers with only primary education.

2.1.3 Job Openings

Next, we combine the expansion and replacement demand projections to estimate the number of job openings by type of education during 2000 to 2004. Figure 6 illustrates the job openings by education. (As usual, the figure refers to cumulative values for the period 2000–2004 and is expressed in the number of jobs).

Figure 6: Job Openings by Education, 2000–2004
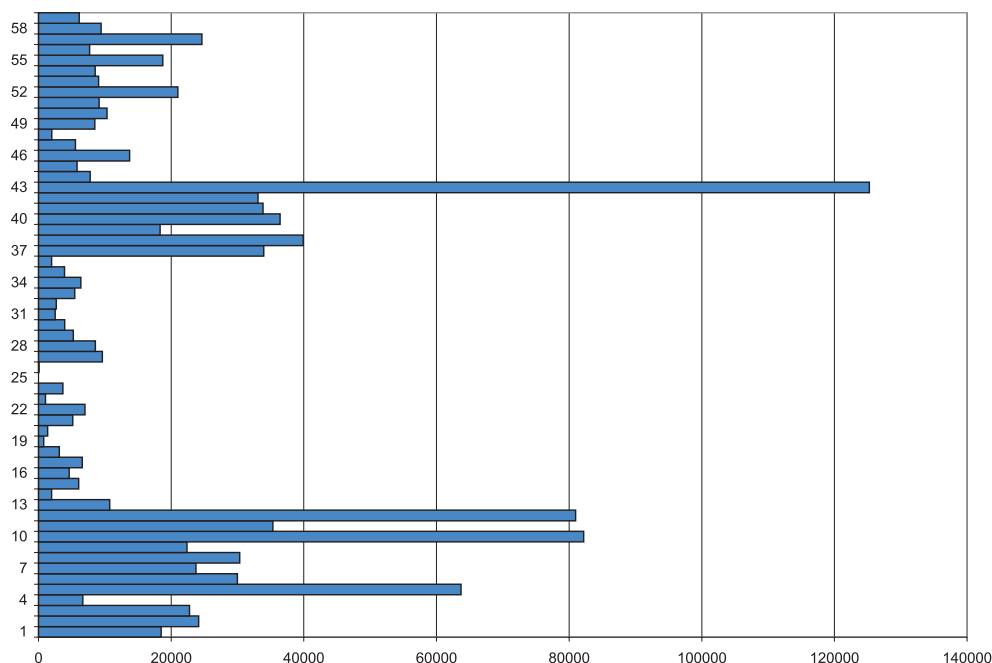
There is an extremely high predicted number of job openings for workers with secondary vocational education in the field of economics, trade, and services [43], followed by the usual suspects: mechanical engineering [5], construction [10], and trade, services [12]. While most of these job openings are due to a combination of high replacement demand and positive expansion demand, job openings for apprentices in mechanical engineering [5] is solely due to the need to replace retiring workers.

2.1.4 School-Graduates and Unemployed

While a large number of job openings is certainly a good sign for workers in a given education category, we do not have a complete picture of the labour-market situation until we confront demand with supply. Building labour supply flows involves predicting the number of short-term unemployed as well as the number of school graduates who will enter the labour force during the forecasting period.

Short-term Unemployed

Figure 7 presents the counts of short-term unemployed (those with less than one year of unemployment) by educational category for 1999 based on the Czech LFS. Our usual suspects, the large groups [5], [10], [12], [43], also account for much unemployment.

Figure 7: Short-term Unemployed, 2000–2004
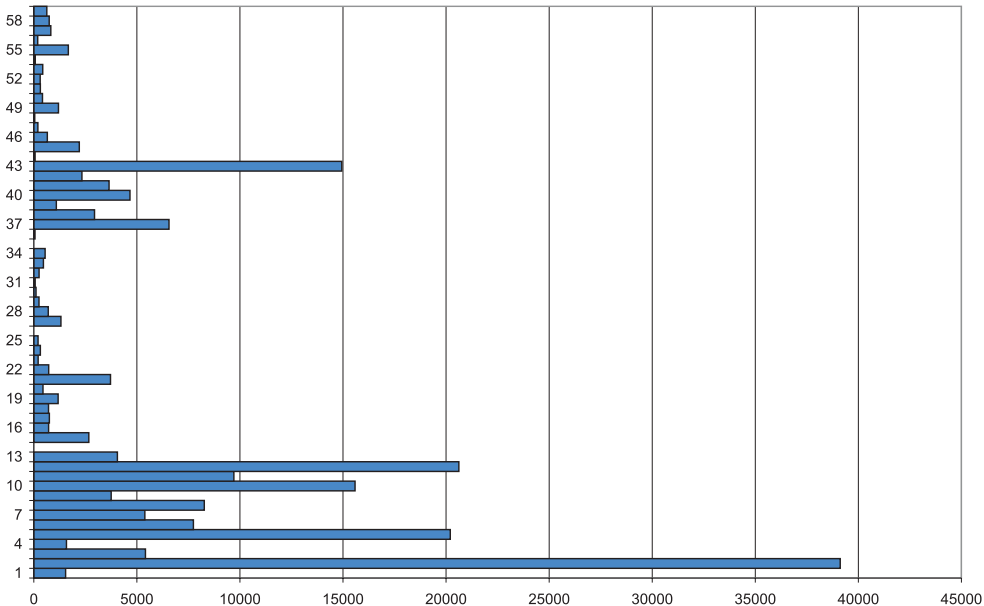
This is due to the large number of people with these educational qualifications-together with the elementary-education category [2] they comprised almost 2 millions workers in 1998, over 40 % of total (LFS) employment (see Table A.3).

Inflow of School Graduates

Figure 8 gives the predicted inflow of school graduates to the labour market over the 2000–2004 period.[24] Apparently, the high number of job openings for education types trade and services [12] and economics, trade and services (secondary vocational with GCE) [43] is reflected in high supply of graduates. Further, there is a significant inflow of Grammar-school (Gymnasia) graduates [3] and college graduates in economics, trade, and services [55] entering the labour force.

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[24] The predictions reflect recent enrollment patterns and flows of students into higher education.

Figure 8: Labour Market Inflow of School Graduates, 2000–2004
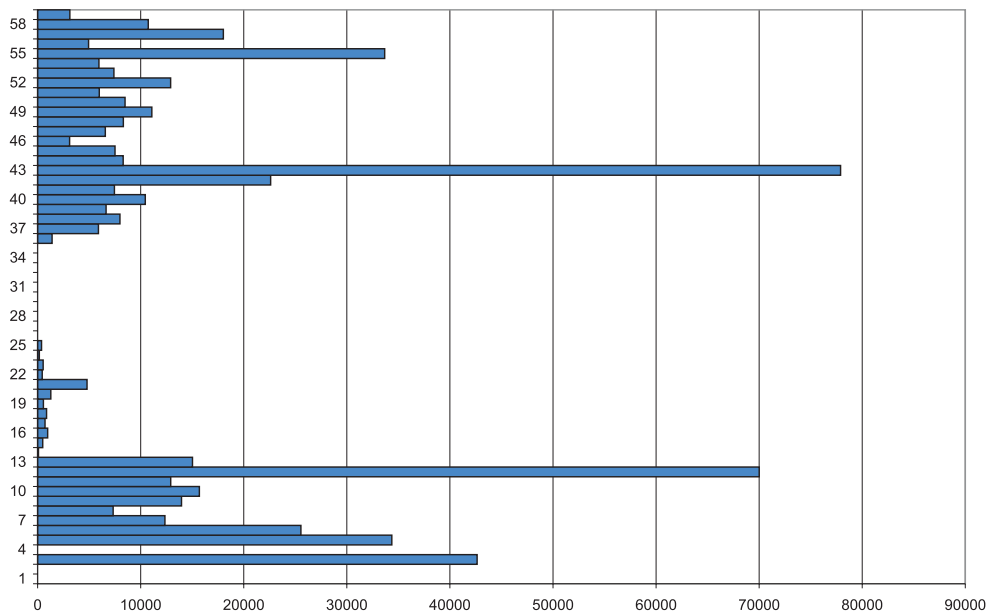
2.1.5 Labour-Market Indicators

Finally, we can combine all the ingredients and present an example of empirical results of the ROA-CR model. We combine the predictions on job openings (demand) with the projected supply to provide two types of output: One is the simple summation of demand and supply by education, which answers the quantitative question about excess supply or demand (Figure 9). The other consists of two key labour market indicators, which are important from the point of view of individual firms or workers (Figures 10 and 11).

Let us first focus on Figure 9, which suggests that many types of education will be in shortage on the Czech labour market (positive bars), while only few will be in excess supply (negative values). Before interpreting the results, it is important to note that, so far, the ROA-CR model does not incorporate the possibility of substitution across occupations. This is an important agenda for future work. For example: while economics, trade and services (secondary vocational) education [43] is in excess demand, the same type of higher education [55] appears to be in excess supply, suggesting the possibility of college graduates with this education filling the newly created jobs and possibly accepting lower wage offers. Alternatively, apprentices in trade and services [12] may substitute for the shortage of economists, trade and services [43] workers at secondary level.

Figure 9: Shortage by Education Type, 2000–2004
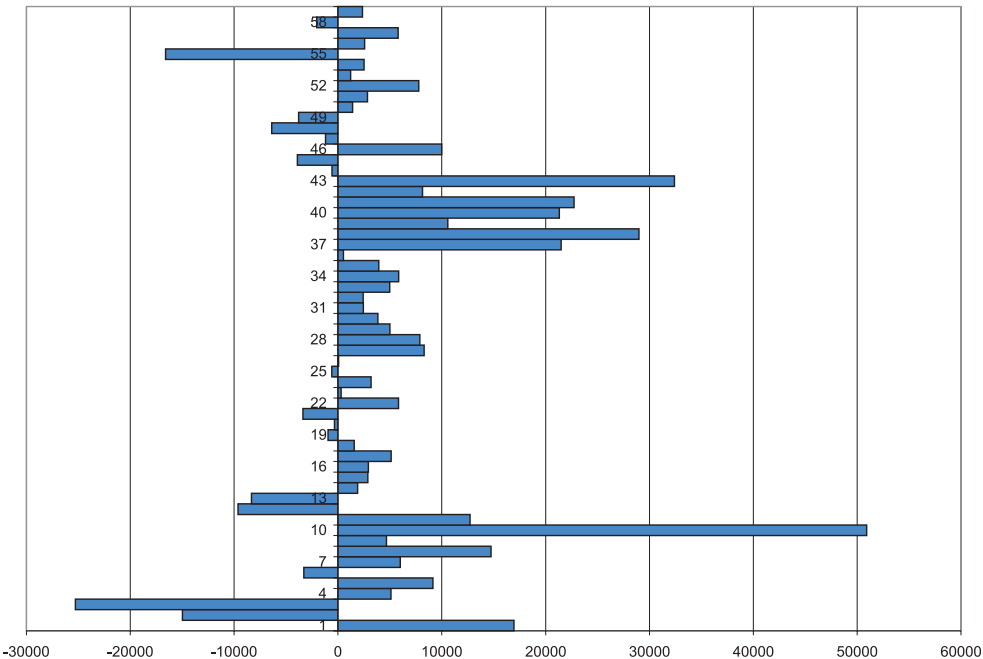
The model suggests that shortages will be severe for the group of workers with secondary vocational education in fields such as mechanical or electrical engineering ([37] and [38]) as well as other technical subjects and agriculture ([40] and [41]). The shortage of construction apprentices [10] may possibly be met by an influx of foreign employees.

While the results presented above are certainly important for evaluating educational policy, they may not be informative from the point of view of individual workers or firms: A relatively small number of workers in excess demand in a given education category may create significant recruitment problems if the size of the category is small. Next, we therefore present two labour market indicators, which are important from the point of view of individual firms or workers, respectively:[25]

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[25] Both of these indicators are cumulative for the period 2000–2004.

Figure 10: Indicator of Future Labour Market Prospects, 2000–2004
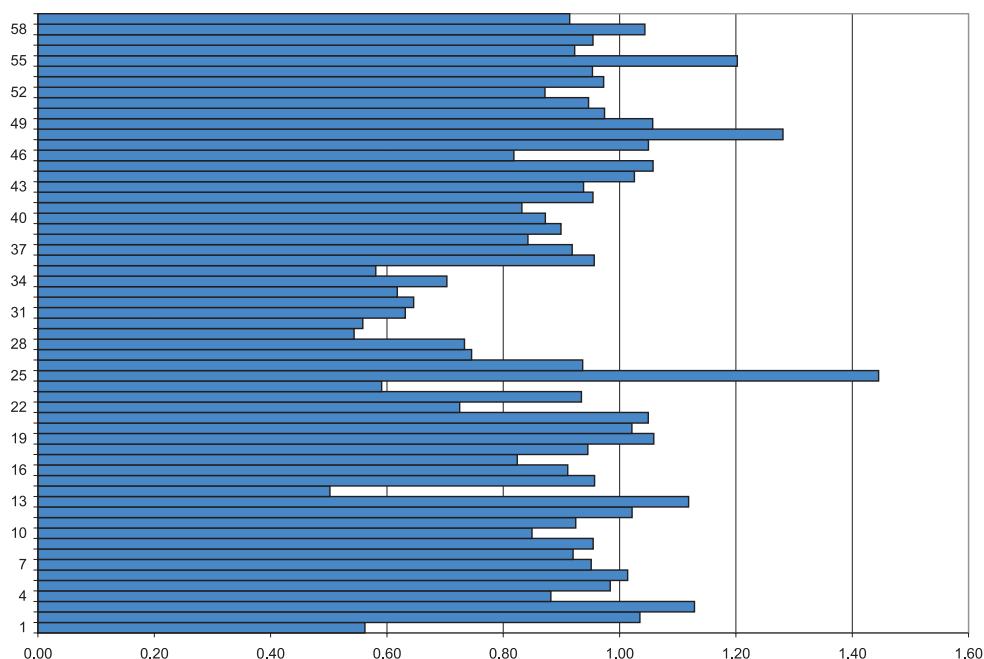
When the Indicator of Future Labour Market Prospects (IFLM) presented in Figure 10 takes on values larger than 1, workers with the given education will find it harder to find employment. For example, the model suggests that workers with a college degree in natural sciences [48] will face difficult labour market prospects.

Figure 11 offers a similar set of results from the point of view of firms. Again, the value of 1 of the Indicator of Future Recruitment Prospects (IFRP) suggest an equilibrium situation, but in contrast to IFLM, higher values of IFRP signal good recruitment prospects. On the other hand, low values of IFRP correspond to problems in recruiting workers with the given type of education.

For example, it will apparently be difficult to hire workers with secondary vocational education in natural sciences [14] (note just opposite result in case of [48] or workers with an apprenticeship with GCE in chemistry [29] and textiles [30]. Note that while the absolute shortage of workers was highest for category [10], the relative measure of recruitment problems for this group is not among the worst. In practice, one should group these two labour market indicators into few (3 or 5) categories (good, neutral, or bad prospects) since small differences in the estimated values are likely to reflect sampling and forecasting errors.

Figure 11: Indicator of Future Recruitment Prospects, 2000–2004
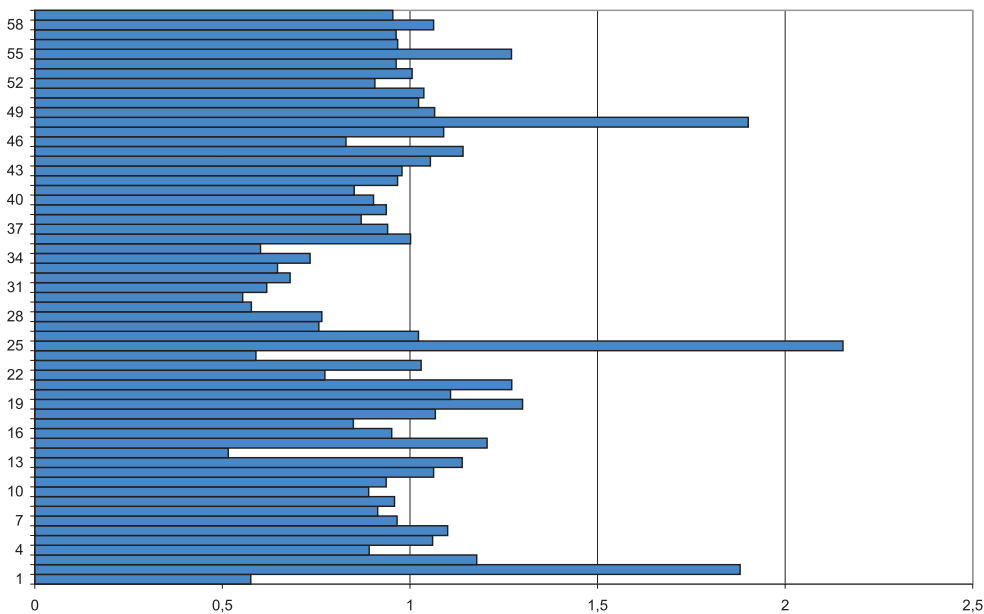
2.1.6 Sensitivity to Macroeconomic Scenarios

As we discuss in detail in Section 1.2, we have implemented the ROA-CR model under 3 different macroeconomic scenarios. Appendix Figure B.12 indicates the differences in the predicted shortage by education type across these different scenarios. While there are some differences, they appear to be only relevant for the 3 large sensitive groups of education number [10], [12], and [43].

■ 2.2 Occupational Forecasts

We have implemented the predictions of expansion demand, replacement demand and job openings for a classification of 50 occupational categories. To conserve space, we present the relevant figures in the Appendix Figures B.13 to B.15. Apparently, the largest number of **job openings** on the Czech labour market will be for managers of small firms (entrepreneurs) [4], followed by sales personnel [20], and office clerks [42]. Very few jobs will be opened for textile machine operators [34] or animal farm personnel [22]. Unfortunately, it is not possible to contrast these demand indicators with an estimate of supply by occupation.

The large number of job-openings for small firm managers [4] is a result of both high replacement demand and high expansion demand. There are, however, occupations where there is little expansion demand, but very high replacement demand; for example occupation of locomotive and motor vehicle drivers [36].

3. ESRI-Type Results

◼ 3.1 ESRI Forecasts

The simpler ESRI forecasting approach starts with projections of industry-specific expansion demand.[26] Next, the usual decomposition is used to generate forecasts of expansion demand by education or occupation (Figures B.17 and B.18, respectively).

Figure B.17 shows the close link between past observed expansion demand and the (trend) forecasts. Comparing Figure B.17 with Figure B.12 suggests few differences. I. e., the first-order structure of expansion demand in the ROA-CR implementation is largely based on trending projections as opposed to the limited content of the macroeconomic scenario we used on employment in 4 HERMIN-type sectors.

◼ 3.2 Shift-Share Analysis

Here, we discuss the results of shift-share decomposition of observed (1994–1999) and predicted (1999–2004) changes[27] in IND x OCC and IND x EDU employment matrices into 3 separate effects: scale, industry, and occupational or educational effect. See Section of 2.2 of Part I for background. The results can be found in Table B.19 to B.24 in the Appendix. To conserve space, we discuss only the occupational analysis in any level of detail.

Table B.22 depicts results of the occupational shift-share analysis. The observed (past) scale effect is negligible (and negative) while the future looks bright on the aggregate side with (small) positive scale effects across all clusters. The industry effects on occupational employment vary considerably across occupations, but are still relatively small for most occupations. Small-sector growth (expansion of services, both personal and business) has apparently boosted the growth of employment of entrepreneurs [4] and business service agents and office clerks [42]. On the other hand, craft workers [47] have been pulled down by the decline in manual labour intensive industries. Large negative occupational effects appear for example for mechanics [28] and assemblers [35] who appear to be losing even conditional on the aggregate and industry-specific forces, perhaps because of organisational and technological changes that affect all industries.

Interestingly, in our work, the occupational and educational effects strongly dominate the forecasts of industry and scale effects in most educational or occupational categories we consider. This is in contrast to a strong industry effect that prevails in Ireland (see Duggan, Hughes, and Sexton, 1997). This suggests that organizational change and technological change within industries are the driving forces of changes in employment structure in the Czech Republic, as opposed to industry-specific forces in Ireland.

4. Auxiliary Indicators

Gini-Hirshman index

This index provides information on how flexible a given education is in terms of the ability of workers to work in different occupations. Figure B.25 presents the values of the GHI for the LFS grouping of education types. One can see that the majority of the index values are close to 0.9 or higher. However, workers with secondary and higher-level education in health

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[26] See Figure B.16 and Table B.1 for classification of industries. For example the trade sector is expected to further grow based on trending projections.
[27] The predictions are based on the ESRI-type trend forecasting.

([54] and [42]), higher education in law [56], and teaching secondary- and higher-level education ([45] and [57]) face GHI values between 0.25 and 0.75. It is perhaps not surprising that medical doctors have the lowest ability/need to switch occupations. Figure B.26 captures the difference in terms of occupation-mix of education types between 1994 and 1999. Most of the education groups tend to increase their mix of occupations, but, for example, lawyers tend to stick to their original education. By comparing the values of the GH index for education types that are in excess supply one may shed light on the ability of workers with the given education to face cyclical downturns.

Similarity index

The Similarity index compares pairs of education types on the dimension of their occupational mix. The Similarity index varies between 0 (no similarity) and 1 (perfect similarity). Zero values occur when two given types of education have no overlapping occupational groups. Unit values appear when occupational structure of the two types of education is the same, i. e. when the shares of occupations in both types of education are equal. Results based on LFS data from 1994 and 1998 are presented in Table B.6, which gives the 59x59 matrix elements for 1994 and 1998 and shows also the difference across this time period. To illustrate the interpretation of the results consider, for example, Grammar school with GCE (Gymnasia) [3], which shows occupational structure relatively similar to many other educational fields at the upper-secondary level and partly even at the tertiary level.[28]

Age structure of employment

Age cohorts are not equally distributed across occupational, educational and industrial groups. Since retirement is the most important factor of replacement demand, there is substantial variation in forecasted replacement demand across groups. The age profile of most recent employment within individual groups can provide a **simple and valuable** piece of information. As an example, in Figure B.27 we compare quite different age profiles of employment in occupations of computing professionals [3] and of labourers [35]. Similarly, the bottom panel of the Figure compares two quite different age profiles of educational groups [2] (workers with primary education) and [6] (apprentices in el. engineering, transport and communication).

5. Conclusions

This project made a major breakthrough into the field of forecasting skill-specific labour-market needs in the Czech Republic. We have mapped the major EU quantitative methodologies and made them operational in the Czech environment. The latter involved handling many large individual and aggregate data sets, grasping, modifying and implementing the methodology, and presenting examples of results. The output of the project is therefore threefold:

1) we collected and processed input data necessary for occupational and educational forecasting and we presented practical results based on a subset of techniques;

2) we have programmed and tested state-of-the-art techniques with real data; this has allowed us to provide illustrations of the techniques even when their results cannot be used in practice yet due to input-data limitations;

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[28] It should be noted that Grammar school is the prerequisite for tertiary education. Those who end up with type [3] education may often be drop-outs from tertiary level or individuals who for specific reasons (exceptional job offer) did not graduate from tertiary level.

3) the process of implementing these methods allowed us to identify the bottlenecks of educational and occupational forecasting in the Czech republic and to outline the future research needed in the field.

By far the most important result of the project is that not presented in this report: the underlying programming work, which will allow gradual implementation of the methods and eventual presentation of the results for public use.

There were several **transition-specific** issues we encountered when implementing the models: using data on an economy in transition to forecast future developments is a drawback because of possible breaks in past employment trends. This is essentially a problem of short time series, which will be automatically cured in the gradual process of implementing our methodology in practice.

Another important question emerged with regard to the low territorial mobility of the Czech workforce. There are good reasons to consider the country's labour market as composed of isolated regional sub-markets. The quantitative models we use cannot reflect regional differences due to statistical limits presented by the size of the LFS. To forecast 0labour-market needs at a regional level, first a separate LFS-type data would have to be collected at regional level.

The most important **future work** entails two data inputs: (i) reliable forecasts of labour-force participation by occupation-cohort and education-cohort groups, and (ii) useful macroeconomic forecasts of sectoral employment. Other data shortcomings have to do with (iii) the school-leavers data, which does not capture life-long learning, and (iv) the educational structure of the LFS not being fully adequate for educational forecasts in the presence of a rapidly changing educational system. Since projections of occupational supply and demand cannot be made without good information on student flows we strongly recommend that appropriate reporting systems is maintained as part of any reform of the administrative system. A system of co-operation between various government agencies should be established that would update the input data on a biannual basis.

Next, future research should focus on (i) extending the ROA-CR model to incorporate substitution effects, which are likely to be important given the human capital mismatch of post-communists countries, and (ii) building outputs interfaces for different users such as administrators, schools, student and the general public.

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APPENDICES

◼ APPENDIX A – TEXTS

A.1 Occupational Clustering

Given the limited size of the LFS data, attaining sufficient reliability of forecasts of the ROA-CERGE-EI model requires that the 119 (ISCO) occupational groups available in the LFS data be clustered into a smaller number of occupational clusters. There are two quite different approaches to such clustering. The first approach is to use pure expert's opinion. One such clustering is presented in Table A.2b, which is available in Czech. The clustering in Table A.2b was kindly provided by Jiří Vojtěch (VÚOŠ). Expert-based clustering has the clear advantage of incorporating field-specific knowledge and experience.

However, this particular clustering is based on 4-digit level occupational ISCO-88 (KZAM) codes, which are available in the original LFS files, but are not available to us at this moment. Furthermore, there are two potential problems with implementing expert-based clustering at this stage: First, the reliability of 4-digit occupational codes from household surveys is questionable. Second, expert-based clustering does not take into account the distribution of data in the LFS data, which has ramifications for the reliability of the estimates of occupational employment (see below). Hence, at this stage, we use a different approach and rely on numerical cluster analysis reflecting the underlying educational (training) structure of occupations. We believe that incorporating expert knowledge into occupational clustering is an important part of future research. Note also that it is very simple, in terms of programming, to replicate our results for any other cluster structure.

At the first stage of the project we used simple aggregation into 10 large occupational groups according to 1st ISCO-88 code. This low number of different occupational groups is, however, insufficient to make detailed forecasts. On the other hand, as explained above, we cannot use all 119 occupational groups in ISCO-88 classification as they appear in the LFS data. We have therefore applied the cluster analysis described below to the 2nd quarter of 1998 LFS data to come up with 45 occupational categories. We also used expert's opinions as a corrective tool and extended the classification to distinguish 50 occupational groups.[29] See Table A.2a for the resulting grouping. Below, we report on a detailed analysis of statistical significance of occupational cell size.

In the rest of this subsection we therefore describe the analytical approach used to create 45 occupation clusters with the Czech LFS data, together with the results. Our approach is based on the assumption (see, de Grip et al., 1987) that educational profiles are the major determinant of labor market segmentation. Although there are other determinants like sex or age, these have much smaller effect (Teulings and Vriend, 1987). In our empirical work, we exclude workers with missing third digit of the occupational code. We revise the results of the analytical clustering procedure, taking into account its finite sample properties (see below). One could also base clustering on various other indicators (e. g., the **Gini-Hirschman index** and the **similarity index** described in Section A.3 of this Appendix) that characterize the educational structure of occupations.

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[29] We revised our former results taking into account the suggestions received during the summer workshop in Paris. Further modifications in occupational structure should be considered based on further expert's opinion (Mr. Vojtěch from VÚOŠ).

Occupational Clusters, Measurement Error and Confidence Intervals

We determine the optimal number of clusters based on a minimum-size rule.[30] The objective of this section is to implement this criterion of clustering, while focusing on the role of sampling errors of cluster-specific employment estimates as a function of the minimum cluster size. The procedure is applied to the 2nd quarter of 1998 LFS data. First, the confidence intervals for employment in samples of different size are calculated. Then the optimal number of clusters is determined according to these confidence intervals.

Our cluster analysis of occupations could result in a number of clusters anywhere between 2 and 119, the number of different occupational groups identified in ISCO-88 (KZAM) classification. The higher the number of clusters, the more information we will be able to give in the forecasting exercise. However, the sampling errors of point values increase as the number of cluster increases and as the number of observations in a given cluster becomes small. By contrast, when clusters contains large numbers of elements, the finite sample errors become negligible but the forecasting efficiency decreases. The decrease in efficiency occurs since elements of very different natures and dynamics are aggregated into the same clusters. A reasonable approach to the clustering procedure is therefore to produce such number of clusters that the errors related to the small sample size be less than some fixed value.

The 95 % confidence intervals for sample employment estimates can be calculated according to the following formula (The Czech Statistical Office, 1999, p. 7):

$$Y_A = \hat{Y} \mu 1.96 \hat{Y} \sqrt{(1-f) \frac{\hat{Y}_A/\hat{Y}\left(1 - \hat{Y}_A/\hat{Y}\right)}{f\hat{Y}}}$$

where $\hat{Y}$ stands for the estimate of total employment, $\hat{Y}_A$ is estimate of employment in a sub-group A, and f the relative sample size (sample size as a share of the total population).

In the 2nd quarter of 1998, total employment $\hat{Y}$ is estimated to be 4,875,000 and the relative sample size is $f = 0.00689$. The estimates of the 95 % confidence intervals for employment in a sub-group are presented in Table A.4. Dark lines denote the cases when measurement errors are equal to 20 %, 15 %, 10 % or 5 %. For example, if the national population employment in a given cluster group of workers is 20, 000 workers and the relative sample size is 0.00689, the 95 % confidence interval corresponds to $\forall$ 16.6 % of the employment in the cluster group.

Choice of the optimal number of clusters

The same clustering procedure as described in the previous report (squared Euclidean distance measure and Ward method[31]) is applied to produce a series of 10 to 60 clusters (see Table A.5).[32] The size of the smallest cluster varies from 94,274 employees (when 10 clusters are distinguished) to 16,495 (under 60 clusters). However, the smallest cluster size does not change continuously with the increasing number of clusters. One can actually maximize over a large span of cluster numbers while conditioning on a bound on the size of the smallest cluster. For example, as the third column of Table A.5 indicates, the error for the smallest

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[30] We expand the number of clusters until the smallest reaches some size threshold.

[31] The Ward method, also known as minimal variance method, is one of several developed algorithms. This method takes into account that occupational groups become less homogenous as more objects are added to them (de Grip 1987). The method keeps the variance within an occupational group at a minimum at the cost of the optimum variance between occupational groups. The algorithm assigns the occupation to the cluster for which the smallest inner variance results.

[32] We exclude from the analysis few workers with missing 3rd digit ISCO code.

cluster is 7.6 % with 10 clusters, while the error remains 8.6 % for 11 to 15 clusters. The error is 17.3 % for the range from 28 to 48 clusters. This level of clustering seems to offer an optimal trade-off between sampling error and information content. Hence, we form 45 clusters which guarantees that employment in the smallest cluster lies within +/−17 % error limits (These figures can be somewhat different for periods other than the 2nd quarter of 1998). Note that it turns out that the smallest cluster in a wide range contains observations of a particular type of 3-digit occupation, namely Legal professionals in the range of cluster numbers 28–48.[33]

The distribution of clusters by three error levels of 15 %, 10 % and 5 % is illustrated in the right two panels of Table A.5. The entries show the number and fraction of clusters exceeding the indicated error limits. For example, under clustering into 45 groups, two clusters (4.4 % out of 45 clusters) have errors higher than 15 %, 14 clusters (31.1 %) are characterized by errors greater than 10 % and the majority of clusters formed (41 out of 45 clusters, or 91 %) have errors larger than 5 %.

Finally, Table A.5 and Figure A.4 illustrate the detailed distribution of errors for the selected 45th clustering level. The individual cluster size varies from 18,389 employees (with error +/−17.3 %) to 263,198 employees (+/−4.5 %). The average error is 8.4 %. In sum, clustering can result in any desired number of clusters between two and the number of initial elements. Applying the criterion of the sampling error, we rely on 37 distinct educational groups to form 45 clusters from 119 occupational groups.

Cluster structure in 1994 vs. 1998
We do not have to stress that the educational structure of occupations is subject to change over the years. This is true especially of countries in transition like the Czech Republic with a lot of the restructuring and growing unemployment. It is instructive to compare the robustness of the clustering results between two different years, for example between 1994 and 1998. To see the scope of changes, we also form 45 clusters based on the data for the 2nd quarter of 1994. Table A.7 gives a detailed occupational composition of clusters in two periods. 119 occupational groups (the full set of the Czech version of ISCO-88 3 digit codes) are ordered by the cluster membership number. We noted that the attribution of cluster numbers in SPSS software is arbitrary. Therefore, it is not possible to see the changes in occupational structure between 1994 and 1998 from Table A.7. Therefore, we created Table A.8 illustrating the dynamics of these changes in cluster membership between '98 and '94 (Due to typographical limitations this table is not illustrated in this publication but is available upon the authors.). For each pair of 3 digit occupations (we have 119 of them), we identify four different cases, reflected by different colors of cells. Black spot identifies the membership of given 3rd digit occupations in the same cluster in both periods. Shadow and green color identifies the appearance of two occupations in the same cluster in one period only. White (empty) color indicates that two occupations did not appear in the same cluster in any of two periods.

Generally, the pattern of clusters reveals substantial changes between 1994 and 1998, because the shadow/green spots dominate black spots. Since shift-share analysis and trend analysis based on the ESRI approach requires that we deal with the same content of clusters across years we impose 1998 structures on 1994 data since 1998 is a more recent structure. The question of course remains whether there is any better solution. Detailed analysis of the composition of the 45 clusters in Table

---

[33] ISCO-88 codes corresponding to each minimum cluster are shown in the fourth column.

A.10 suggests that cluster analysis does its job, although the composition of several clusters obviously raises some questions. This is the case of the quite diverse cluster #2 containing 41 3-digit occupations, although it is not the largest cluster in terms of employment are **Salespersons** (ISCO =521). We later adjusted the clustering structure to reflect expert opinions, which resulted in the 50 occupational clusters presented in Table A.2a.

Another auxiliary table and graph focus on the comparison of employment and measurement errors on cluster level. Table A.9a gives the data ordered by cluster number and Table A.9b orders the data by population employment. For each cluster (first column), the second column illustrates the number of occupations which are included in each cluster. The following two columns give the number of observations in a cluster and total figures referred to the whole population. The last column reports the 95% confidence limits (in percentages) of population employment. The change in cluster size and errors is illustrated on Figure A.5. We observe very similar pattern of the clusters, which are ordered by size. The similarity of patterns between '94 and '98 gives us additional argument in favor of the consistency of clustering structure over the whole period.

A.2 Replacement Demand Formulas

■ A.2.1 Fixed Coefficient Approach

This is a simple easy-to-interpret approach, which does not require any regression techniques. It relies on two corrections of past growth of each cohort x occupation cell: one for business cycle and the other for predicted future participation rates.

The input matrices are: W_t and W_{t-n}, – employment by occupations and age groups in years t and $t-n$. POP_t and POP_{t+m} represent total population by age groups in period t and predicted level of population in period $t+m$. In the fixed coefficient model we use data on employment in years 1994 and 1999, and data on total population for years 1999 and 2004. We have a 5 years interval both for past and future. We also use 5 years age groups. The nine age groups available are: 25–29, 30–34, 35–39, 40–44, 45–49, 50–54, 55–59, 60–64, 65–69.

The total number of working persons for each age group is:

$$WP_{a,t} = \sum_{j=1}^{nocu} W_{a,j,t}$$

Where
a – age
j – occupation
t – year
"*nocu*" – total number of occupations

Annual growth ratios for:
■ workers of age a in occupation j:

$$f_{a,j,t-n\backslash t} = \sqrt[n]{\frac{W_{a+n,j,t}}{W_{a,j,t-n}}} - 1$$

■ total number of working persons of age a:

$$f_{a,t-n\backslash t} = \sqrt[n]{\frac{WP_{a+n,t}}{WP_{a,t-n}}} - 1$$

One needs to further construct the annual growth of labour force of age a f^s by relying on the growth rates of labour force participation from the LFS. The predicted annual growth ratio for period $t+m$ corrected for business cycle and degree of participation then is:

$$\hat{f}_{a,j,t\backslash t+m} = f_{a,j,t-n\backslash t} - f_{a,t-n\backslash t} + f^s_{a,t\backslash t+m} \quad \text{if} \quad f_{a,j,t-n\backslash t} \in (-1,0)$$

and

$$\hat{f}_{a,j,t\backslash t+m} = f_{a,j,t-n\backslash t}$$ otherwise. Using these values we calculate the future net outflow:

$$\hat{O}_{a,j,t\backslash t+m} = \max\left\{0, W_{a,j,t} - W_{a+m,j,t+m}\right\} = \max\left\{0, W_{a,j,t} - W_{a,j,t}\left(1 + \hat{f}_{a,j,t\backslash t+m}\right)^m\right\}$$

We add the last age group in year 1999 to the outflow assuming that all this group will retire in the next period. The total number of workers for occupation j is:

$$L_{j,t} = \sum_{a=1}^{nage} W_{a,j,t}$$

The total number of all workers in a given year is:

$$L_t = \sum_{a=1}^{nage} WP_{a,t}$$

Following is the expression for annual growth ratios of employment in occupation j:

$$f_{j,t-n\backslash t} = \sqrt[n]{\frac{L_{j,t}}{L_{j,t-n}}} - 1$$

The predicted growth ratio of workers for each occupation is:

$$\hat{f}_{j,t\backslash t+m} = f_{j,t-n\backslash t} - f_{t-n\backslash t} + \hat{f}^s_{t\backslash t+m}$$

The predicted number of workers in occupation j is:

$$L_{j,t+m} = L_{j,t}\left(1 + \hat{f}_{j,t\backslash t+m}\right)^m$$

The replacement demand is equal to:

$$RD_{j,t\backslash t+m} = \sum_{a=1}^{nage} \hat{O}_{a,j,t\backslash t+m} + \min\left(0, L_{j,t+m} - L_{jt}\right)$$

◼ A.2.2 The Random Coefficient Approach

In implementing this approach, we follow ROA's practice of using a Bayesian extension of a linear regression suited for a situation when there are many (related) group-specific coefficients, not all of which are precisely estimated. The input data are annual employment growth rates for each occupation x cohort or education x cohort group.

Input matrices are $L_{94}, ..., L_{99}$, employment by occupations and age groups in years 1994,..., 1999 as well as the predicted labour-force size by age groups in years 1999,..., 2004. Nine age groups by five years intervals are available: 25–29, 30–34, 35–39, 40–44, 45–49, 50–54, 55–59, 60–64, 65–69. The number of working persons for each age group is

$$WP_{a,t} = \sum_{j=1}^{nocu} L_{a,j,t}$$

The vector f_j is a vector of growth rates of employment in the occupation j and vector f is a vector of growth rates of total employment. Vectors f_j and f are:

$$f_j = \begin{bmatrix} f_{1,j,t-n-1\backslash t-n} \\ ... \\ f_{1,j,t-1\backslash t} \\ f_{2,j,t-n-1\backslash t-n} \\ ... \\ f_{2,j,t-1\backslash t} \\ ... \\ f_{A,j,t-n-1\backslash t-n} \\ ... \\ f_{A,j,t-1\backslash t} \end{bmatrix} \qquad f = \begin{bmatrix} f_{1,t-n-1\backslash t-n} \\ ... \\ f_{1,t-1\backslash t} \\ f_{2,t-n-1\backslash t-n} \\ ... \\ f_{2,t-1\backslash t} \\ ... \\ f_{A,t-n-1\backslash t-n} \\ ... \\ f_{A,t-1\backslash t} \end{bmatrix}$$

where:

$$f_{a,j,t-n-1\backslash t-n} = \frac{L_{a,j,t-n}}{L_{a,j,t-n-1}} - 1$$

This is the growth rate of employment in age group a in period $(t-n-1, t-n)$. As noted above, here we compare the same age groups in two years.

$$f_{a,t-n-1\backslash t-n} = \frac{WP_{a,t-n}}{WP_{a,t-n-1}} - 1$$

The matrix of dummy variables D_α is

$$D_\alpha = \begin{bmatrix} 1 & 0 & ... & 0 \\ : & 0 & & \\ 1 & 0 & ... & 0 \\ 0 & 1 & & 0 \\ 0 & : & & \\ 0 & 1 & & 0 \\ ... & ... & ... & ... \\ 0 & ... & 0 & 1 \\ & & : & \\ 0 & ... & 0 & 1 \end{bmatrix}$$

The matrix of weights is:

$$\Omega_j = \begin{bmatrix} \sqrt{L_{1,j,t-n-1}} & 0 & \cdots & & & & 0 \\ 0 & \cdots & & & & & \cdots \\ \cdots & & \sqrt{L_{1,j,t-1}} & & & & \\ & & & \cdots & & & \\ & & & & \sqrt{L_{A,j,t-n-1}} & & \\ & & & & & \cdots & 0 \\ 0 & \cdots & & & & 0 & \sqrt{L_{A,j,t-1}} \end{bmatrix}$$

The model explaining labour market flows is:

$$f_j = f + D_\alpha \alpha_j + \varepsilon_j$$

It may be written as:

$$df_j = f_j - f = D_\alpha \alpha_j + \varepsilon_j$$

We multiply both sides by the matrix of weights Ω_j:

$$df_j^* = D_\alpha^* \alpha_j + \varepsilon_j^*$$

We use the Random Coefficient Model for this equation.

Formulas used in the random coefficient model:
The standard linear model is:

$$y_j = X_j \beta_j + \varepsilon_j$$

This equation can be rewritten as:

$$y_j = X_j \left(\bar{\beta} + \mu_j \right) + \varepsilon_j$$

OLS estimators for coefficients are.

$$b_j = \left(X'_j X_j \right)^{-1} X'_j y_j$$

Residuals of OLS estimates are:

$$\hat{\varepsilon}_j = y_j - X_j b_j$$

An unbiased estimator of $\hat{\sigma}_j^2$ is:

$$\hat{\sigma}_j^2 = \frac{\hat{\varepsilon}'_j \hat{\varepsilon}_j}{M - K}$$

In our model, M, the number of observations for occupation j is equal to 45 (9 age groups * 5 time periods); K, the number of parameters is 9 (the number of age groups).

We calculate matrix S_b:

$$S_b = \sum_{j=1}^{N} b_j b'_j - \frac{1}{N} \sum_{j=1}^{N} b_j \sum_{j=1}^{N} b'_j$$

In our model N, the number of occupations, is 50.

An unbiased estimator for the matrix Δ is:

$$\hat{\Delta} = \frac{S_b}{N-1} - \frac{1}{N} \sum_{j=1}^{N} \hat{\sigma}_j^2 \left(X_j' X_j\right)^{-1}$$

In case of a negative definite matrix $\hat{\Delta}$ we assume:

$$\hat{\Delta} = \frac{S_b}{N-1}$$

The estimator of the variance matrix of the composite disturbance term is:

$$\hat{\Phi}_j = X_j \hat{\Delta} X_j' + \hat{\sigma}_j^2 I$$

The Estimated Generalized Least Squares estimator for $\overline{\beta}$ is:

$$\hat{\overline{\beta}} = \left(\sum_{j=1}^{N} X_j' \hat{\Phi}_j^{-1} X_j \right)^{-1} \sum_{j=1}^{N} X_j' \hat{\Phi}_j^{-1} y_j$$

The estimator of the random parameter vector for j is:

$$\hat{\beta}_j = \left(\hat{\Delta}^{-1} + \hat{\sigma}_j^{-2} \left(X_j' X_j\right) \right)^{-1} \left(\hat{\sigma}_j^{-2} \left(X_j' X_j b_j\right) + \hat{\Delta}^{-1} \hat{\overline{\beta}} \right)$$

Using these formulas we estimate coefficients β_j which in our case are α_j.

Calculation of the Replacement Demand from the RCM Estimates

Using α_j from the model described above we find predicted values of growth ratios:

$$\hat{f}_j = \hat{f} + D_\alpha \alpha_j$$

Of course, this requires an estimate of the future growth of the number of working persons $\hat{f}$ that should reflect changes in participation and in the total population $\hat{f}^s$.

Using $\hat{f}_j$ we calculate future employment for occupation j and age group a as:

$$L_{a,j,t+1} = L_{a,j,t}\left(1 + \hat{f}_{a,j,t\backslash t+1}\right)$$
$$\ldots$$
$$L_{a,j,t+n} = L_{a,j,t+n-1}\left(1 + \hat{f}_{a,j,t+n-1\backslash t+n}\right)$$

Here, as described above, we compare the same age groups between two years.
The Net outflow is:

$$O_{j,t\backslash t+1} = - \sum_{a=1}^{nage} \min\{0, L_{a,j,t} - L_{a,j,t-1}\}$$

We add the last age group in year $t-1$ to the outflow assuming that these people will retire the next period. The replacement demand for a one year period $(t, t+1)$ is:

$$RD_{j,t\backslash t+1} = O_{j,t\backslash t+1} + \min\{0, L_{j,t+1} - L_{j,t}\}$$

where

$$L_{j,t} = \sum_{a=1}^{nage} L_{a,j,t}$$
$$L_{j,t+1} = L_{j,t}\left(1 + f_{j,t-m\backslash t}\right)$$

$$f_{j,t-m\backslash t} = \sqrt[m]{\frac{L_{j,t}}{L_{j,t-m}}} - 1$$

The outflow for n years period $(t, t+n)$ is:

$$O_{j,t\backslash t+n} = \sum_{h=1}^{n} O_{j,t+h-1\backslash t+h}$$

The replacement demand for n years period $(t, t+n)$ is:

$$RD_{j,t\backslash t+n} = O_{j,t\backslash t+n} + \min\{0, L_{j,t+n} - L_{j,t}\}$$

where

$$L_{j,t+n} = L_{j,t}\left(1 + f_{j,t-m\backslash t}\right)^n .$$

■ A.2.3 Same-as-Before Replacement Demand

The simplest possible calculation of replacement demand simply sums up the net outflows from employment. This simple approximation is based on the assumption of stable age structure of the labour force. We use five-year age groups and a one-year time interval. In order to find net labour market outflows we compare the same age groups in two years:

$$O_{a,j,t-1\backslash t} = \max\{0, L_{a,j,t-1} - L_{a,j,t}\}$$

We add the last age group in year $t-1$ to the outflow assuming that these people will retire next period. The replacement demand is:

$$RD_{j,t-1\backslash t} = \sum_{a=1}^{nage} O_{a,j,t-1\backslash t} + \min\left(0, L_{j,t} - L_{jt-1}\right)$$

A.3 Schooling System, School Graduates and Labour Market Entrants

In order to use the school-graduates to predict the future labour market inflow of graduates, we need to correct the predicted flows of graduates for enrolment higher types of education.

In order to compute ratios of school graduates who continue studying at universities we use university applicants' data for the year 1997 provided by ÚIV. In these data we are able to distinguish all 59 types (see the LFS classification of education in Table 2) of school students graduated before applying to university. See Tables A.15 to A.17 (in Czech) for a summary of the data.

Given the share p of graduates that continue studying at universities, we compute the share of those who go to the labour force as $1 - p$. We assume these shares are constant in the future, and we use them to calculate the inflow of school leavers to the labour market for the years 2000–2004.

However, several assumptions are needed to use the ÚIV data for identifying the fraction p. In the data on school-leavers, flows from secondary vocational education and secondary vocational with GCE are reported together. Following expert opinion we estimated that the first group is 5 % of the total figure and the second group is 95 %. Further, we cannot distinguish between groups Apprenticeship without GCE and Apprenticeship with GCE. Since most of Apprenticeships are without GCE, we attribute the whole number to the former group. We further assume that only graduates from Gymnasia and from secondary vocational schools with GCE can enter university. All graduates with a lower type of education are assumed to enter the labour market. Due to data limitations we neglect the small number of graduates from secondary school extension programs (nastavba). Flows of students to and from Higher

Professional Schools are also neglected due to data limitations.[34]

The forecasts of school graduates entering labour market could be estimated more precisely if the existing administrative information on flows of school entrants and school graduates were better structured. However, the ongoing transfer of the administration of secondary schools to the regional level combined with the limited statistical reporting of tertiary institutions may create further problems in the future.

A.4 Algebra of the Shift-Share Analysis

Shift-share analysis based on the ESRI approach provides an additional set of auxiliary indicators to supplement the basic ROA-CERGE-EI model outputs. The method decomposes employment trends into the following effects:

The scale effect measures the change (in terms of individuals) in employment which would have taken place if the employment level in the relevant cell had grown at exactly the same rate as total employment. **The industry effect** measures the change (in terms of individuals) which would have taken place if there were no scale effects and the employment level in the IND x OCC cell had grown or declined in line with the trend in employment in the industry to which the cell refers, on the assumption that no change took place in the occupational structure within the industry. **The Occupation effect** represents the change (number of individuals) which would have occurred if neither the industry nor the scale effect had occurred, and the only change in employment level in the cell was that due to the change in the relevant occupation's share in employment in the industry concerned. **The interaction effect** is the residual "necessary" to make the sum of all effects equal to actual (observed) development.

Following the ESRI notation the shift-share decomposition can be described in the following way: Let $E_{ij,t}$ stand for the level of employment in industry i occupation j at time t. Compute marginal sums as

$$IND_{i,t} = \sum_j E_{ij,t}$$
$$OCC_{j,t} = \sum_i E_{ij,t}$$

Compute total employment as
$$TOT_t = \sum_i IND_{i,t}$$

Compute occupation j share within industry i as
$$OCCSH_{ij,t} = \frac{E_{ij,t}}{IND_{i,t}}$$

Define the *scale effect* for specific *ij* cell as
$$S_{ij,t} = \left(\frac{TOT_{t+1}}{TOT_t} E_{ij,t} \right) - E_{ij,t}$$

and the total scale effect for specific occupation *j* as
$$S_{j,t} = \sum_i S_{ij,t}$$

Define **the industry effect** for specific *ij* cell as

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[34] See Figure A.6 for a chart of all relevant flows of students in the Czech schooling system.

$$INDEFF_{ij,t} = \frac{IND_{i,t+1} {}^{*}E_{ij,t}}{IND_{i,t}} - \frac{TOT_{t+1} {}^{*}E_{ij,t}}{TOT_t}$$

and the total industry effect for specific occupation j as

$$INDEFF_{j,t} = \sum_i INDEFF_{ij,t}$$

Define the *occupation effect* for specific ij cell as

$$OCCEFF_{ij,t} = IND_{i,t}\left(OCCSH_{ij,t+1} - OCCSH_{ij,t}\right)$$

and the total occupation effect for specific occupation j as

$$OCCEFF_{j,t} = \sum_i OCCEFF_{ij,t}$$

Next, define the *interactive effect* for specific ij cell as

$$INTEFF_{ij,t} = E_{ij,t+1} - E_{ij,t} - S_{ij,t} - INDEFF_{ij,t} - OCCEFF_{ij,t}.$$

Reshufling, we can also write

$$\Delta E_{ij,t} \equiv E_{ij,t+1} - E_{ij,t} = S_{ij,t} - INDEFF_{ij,t} - OCCEFF_{ij,t} + INTEFF_{ij,t}.$$

The total interactive effect for specific occupation j is

$$INDEFF_{j,t} = \sum_i INDEFF_{ij,t}.$$

Finally, it can be shown that:

$$INDEFF_t = \sum_j INDEFF_{j,t} = 0$$

$$OCCEFF_t = \sum_j OCCEFF_{j,t} = 0$$

$$INTEFF_t = \sum_j INTEFF_{j,t} = 0.$$

A.5 ESRI-Type Model Forecasts

We performed occupational employment forecasts applying two specific methodologies described in Corcoran (1993): the *Single-cell* and *Matrix* occupational projections. The first method represents trending of values of individual cells. In addition, projections of marginal (occupational and industrial) sums can be added, representing additional constraint on forecasts. Since at this stage forecasts based on a macro-model of the Czech economy do not exist, we forecast marginal values using their past values based on LFS.

We use the most recent 1999 data to compare the forecasting quality of the tested models. As a measure of forecast quality we use mean absolute percentage error, the MAPE index:

$$MAPE = \frac{1}{n} \sum \left| \frac{\hat{a}_{ij}^{t+k} - a_{ij}^{t+k}}{a_{ij}^{t+k}} \right|$$

where $a_{ij}^{t+k} \left(\hat{a}_{ij}^{t+k} \right)$ represents realized (forecasted) employment level in industry i, occupation j cell, at period $t+k$. Zero cells cause a problem stemming from the definition of the MAPE index if the item $a_{ij}^{t+k} = 0$ since it appears in the denominator. At this stage we simply counted such observations with percentage prediction equal to 1. Such an approach affects only the absolute values of the resulting MAPE indices for individual forecasting methods, but does not affect the relative evaluation of forecasts quality by across different methods.

The table enclosed below compares the predictive power (MAPE index) of the many alternative methods of trending which we have applied:

Projection of cells	Projection of margins	MAPE Index
Single Cell projections		
Same As Before (SAB) method employed on levels	NO	50.4
SAB method employed on row shares of employment matrices. This method assumes constant occupational shares within industries.	Marginal sums forecasted by linear trending of past values.	49.9
Linear extrapolation of cell levels	NO	54.7
Exponential extrapolation of cell levels	NO	97.8
Linear extrapolation of occupation shares within industries	Linear extrapolation of marginal levels	53.9
Matrix projections		
RAS iterative method	Margins forecasted by linear extrapolation of previous levels	50.0
RAS iterative method	Margins forecasted by SAB levels	50.3

The MAPE results presented in this table correspond to trend parameters estimated using three observations (1996, 1997, 1998). We found this length to be optimal as time series covering earlier years (before 1996) provided poorer MAPE indices. We also tried to use periods excluding the last 1998 period, but again the resulting MAPEs were much poorer than those presented. It also seems that exponential trending suffers a lot when zero cells are present. The relative performance of different methods is similar to that found by ESRI using Irish data. The SAB method is almost the best one. Interestingly, RAS method performs almost as good as SAB methods.

A.6 Auxiliary Indices

The Gini-Hirshman index provides information on whether education of a given level/type is specific to few or many occupations. The index is computed as follows:

$$
GH_i = \left(1 - \sum_{j=1}^{O} \left(\frac{p_{i,j}}{\sum_{j=1}^{O} p_{i,j}} \right)^2 \right) \frac{O}{O-1},
$$

where O is the total number of educational groups, and P_{ij} are the numbers of workers with education i in occupation j.

The Similarity-competition index compares pairs of education groups with respect to their occupational structure and is given by

$$
s_{i,i'} = \frac{\sum_{j=1}^{O} \left(\frac{p_{i,j}}{\sum_{j=1}^{O} p_{i,j}} \right) \left(\frac{p_{i',j}}{\sum_{j=1}^{O} p_{i',j}} \right)}{\sqrt{\sum_{j=1}^{O} \left(\frac{p_{i,j}}{\sum_{j=1}^{O} p_{i,j}} \right)^2 \sum_{j=1}^{O} \left(\frac{p_{i',j}}{\sum_{j=1}^{O} p_{i',j}} \right)^2}}
$$

where $s_{i,i'}$ is the matrix element of similarity-competition for educational groups i and i', O is the total number of educational groups, and p_{ij}, are the numbers of workers with education i in occupation j.

◼ APPENDIX A – FIGURES

Figure A.1: ROA-CR model – Czech Translation[35]

```
┌─────────────────────────────────────────────────────────────────────┐
│           Expanzní poptávka podle sektorů (2000–2005)                 │
│           – Vektor zaměstnanosti E podle 15 sektorů                   │
└─────────────────────────────────────────────────────────────────────┘
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┌────────────────────────────────┐    ┌────────────────────────────────┐
│ Expanzní poptávka podle povolání│    │ Expanzní poptávka podle vzdělání│
│ (2000–2005)                     │    │ (2000–2005)                     │
│ a) Vektor zaměstnanosti E podle │    │                                 │
│    10 povolání                  │    │ – Vektor zaměstnanosti E podle  │
│ b) Vektor zaměstnanosti E podle │    │    59 vzdělání                  │
│    50 povolání                  │    │                                 │
└────────────────────────────────┘    └────────────────────────────────┘
```

```
┌────────────────────────────────┐    ┌────────────────────────────────┐
│ Nahrazovací poptávka podle povolání│ │ Nahrazovací poptávka podle vzdělání│
│ (2000–2004)                     │    │ (2000–2004)                     │
│ a) Vektor zaměstnanosti E podle │    │                                 │
│    10 povolání                  │    │ c) Vektor zaměstnanosti E podle │
│ b) Vektor zaměstnanosti E podle │    │    59 vzdělání                  │
│    50 povolání                  │    │                                 │
└────────────────────────────────┘    └────────────────────────────────┘
```

```
┌────────────────────────────────┐    ┌────────────────────────────────┐
│ Nová pracovní místa podle povolání│  │ Nová pracovní místa podle vzdělání│
│ (2000–2004)                     │    │ (2000–2004)                     │
│ a) Vektor zaměstnanosti E podle │    │                                 │
│    10 povolání                  │    │ – Vektor zaměstnanosti E podle  │
│ b) Vektor zaměstnanosti E podle │    │    59 vzdělání                  │
│    50 povolání                  │    │                                 │
└────────────────────────────────┘    └────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────────────────────────┐
│       Indikátory trhu práce podle vzdělání: 2000–2004:                │
│       – Indikátor budoucí perspektivy na trhu práce (IFLM)            │
│       – Indikátor budoucí perspektivy najímání (IFRP)                 │
└─────────────────────────────────────────────────────────────────────┘
```

```
┌────────────────────────────────┐    ┌────────────────────────────────┐
│ Krátkodobá nezaměstnanost       │    │ Příliv absolventů škol podle    │
│ podle vzdělání (1999)           │    │ vzdělání (1999–2004)            │
│  – Vektor nezaměstnanosti U     │    │  – Vektor počtu absolventů      │
│    podle 59 vzdělání            │    │    škol podle 59 vzdělání       │
└────────────────────────────────┘    └────────────────────────────────┘
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[35] See Part I, Selection 1.1 for a version of Figure 1 to translated into English

Figure A.2 Expansion Demand by Occupation

```
┌──────────────────────┐      ┌──────────────────────┐
│ Employment forecasts │      │     Employment       │
│   by 15 industries   │      │   15 IND x 50 OCC    │
│     (2000−2005)      │      │     (1993−1999)      │
└──────────┬───────────┘      └──────────┬───────────┘
           │                             │
           ▼                             ▼
        ╭─────────────────────────────────╮
        │     Occupational model          │
        │   (linear projections of        │
        │   occupational shares in         │
        │   each of 15 industries)        │
        ╰────────────────┬────────────────╯
                         │
                         ▼
              ┌──────────────────────┐
              │     Employment       │
              │     by 50 OCC        │
              │    (1993−2005)       │
              └──────────────────────┘
```
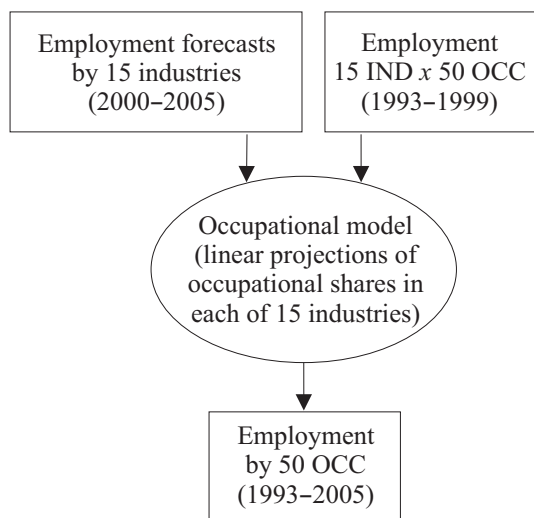
Figure A.3 Expansion Demand by Education

```
┌──────────────────────┐      ┌──────────────────────┐
│ Employment forecasts │      │     Employment       │
│   by 15 industries   │      │   15 IND x 59 EDU    │
│     (2000−2005)      │      │     (1993−1999)      │
└──────────┬───────────┘      └──────────┬───────────┘
           │                             │
           ▼                             ▼
        ╭─────────────────────────────────╮
        │     Educational model           │
        │   (linear projections of        │
        │   educational shares in          │
        │   each of 15 industries)        │
        ╰────────────────┬────────────────╯
                         │
                         ▼
              ┌──────────────────────┐
              │     Employment       │
              │     by 59 EDU        │
              │    (1993−2005)       │
              └──────────────────────┘
```
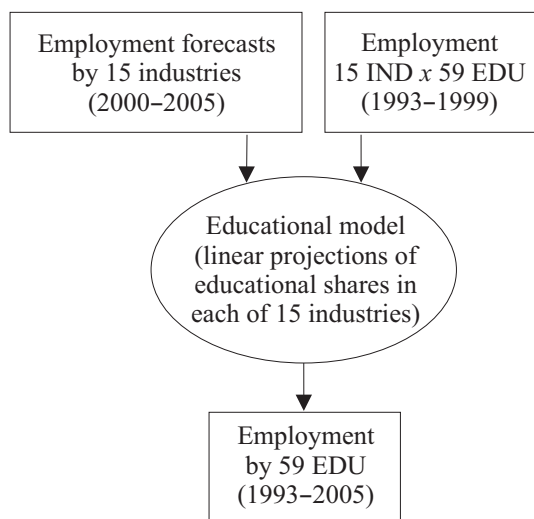
■ APPENDIX B – TEXTS

B.1 Background for Employment Trends

When the social and economic transformation of the country officially started in 1991, the economy experienced an unparalleled, though possibly partly misreported, decrease in aggregate output. Such a decline continued for two more years. A moderate rebound started in 1994, followed by strong growth. In 1997 several dramatic events took place: an exchange rate and financial market crisis and summer flooding. By the end of 1998, the country was in a recession. The decline of aggregate output continued throughout the first half of 1999.

The recession is often blamed on serious shortcomings of the voucher privatisation and on flaws in the enforcement of the country's legal system. However, the recession has been also largely driven by aggregate demand, with standard transmission mechanisms, making it similar to cyclical recessions in developed economies: The unsustainable growth of wages (2.5 times faster than labour productivity growth) was the most important labour market-related cause of recession. Wage growth slowed down in 1998.

The total size of the population has been stable up to now, but it will change substantially over the next 30 years. Substantial ageing is expected to start in the second half of the next decade. The gross birth rate is now at its lowest point in the last two centuries and ranks bottom in Europe. Emigration appears, so far, to be a negligible source of changes in the size of the labour force size. Internal (within-country) migration was relatively low in the early 1990s and actually appears to have declined since then.

The transition witnessed a persistent decline of employment in agriculture, mining, and other heavy industries and these declines are likely to continue. The current structure of employment is not much different from that of the EU countries. Three-quarters of all those employed work in the private sector and the private/state mixed sector. The country has a very low proportion of part-time employment by OECD country standards for both genders.

The unemployment rate has been rising steadily during 1996–1999. By early 2000, it came close to 10 percentage points, but it decreased somewhat sine then.

B.2 Notes from Expert Workshops

1) Except for the HERMIN model, there is no other sectoral model of the Czech economy.
   a) The Ministry of Finance and Czech National Bank run their one-sector model.
   b) The Czech Statistical Office may be able to resurrect their older model.

2) Experts agreed that the best operational practice is to combine different approaches to get the best predictions of (15) sectoral employment time series. The recommendation was to use either HERMIN forecasts or directly predict employment using past trends (of different lengths). The raw forecasts should be sent to experts and the predicted series should be modified in cases of a consistent agreement of surveyed experts. Further, employment structures and trends in similar EU countries should be also reflected.

3) The Czech labour market consists of many regional segments because of low territorial mobility, which should ideally be reflected in the forecasts. This is true. Our model, however, cannot reflect this important dimension given data limitations. To provide regional forecasts either there would have to be a LFS for each region or the grouping of education types and occupations would have to become very crude and hence meaningless.

4) Current educational structures do not allow us to create indicators for joint cross-fields of education (e. g. management in construction, etc.).

5) Graduates vs. graduates entering the labour market
   a) It is important to exclude applicants who graduated from secondary school years ago in estimating the rate p of students enrolled in universities.
   b) Life-long learning is not reflected in the data on school graduates. It is partly captured by our estimate of replacement demand, but this is not sufficient. Any further step to reflect life-long education would require new data collection.
   c) The flow of graduates out of the labour market is neglected at the current stage.

6) Some patterns are specific only for big markets like Prague or Brno. These can only be handled by experts filtering the quantitative predictions.

7) In future, VŠPS will introduce identification of VOŠ. This should be incorporated.

■ APPENDIX – FIGURES AND TABLES

Figure A.4: Errors in clusters
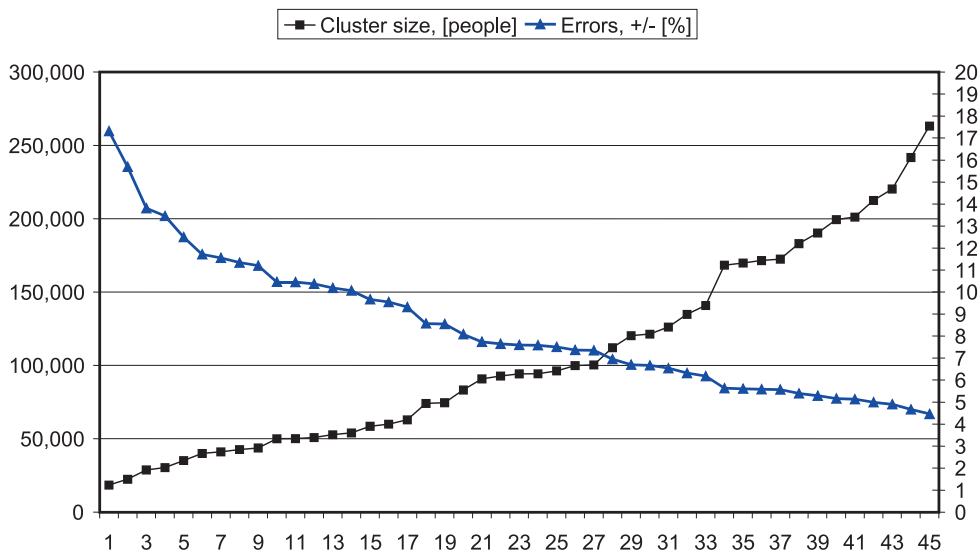
Figure A.5: Errors in clusters
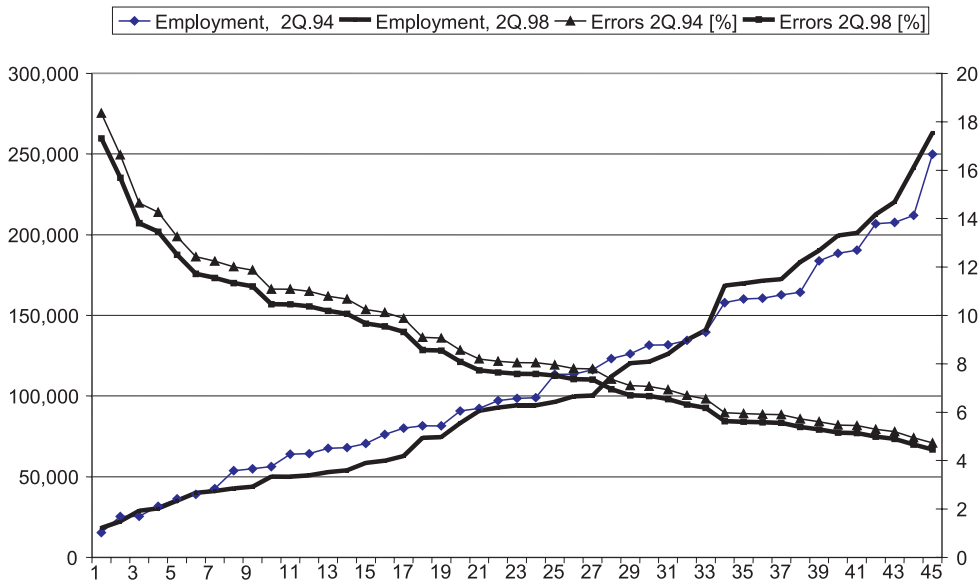
Figure B.1: **Hermin Forecast of Employment in LA-Agriculture, LT-Tradable Goods, LN-Nontradable Sector (Services), and LG-Government Sector (Public Services)**
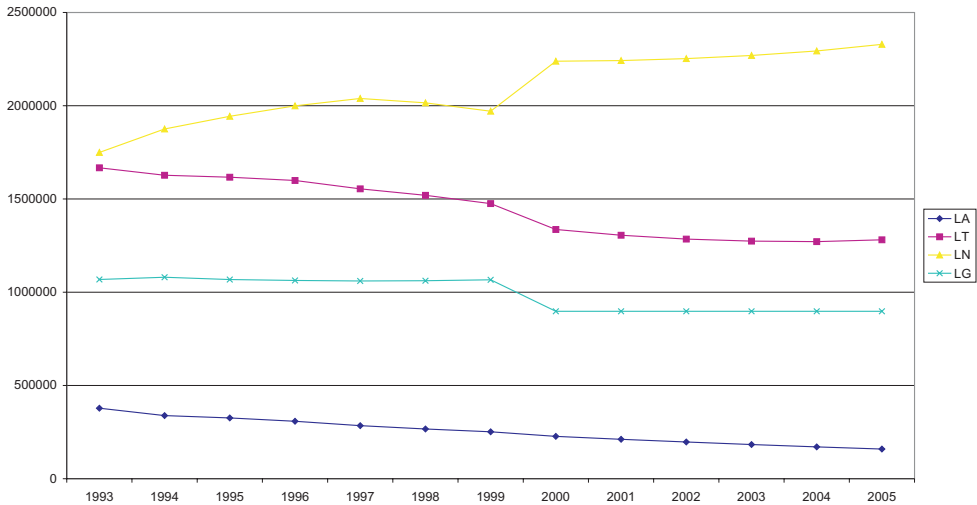
Figure B.2: **Optimistic Scenario of Employment in LA-Agriculture, LT-Tradable Goods, LN-Nontradable Sector (Services), and LG-Government Sector (Public Services)**
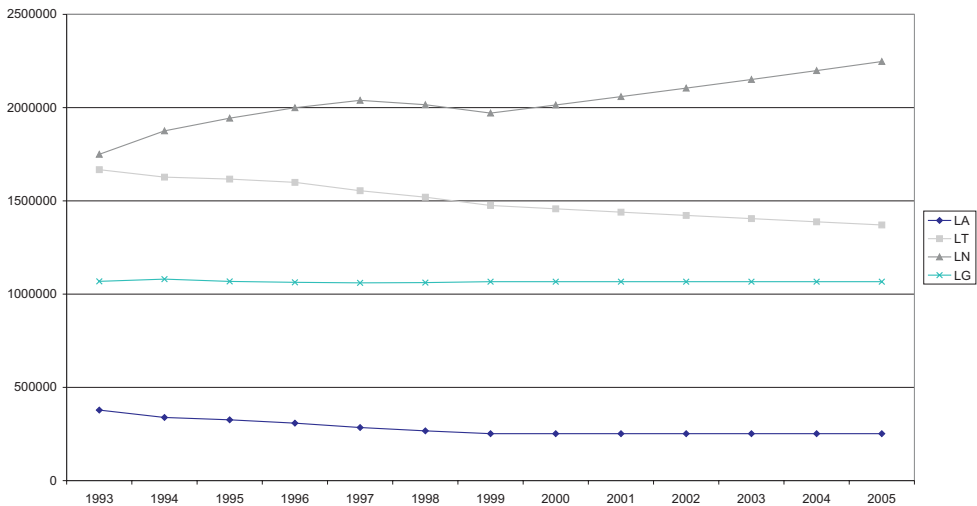
Figure B.3 Total employment in our neutral and optimistic scenario
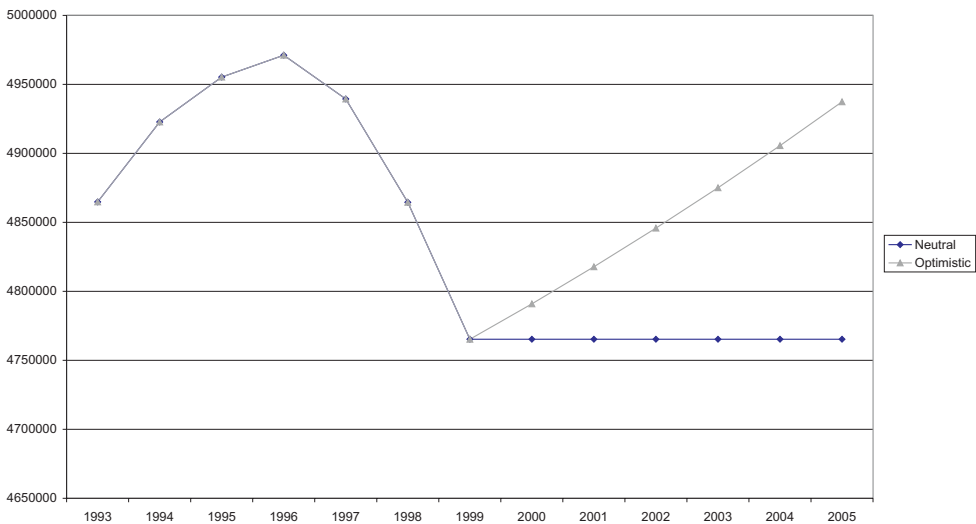
Figure B.4 Agriculture Employment in the EU
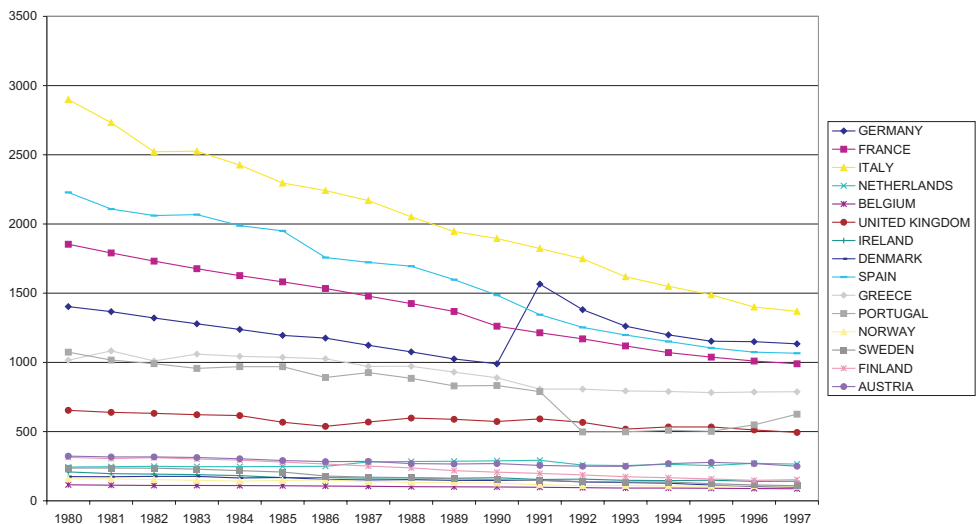
Figure B.5 Industry Employment in the EU
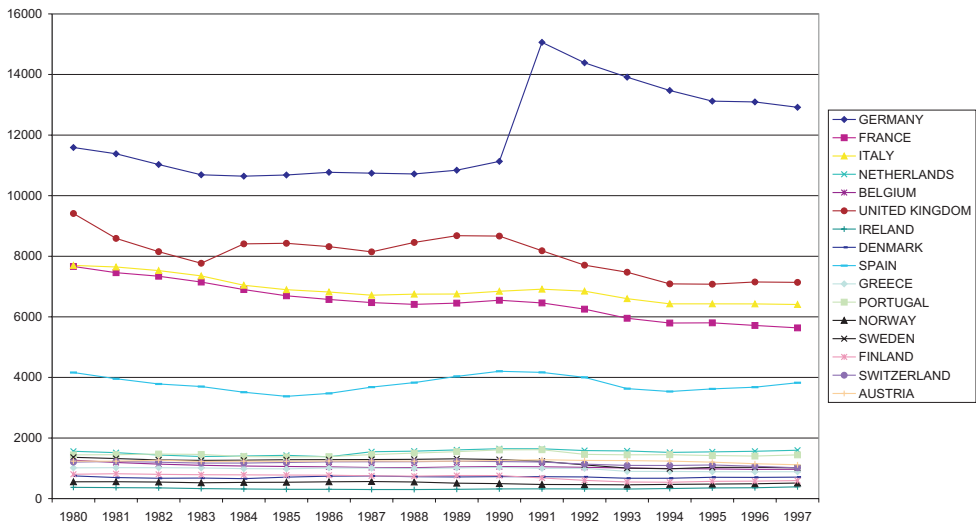
Figure B.6 Employment in Services in the EU
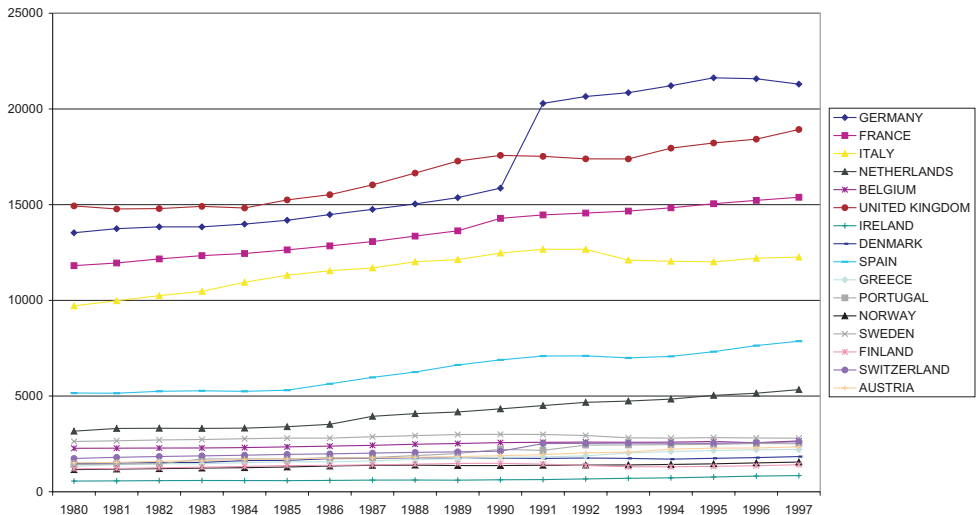
Figure B.7 Share of Employment in Agriculture in the EU
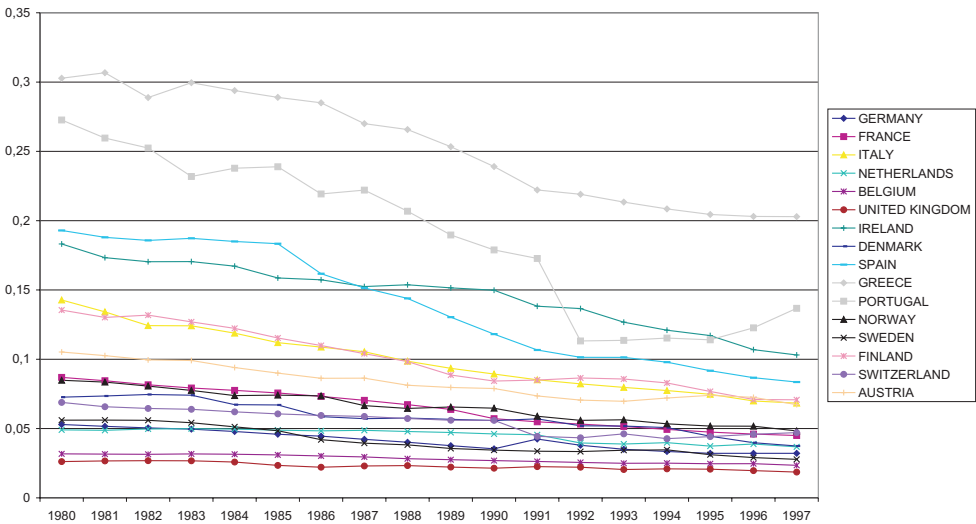
Figure B.8 Share of Employment in Industry in the EU
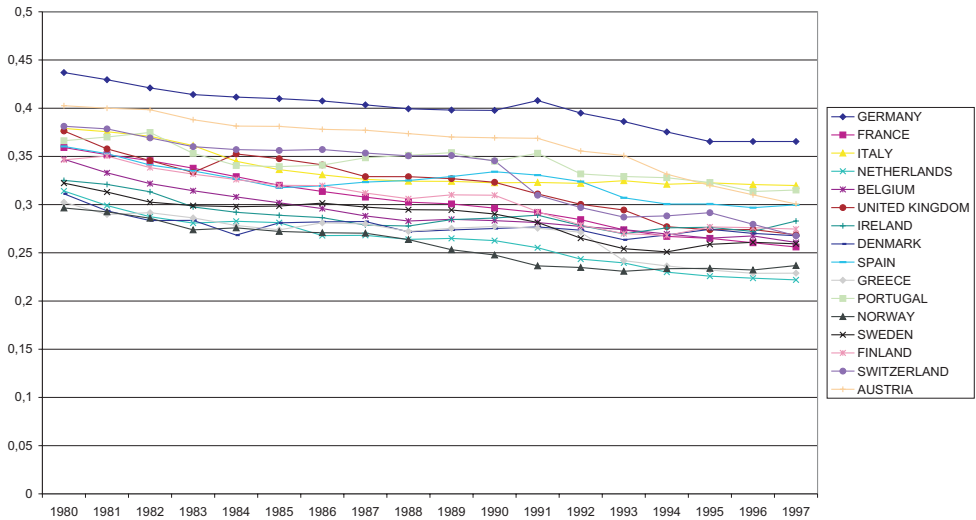
Figure B.9 Share of Employment in Services in the EU
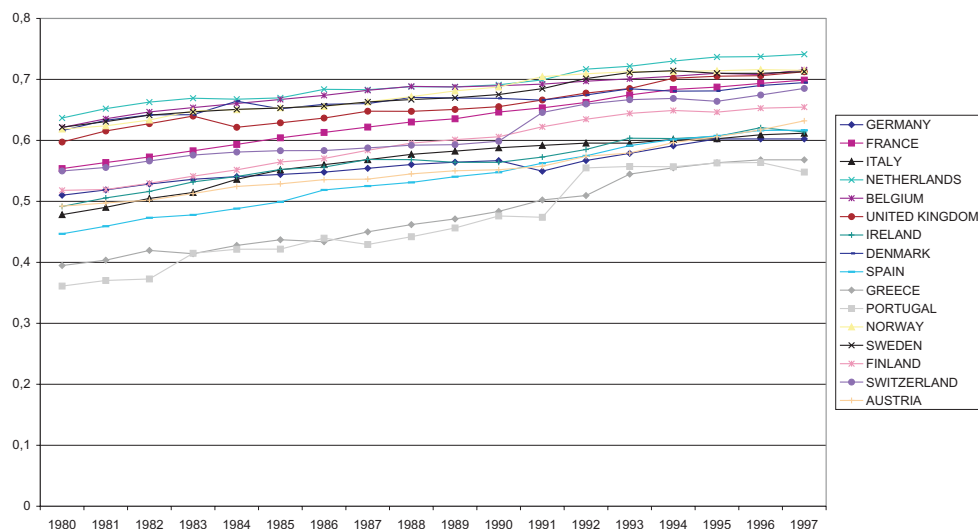
Figure B.10 Trends in Sectoral Employment in Italy
(Trends for other EU countries are available on the CD-ROM.)
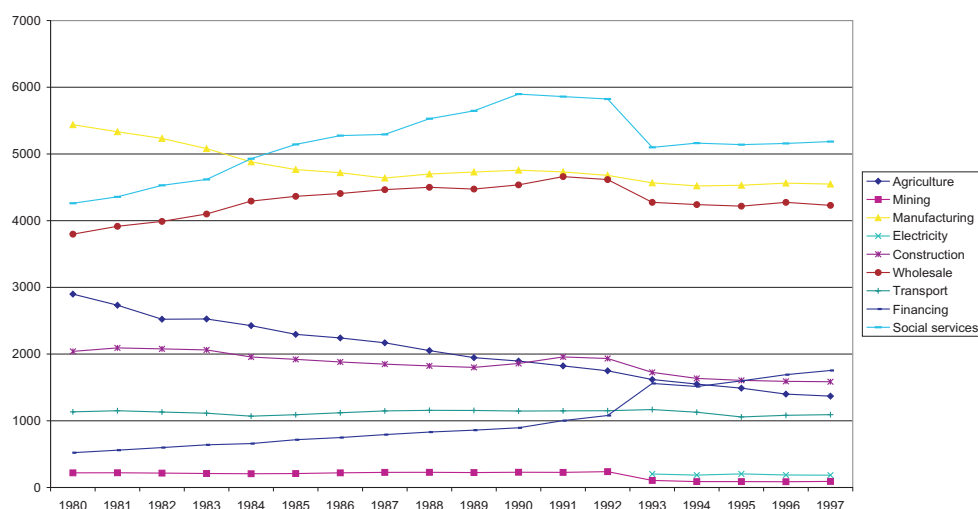
Figure B.11 Comparison of Replacement demand by Education genearted by the Fixed Coefficient Model with the commulated outlflow observed over last five years (SAB = same as before)
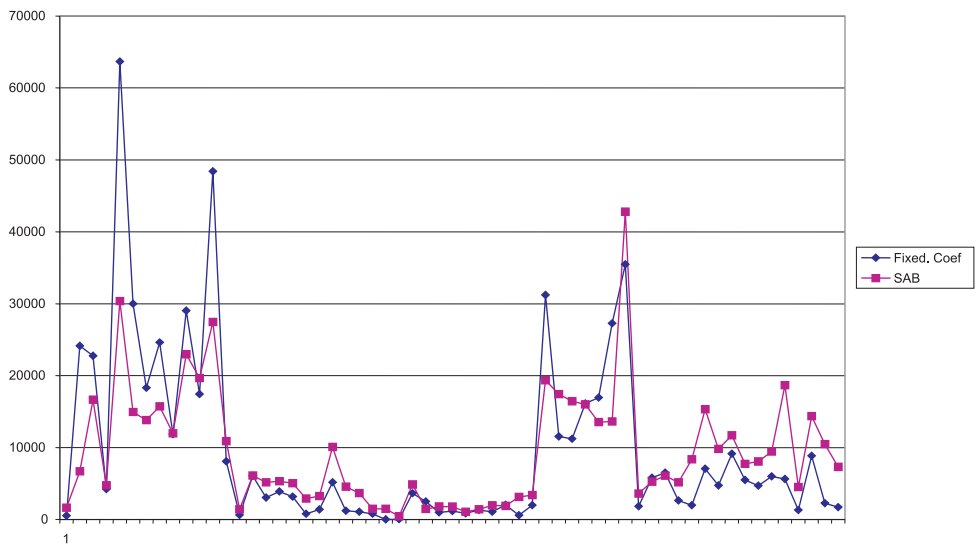
Figure B.12 Comparison of Predicted Shortages by Education Type across 3 Macro-economic Scenarios
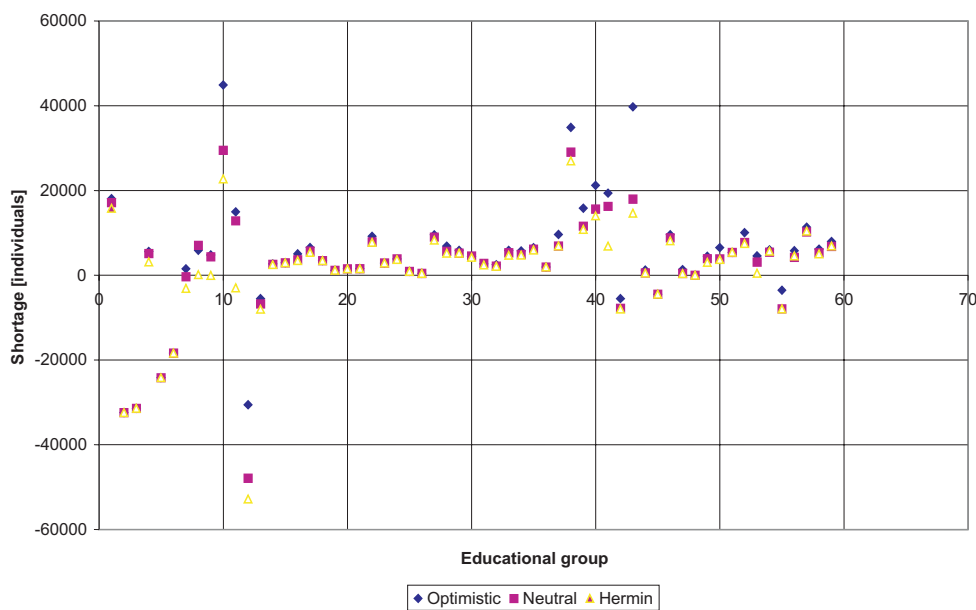
Figure B.13 Expansion Demand by 50 Occupational Clusters
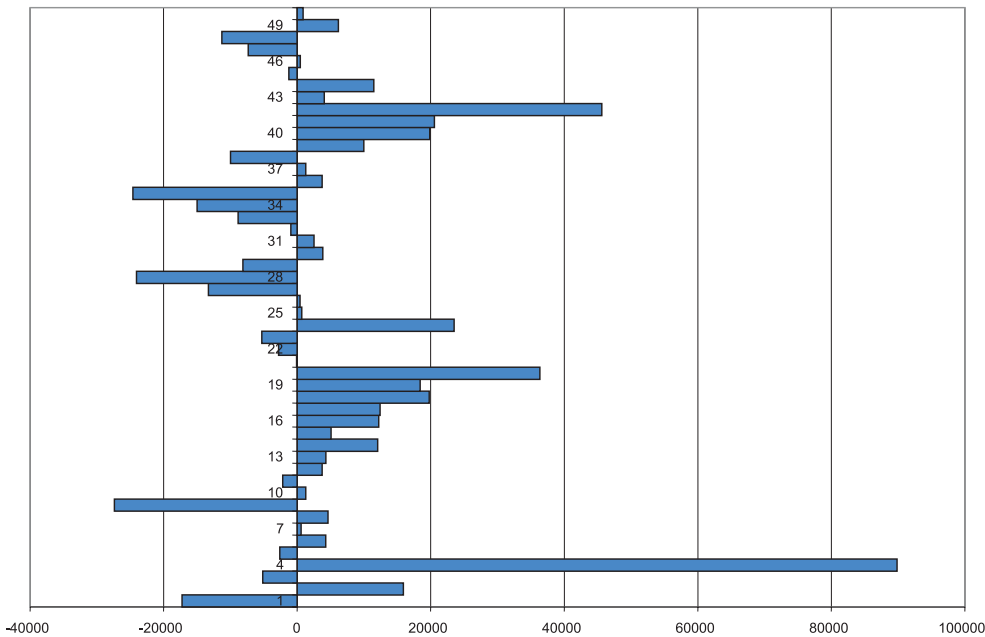
Figure B.14 Replacement Demand by 50 Occupational Clusters
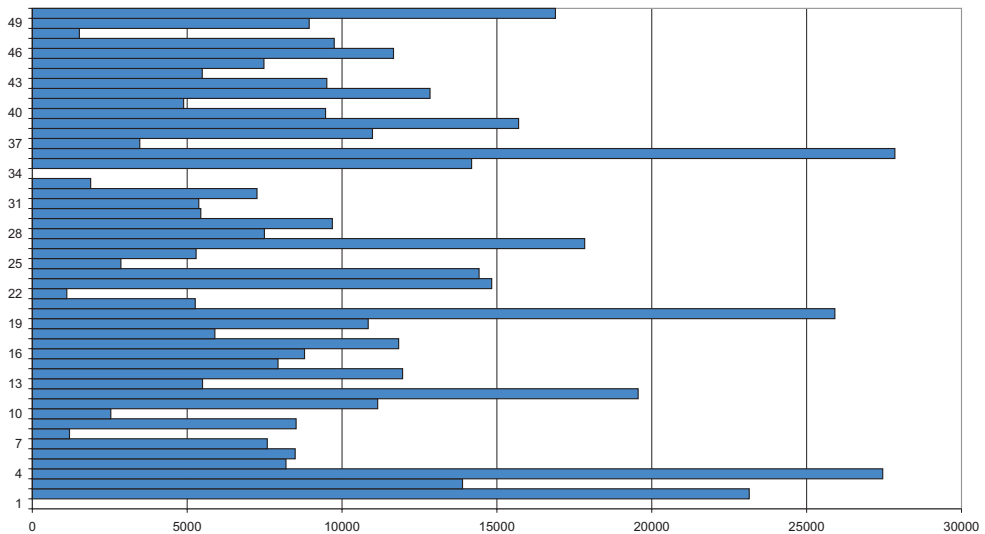
Figure B.15 Job Openings by 50 Occupational Clusters
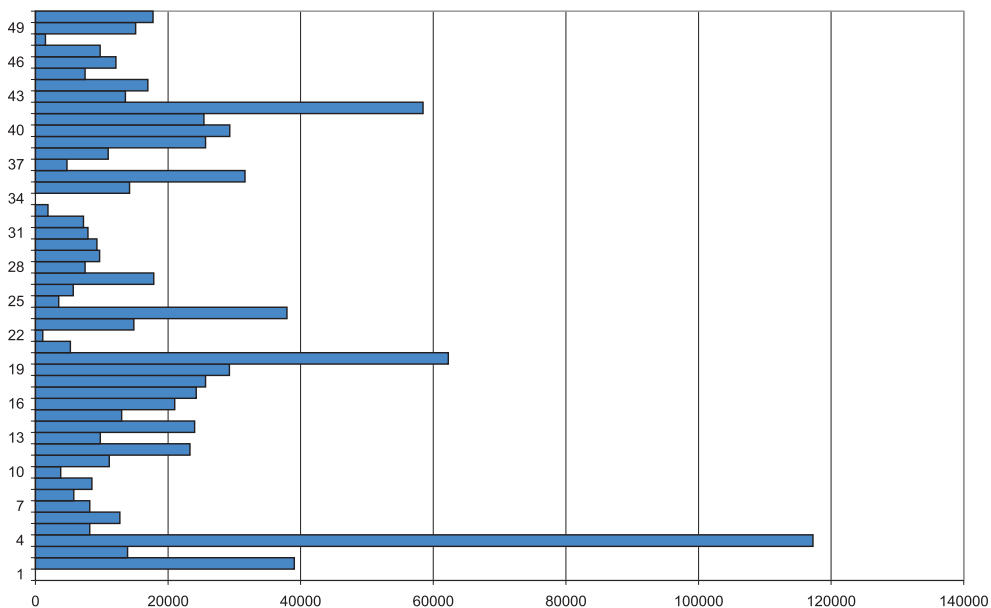
Figure B.16 Expansion demand by Industry (forecasts for 2000–2005)
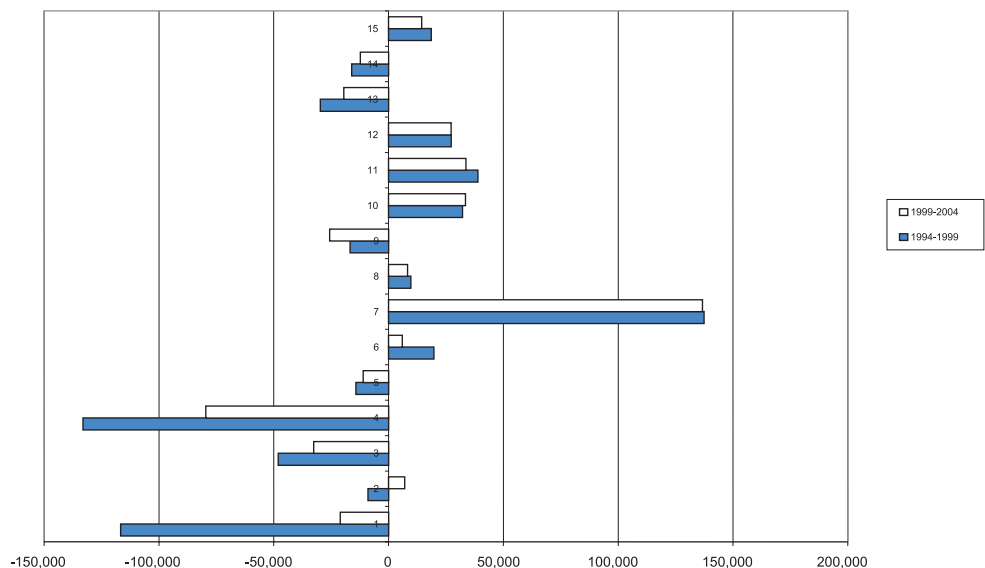
Figure B.17 Expansion demand by Education (forecasts for 2000–2005)
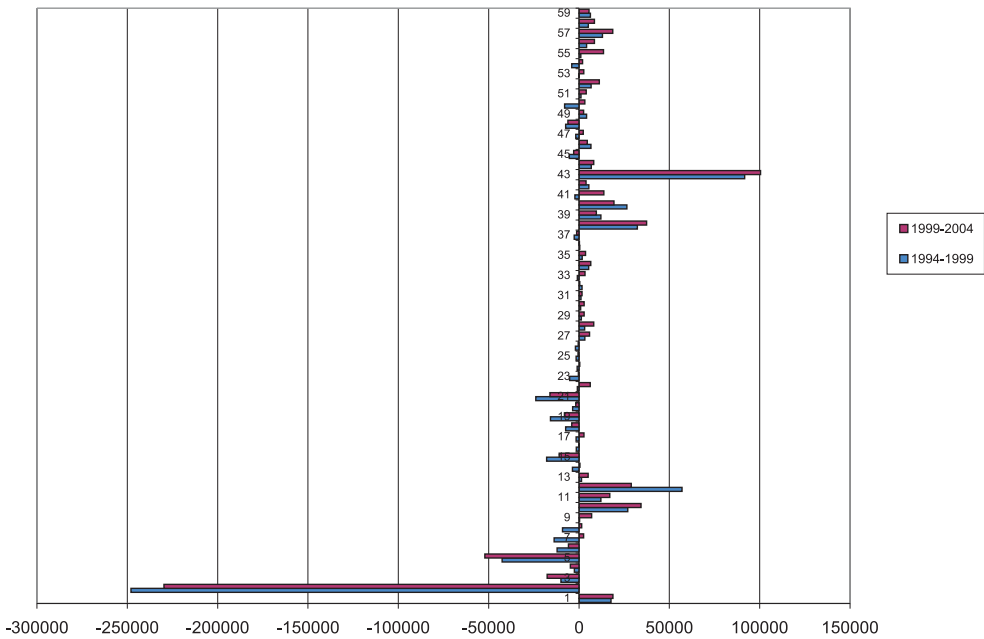
Figure B.18 Expansion demand by Occupation (forecasts for 2000–2005)
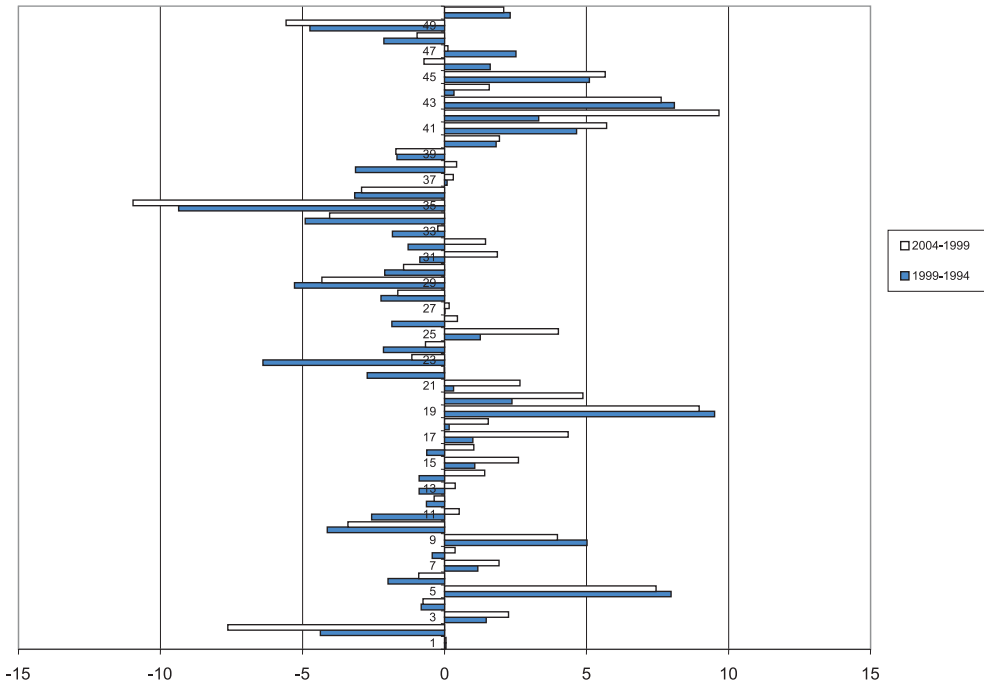
Figure B.19 Scale Effect by Education (forecasts for 2000–2005)
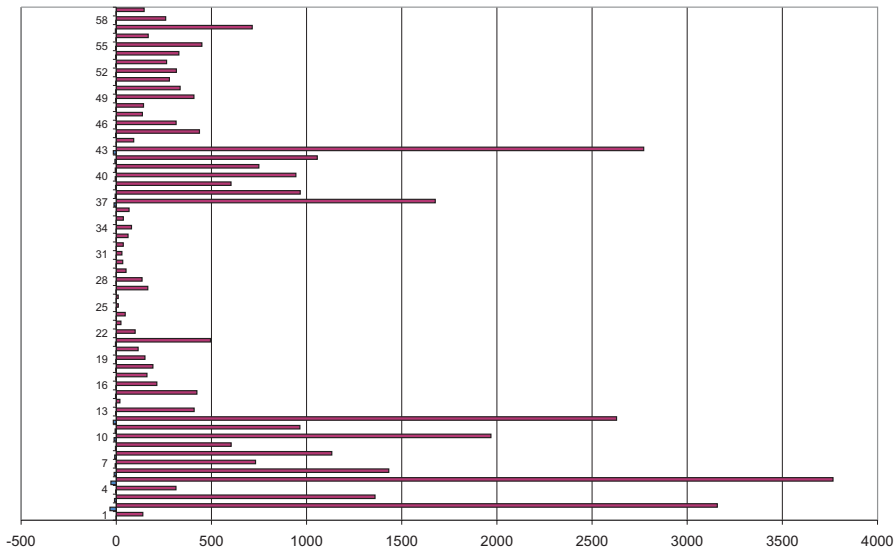
Figure B.20 Industry Effect by Education (forecasts for 2000–2005)
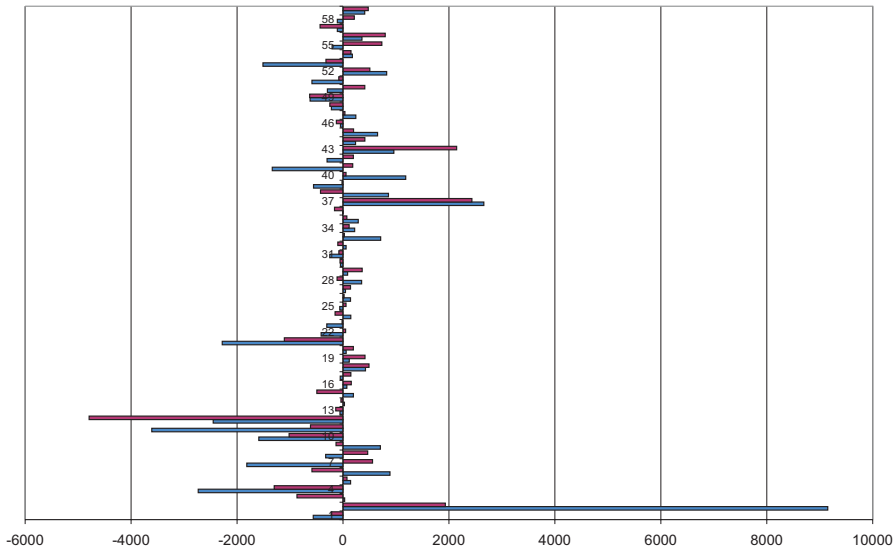
Figure B.21 Educational Effect by Education (forecasts for 2000–2005)
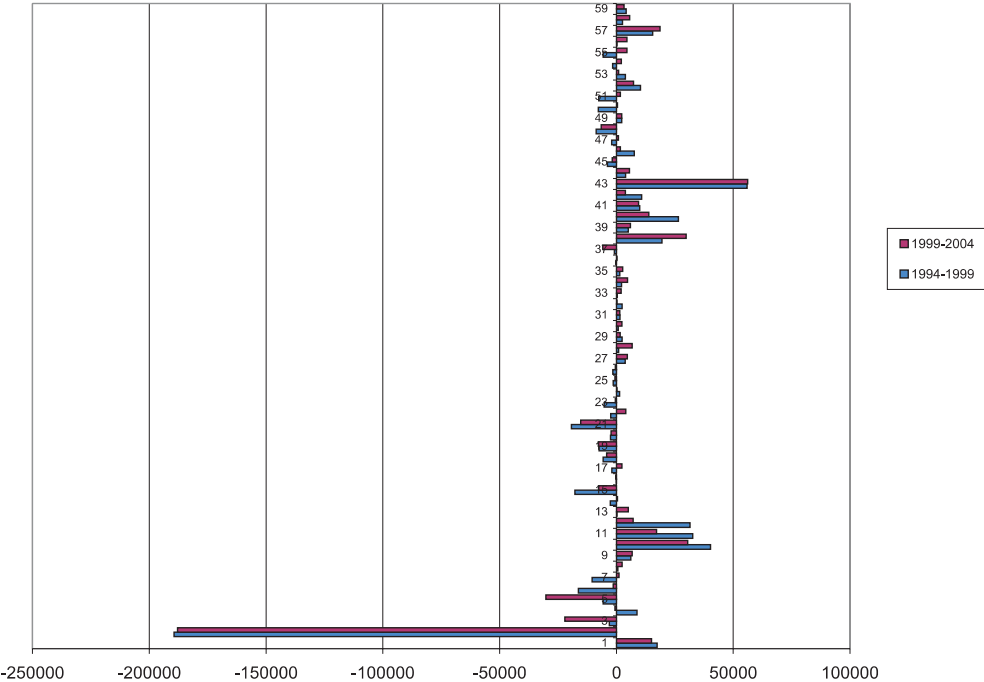
Figure B.22 Scale effect by Occupation (forecasts for 2000–2005)
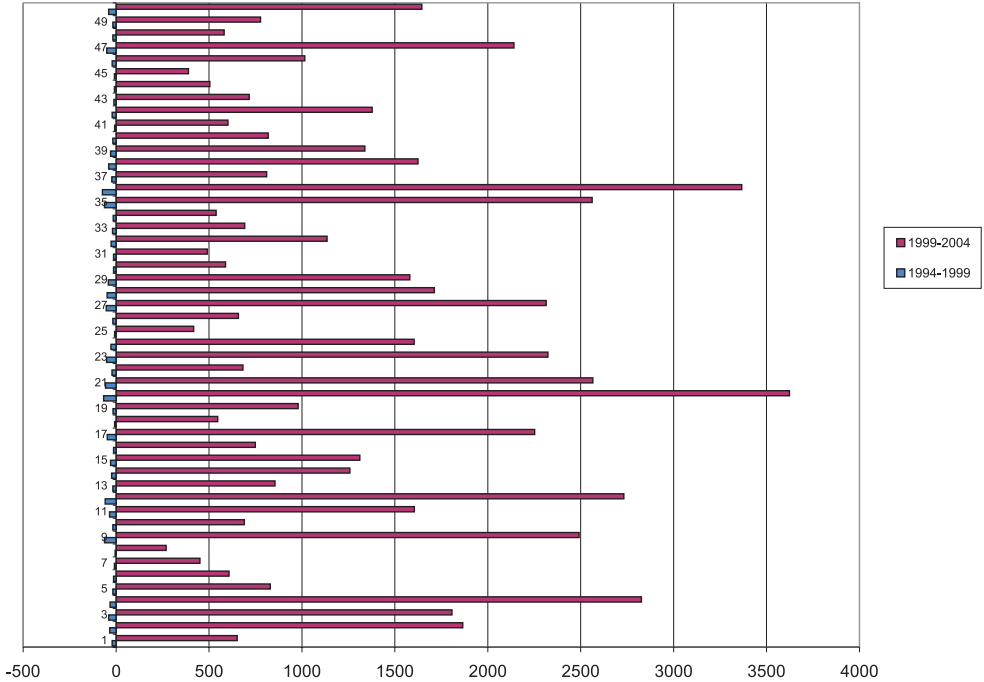
Figure B.23 Industry effect by Occupation (forecasts for 2000–2005)
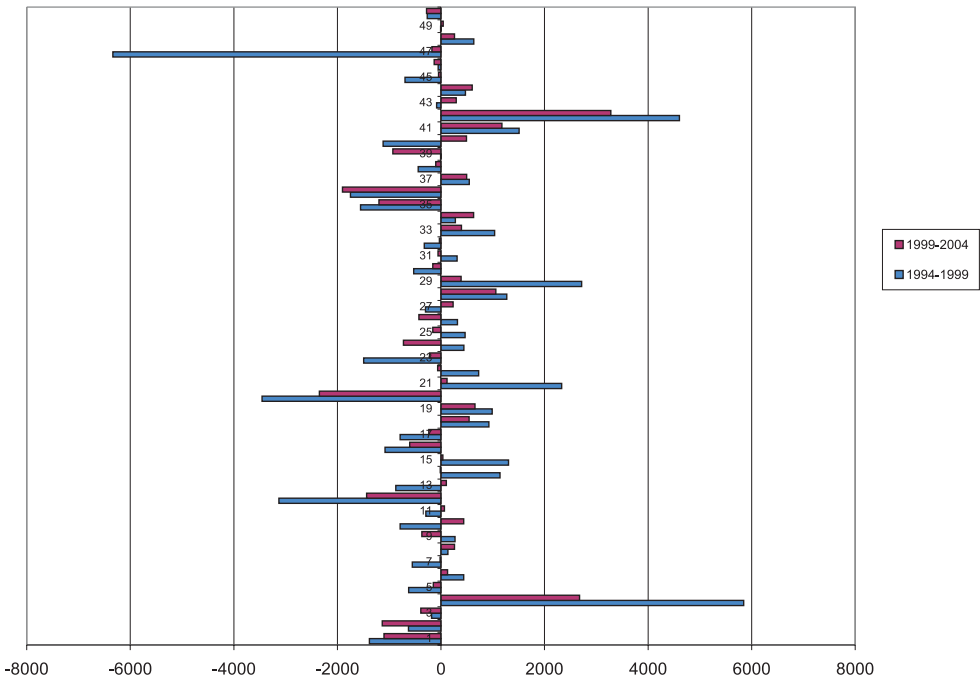
Figure B.24 Occupational effect by Occupation (forecasts for 2000–2005)
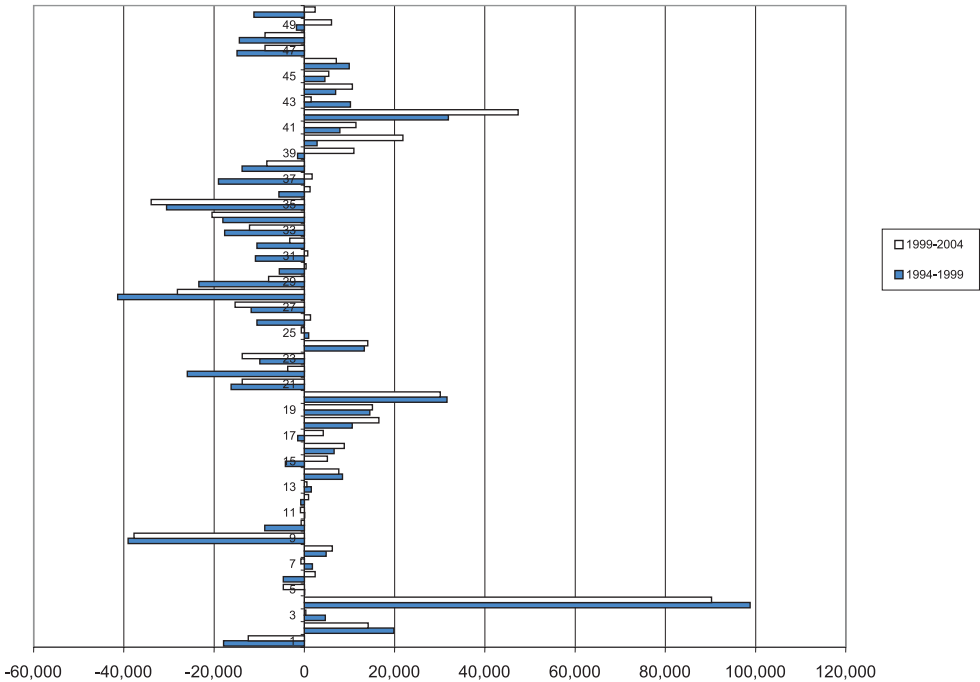
Figure B.25 Gini-Hirshman indices by education, 1994–1996 and 1997–1999
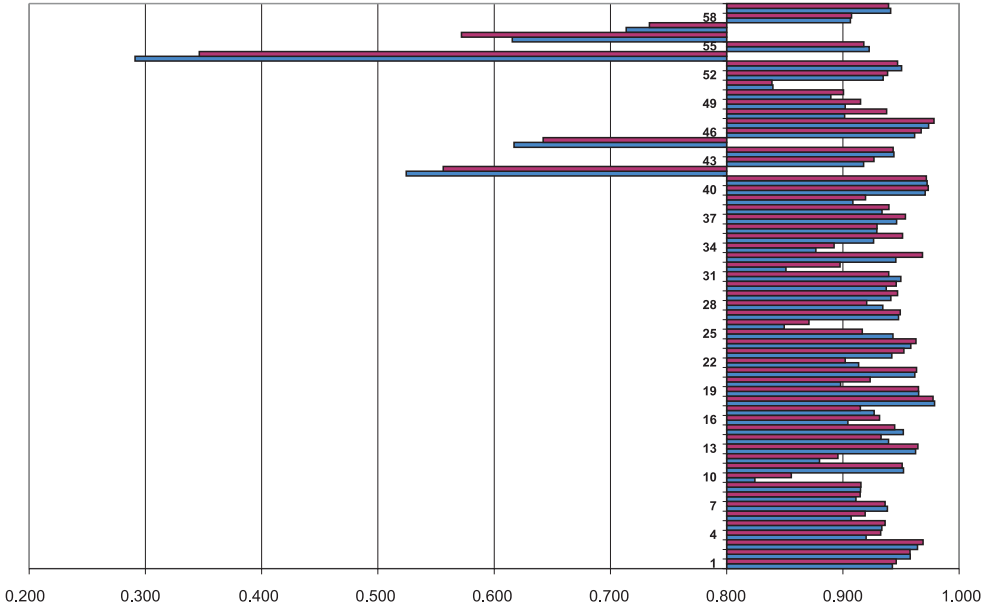
**Figure B.26 Changes in Gini-Hirshman indices by education [x100], (1997–1999 average
minus 1994–1996 average)**
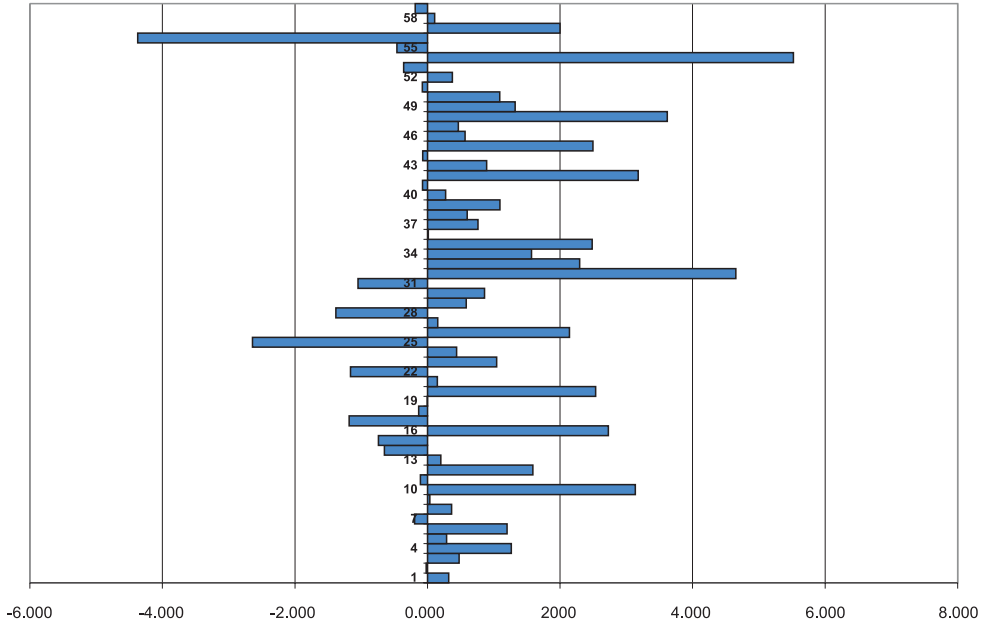
Figure B.27 Age structure of two selected occupations and two types of education
Horizontal axes correspond to 9 age groups (see Section 1.2.2 Part I of this Final Report).
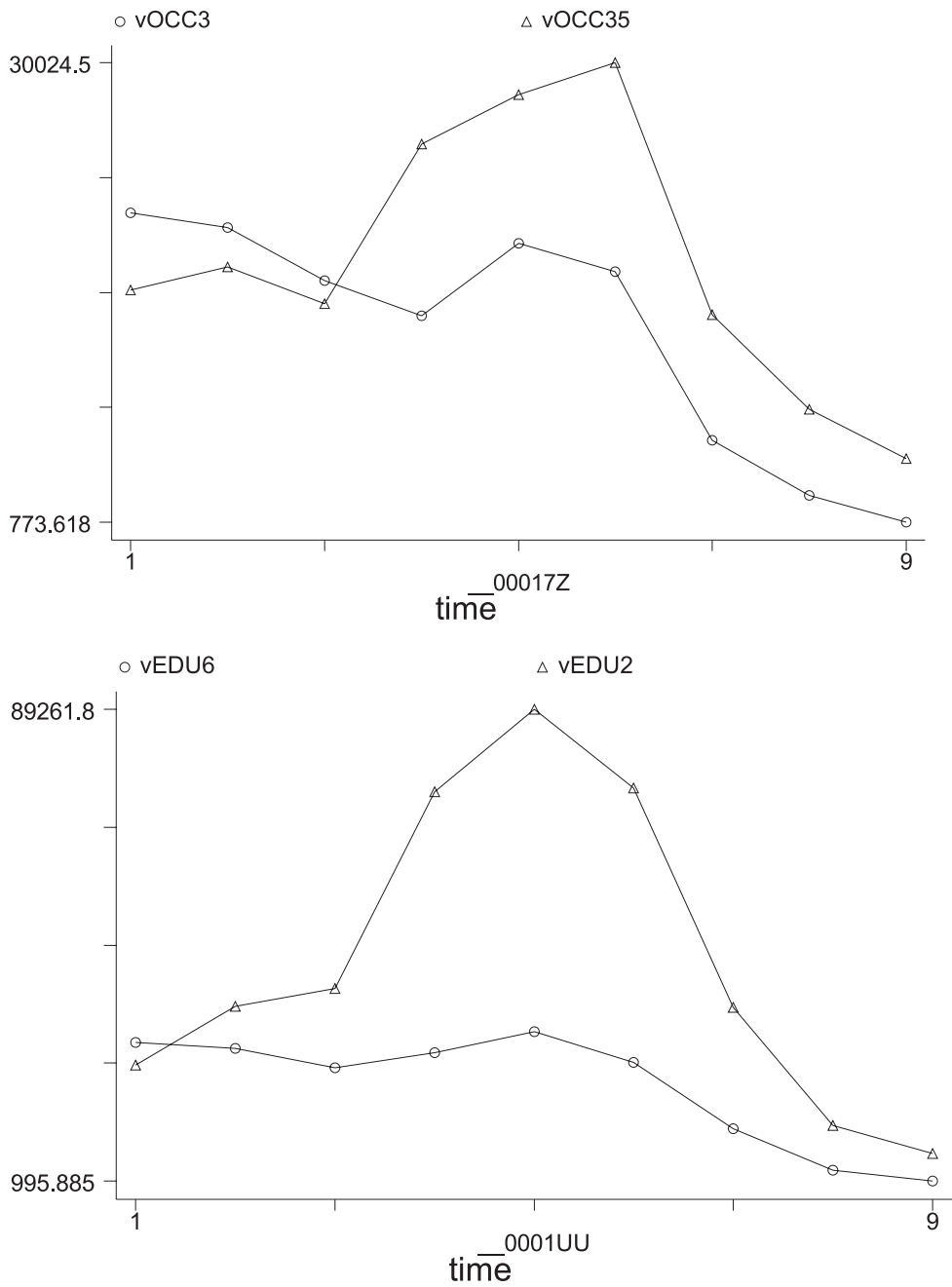
Figure A.6   Flows of school-leavers between defferent types of education

PhD

27

doctoral
studies
ISCED 6

24

Mgr., Ing., MUDr., MVDr., ...

Bc.

22

ISCED 5A   *ISCED 5A*   *ISCED 5B*

HIGHER EDUCATION INSTITUTIONS   Bachelor   HIGHER PROFESSIONAL

Master studies   studies   SCHOOLS

19

5   4   4   3   3,5   2

"maturita" exam

ISCED 4A
follow-up
studies

20
19

13
12   *ISCED 3A*   *ISCED 3A*   *ISCED 3A*
11   GYMNASIUM   SECONDARY TECHNICAL   SECONDARY VOCATIONAL
10   SCHOOL   *ISCED 3C*   SCHOOL   *ISCED 3C*
15   9   8   6   4   4   3   2   4   3   2   1

(n.a.)

15
14   9
8   6   2nd stage
7
11   6   8   *ISCED 2*
10   5
4   **BASIC SCHOOL**
3
2   1st stage
6   1   *ISCED 1*

KINDERGARTEN   *ISCED 0*

3

AGE   YEARS

COMPULSORY EDUCATION

SPECIAL SCHOOLS

Explanatory notes:

final examination	next education level (considered in the model)
"maturita" examination	next education level (neglected)
state/doctoral examination	work life (considered in the model)
absolutorium	work life (neglected)

The arrows with bold lines show flows included in the model. The dashed arrows show neglected flows.

Table A.1 Industry Classification

		Classification of industries (Czech Statistical Office)			**Corresponding sector (HERMIN macro-model)**	
No	**Code**	**Industry group**	**Empl in '98**	**Code**	**Sector**	**Empl in '98**
1	Agr&Hunt	Agriculture, hunting, and related service activities	216 815	A	Agriculture	268527,29
2	Forestr	Forestry, fishing, operation of fish hatcheries and farms	51 712	A		
3	Min&Qua	Mining and quarrying	87 483	T	Traded (manufacturing)	1523723,43
4	Manufac	Manufacturing	1 343 546	T		
5	El&Gas&W	Electricity, gas and water supply	92 694	T		
6	Constr	Construction	482 357	N	Non traded (market services)	2019952,17
7	Trade	Trade, rep. of mot. vehicules and pers. and household goods	639 021	N		
8	Hotel&R	Hotels and restaurants	176 203	N		
9	Tran&Com	Transport, storage and communications	373 442	N		
10	Fin&Ins	Financial intermediation and insurance	96 616	N		
11	RealEst	Real estate, renting and business activities	252 313	N		
12	PubAd&De	Public administration and defense; compulsory soc. security	320 177	G	Government (public services)	1061638,2
13	Educ	Education	296 858	G		
14	Hlth&Soc	Health and social work	265 662	G		
15	OtherCo	Other community, social and personal services	178 942	G		
			Total 4 873 841			*Total* 4 873 841

Table A.2a Occupational Classification

Classification of occupations at the first-digit level (CZ ISCO-88)

Code		Occupational group	Empl in '98
1	ArmFor	Armed forces	45 935
2	Legisl	Legislators, senior officials and managers	323 686
3	Profess	Professionals	464 258
4	Technic	Technicians and associate professionals	875 237
5	Clerks	Clerks	392 617
6	SerWork	Service workers and shop and market sales workers	601 820
7	SkillAgr	Skilled agricultural and forestry workers	105 745
8	Craft	Craft and related trade workers	1 027 675
9	MachiOp	Plant and machine operators and assemblers	616 404
10	ElemOcc	Elementary occupations	420 464
		Total	*4 873 841*

Clustering of occupations (50 clusters from 119 three-digit level groups)

Cluster	ISCO-88	Title	Esample	Epopul
1	11	011Armed forces	308	42 409
2	122	122 Production and operations department managers	420	60 917
2	341	341 Finance and sales associate professionals	493	74 002
3	123	123 Other departmental managers	219	30 280
3	213	213 Computing professionals	163	26 049
3	312	312 Computer associate professionals	203	32 065
3	315	315 Safety and quality inspectors	144	20 987
3	345	345 Police inspectors and detectives	116	17 366
4	131	131 Small firm managers	1 374	201 113
5	214	214 Architects, engineers and related professionals	370	58 538
6	222	222 Health professionals (except nursing)	279	42 723
7	232	232 Secondary education teaching professionals	221	28 838
8	242	242 Legal professionals	120	18 389
9	311	311 Physical and engineering science technicians	1 202	183 055
10	321	321 Life science technicians and related associate professionals	366	52 770
11	322	322 Modern health associate professionals (except nursing)	149	22 382
11	323	323 Nursing and midwifery associate professionals	621	94 274
12	343	343 Administrative associate professionals	1 352	199 535
13	411	411 Secretaries and keyboard-operating clerks	402	62 931
14	412	412 Numerical clerks	602	90 832
15	413	413 Material-recording and transport clerks	668	94 323
16	421	421 Cashiers, tellers and related clerks	371	54 019
17	512	512 Housekeeping and restaurant services workers	1 126	169 796
18	514	514 Other personal service workers	256	39 996
19	516	516 Protective services workers	489	74 618
20	521	521 Shop salespersons and demonstrators	1 785	263 198
21	522	522 Outside (Open air) markets salespersons	86	14 150
21	614	614 Forestry and related workers	109	16 900
21	814	814 Wood processing and papermaking plant operators	158	23 771
21	823	823 Rubber and plastic products machine operators	153	22 014
21	827	827 Food and related products machine operators	126	17 906

Cluster	ISCO-88	Title	Esample	Epopul
21	829	829 Other machine operators and assemblers	138	18 933
21	914	914 Building caretakers, window and related cleaners	140	21 217
21	916	916 Garbage collectors and related labourers	187	27 337
21	921	921 Agricultural, fishery and related labourers	84	12 199
21	316	316 Railroad laborers	142	21 156
22	612	612 Market-oriented animal producers and related workers	387	50 117
23	712	712 Building frame and related trades workers	1 131	171 464
24	713	713 Building finishers and related trades workers	776	120 324
25	714	714 Painters, building structure cleaners and related trade workers	199	30 385
26	721	721 Metal moulders, welders, sheet-metalworkers, structural-metal preparers	337	50 066
27	722	722 Blacksmiths, toolmakers and related trades workers	1 149	172 482
28	723	723 Machinery mechanics and fitters	834	126 144
29	724	724 Electrical and electronic equipment mechanics and fitters	721	112 047
30	741	741 Food processing and related trades workers	306	43 722
31	742	742 Wood treaters, cabinet-makers and related trades workers	234	35 147
32	743	743 Textile, garment and related trades workers	579	83 333
33	812	812 Metal-processing plant operators	157	24 864
33	821	821 Metal and mineral products machine operators	181	26 048
34	826	826 Textile, fur and leather products machine operators	299	41 149
35	828	828 Assemblers	384	54 051
35	915	915 Messengers, porters, doorkeepers and related workers	317	42 748
35	931	931 Mining and construction labourers	231	35 644
35	933	933 Transport labourers and freight handlers	371	57 901
36	831	831 Locomotive engine-drivers and related workers	213	31 479
36	832	832 Motor vehicle drivers	1 420	212 547
37	833	833 Agricultural and other mobile plant operators	422	59 987
38	913	913 Domestic and related helpers, cleaners and launderers	843	121 341
39	932	932 Manufacturing labourers	654	96 339
40	241	241 Business professionals	378	57 061
41	244	244 Social sciences and related professionals	289	42 807
42	342	342 Business services agents and trade brokers	283	44 705
42	419	419 Other office clerks	222	33 328
42	422	422 Client information clerks	132	20 313
43	344	344 Customs, tax and related government associate professionals	156	22 259
43	414	414 Library, mail and related clerks	216	31 727
44	111	111 Legislators	36	4 255
44	112	112 Senior government officials	35	5 201
44	114	114 Senior officials of special interest organizations	8	1 226
44	121	121 Directors and chief executives	37	4 366
44	115	115 Managers and supervisory workers of district and municipality offices	27	4 067
44	247	247 Other administrative workers.	101	16 104
44	349	349 Workers of religious organizations	5	701
45	211	211 Physicists, chemists and related professionals	70	9 684
45	212	212 Mathematicians, statisticians and related professionals	12	1 748
45	221	221 Life science professionals	49	6 370

Cluster	ISCO-88	Title	Esample	Epopul
45	243	243 Archivists, librarians and related information professionals	37	3 853
45	246	246 Religious professionals	9	168
46	313	313 Optical and electronic equipment operators	36	6 456
46	314	314 Ship and aircraft controllers and technicians	24	3 718
46	333	333 Special education teaching associate professionals	38	5 617
46	346	346 Social work associate professionals	47	6 544
46	347	347 Artistic, entertainment and sports associate professionals	57	8 387
46	348	348 Religious associate professionals	45	6 749
46	511	511 Travel attendants and related workers	103	16 236
46	513	513 Personal care and related workers	113	15 940
47	711	711 Miners, shot-firers, stonecutters and carvers	130	17 636
47	611	611 Market gardeners and crop growers	52	7 136
47	613	613 Market-oriented crop and animal producers	12	1 534
47	615	615 Fishery workers, hunters and trappers	36	4 194
47	621	621 Subsistence agricultural and fishery workers	126	26 467
47	731	731 Precision workers in metal and related materials	74	11 088
47	733	733 Handicraft workers in wood, textile, leather and related materials	11	1 959
47	734	734 Printing and related trades workers	73	10 578
47	744	744 Felt, leather and shoemaking trades workers	58	8 256
47	811	811 Mining and mineral-processing plant operators	51	8 549
47	813	813 Glass, ceramics and related plant operators	67	9 692
47	815	815 Chemical processing plant operators	75	11 423
47	817	817 Automated assembly-line and industrial robot operators	91	13 055
47	822	822 Chemical products machine operators	42	6 018
47	824	824 Wood products machine operators	27	3 156
47	825	825 Printing, binding and paper products machine operators	62	9 711
47	834	834 Ships' deck crews and related workers	6	1 198
47	911	911 Street vendors and related workers	21	3 359
47	912	912 Shoe cleaning and other street services' elementary occupations	1	83
48	732	732 Potters, glass-makers and related trades workers	128	18 942
48	816	816 Power production and related plant operators	138	20 009
48	818	818 Operators of machinery for railroad constructions and repairs	8	1 319
49	231	231 College, university and higher education teaching professionals	86	9 843
49	234	234 Special education teaching professionals	71	9 917
49	235	235 Other teaching professionals	62	8 481
49	245	245 Writers and creative or performing artists	148	16 495
50	331	331 Primary education teaching associate professionals	519	74 160
50	332	332 Pre-primary education teaching associate professionals	102	14 709
50	334	334 Other teaching associate professionals	39	6 740
50	233	233 Primary and pre-primary education teaching professionals	178	26 640
			32 346	4 792 259

Table A.2b: An Expert Clustering of Occupations – Czech Version

Cluster	Name of occupational cluster	ISCO	Name of original ISCO occupation
N1	**Zemědělští, lesní a rybářští dělníci**		
N13	/zemědělští mechanizátoři a operátoři	8331	Obsluha zemědělských a lesních strojů
N18	/pěstitelé a chovatelé, zemědělci	611	Zahradníci a pěstitelé orientovaní na trh
N18	/pěstitelé a chovatelé, zemědělci	612	Chovatelé zvířat pro trh a pracovníci v příbuzných oborech
N18	/pěstitelé a chovatelé, zemědělci	613	Pěstitelé a chovatelé orientovaní na trh (smíšené hospodářství)
N18	/pěstitelé a chovatelé, zemědělci	621	Samozásobitelští zemědělci a rybáři
N18	/pěstitelé a chovatelé, zemědělci	9211	Pomocní a nekvalifikovaní dělníci v zemědělství
N19	/lesní a rybářští dělníci	614	Kvalifikovaní dělníci v lesnictví a v příbuzných oborech
N19	/lesní a rybářští dělníci	615	Kvalifikovaní dělníci v rybářství a myslivosti
N19	/lesní a rybářští dělníci	9212	Pomocní a nekvalifikovaní dělníci v lesnictví
N19	/lesní a rybářští dělníci	9213	Pomocní a nekvalifikovaní dělníci v rybářství
N19	/lesní a rybářští dělníci	9214	Pomocní a nekvalifikovaní dělníci v myslivosti
N2	**Dělníci při těžbě a úpravě surovin v hutnictví, energetice a ve vodním hospodářství**		
N21	/dělníci hlubinné a povrchové těžby uhlí, rud a dalších surovin	711	Horníci při dobývání surovin, dělníci pro práci s výbušninami a kameníci
N21	/dělníci hlubinné a povrchové těžby uhlí, rud a dalších surovin	8111	Obsluha důlního zařízení a razicích štítů
N22	/hutnická dělnická zaměstnání	812	Obsluha zařízení na zpracování kovů
N29	/úpraváři, těžaři, dělníci v energ., vodárenství a vod. hosp.	8112	Obsluha zařízení na úpravu rudných a nerudných surovin
N29	/úpraváři, těžaři, dělníci v energ., vodárenství a vod. hosp.	8113	Vrtaři, jeřábníci při ropných nebo plynových vrtech, dělníci v příbuz. obor. (vč. vrtařů stud., čerp. na rop. a plyn. vrtech)
N29	/úpraváři, těžaři, dělníci v energ., vodárenství a vod. hosp.	816	Obsluha elektrárenských a příbuzných zařízení
N29	/úpraváři, těžaři, dělníci v energ., vodárenství a vod. hosp.	9311	Pomocní a nekvalifikovaní dělníci v dolech a lomech a v příbuzných oborech (těžba ropy...)
N29	/úpraváři, těžaři, dělníci v energ., vodárenství a vod. hosp.	9315	Pomocní a nekvalifikovaní pracovníci při geologickém a jiném průzkumu
N3	**Dělníci – zpracovatelé (výrobci, opraváři a údržbáři)**		
N31	/zpracovatelé chemických, gumár. a plast. výrob	815	Obsluha zařízení při chemické výrobě
N31	/zpracovatelé chemických, gumár. a plast. výrob	8221	Obsluha strojů při farmaceutické výrobě
N31	/zpracovatelé chemických, gumár. a plast. výrob	8222	Obsluha strojů na výrobu střeliva a výbušnin
N31	/zpracovatelé chemických, gumár. a plast. výrob	8225	Obsluha strojů na výrobu toaletních a kosmetických výrobků
N31	/zpracovatelé chemických, gumár. a plast. výrob	8226	Obsluha strojů na výrobu linolea nebo jiných plastových krytin
N31	/zpracovatelé chemických, gumár. a plast. výrob	8229	Obsluha ostatních strojů na výrobu chemických výrobků jinde neuvedená (např. detergentů, svíček, zápalek apod.)
N31	/zpracovatelé chemických, gumár. a plast. výrob	823	Obsluha strojů na výrobu pryžových a plastových výrobků
N32	/zpracovatelé kovů, mechanici, montéři – bez údržbářů a opr.	721	Formíři, svářeči, výrobci a opraváři výrobků z plechů, potápěčské čety a pracovníci v příbuzných oborech
N32	/zpracovatelé kovů, mechanici, montéři – bez údržbářů a opr.	722	Kováři, nástrojaři, zámečníci a pracovníci v příbuzných oborech
N32	/zpracovatelé kovů, mechanici, montéři – bez údržbářů a opr.	731	Výrobci a opraváři přesných přístrojů a nástrojů z kovů a podobných materiálů a výrobci a opraváři šperků
N32	/zpracovatelé kovů, mechanici, montéři – bez údržbářů a opr.	817	Obsluha automatických montážních linek a průmyslových robotů
N32	/zpracovatelé kovů, mechanici, montéři – bez údržbářů a opr.	8211	Obsluha automatických nebo poloautomatických obráběcích strojů (kromě seřizovačů – skupina 722)

Cluster	Name of occupational cluster	ISCO	Name of original ISCO occupation
N32	/zpracovatelé kovů, mechanici, montéři – bez údržbářů a opr.	8223	Obsluha strojů při konečné úpravě a nanášení ochranných povlaků na kovové předměty (vč. galvanizování a elektrolytického pokovování předmětů)
N32	/zpracovatelé kovů, mechanici, montéři – bez údržbářů a opr.	8281	Montážní dělníci montující mechanická zařízení (stroje, vozidla apod.)
N33	/výrobci elektrot. výrobků, elektromontéři, elektromechanici – bez údržbářů a opr.	7241	Elektromechanici, opraváři a seřizovaci různých typů elektr. zařízení, přístr., motorů, generátorů, el. částí výtahů
N33	/výrobci elektrot. výrobků, elektromontéři, elektromechanici – bez údržbářů a opr.	7244	Telefonní a telegr. mechanici, montéři a opraváři
N33	/výrobci elektrot. výrobků, elektromontéři, elektromechanici – bez údržbářů a opr.	8282	Montážní dělníci montující elektrická zařízení
N33	/výrobci elektrot. výrobků, elektromontéři, elektromechanici – bez údržbářů a opr.	8283	Montážní dělníci montující elektronická zařízení
N34	/zpracovatelé silikátových výrobků (skla, keramiky, porcelánu, stav. hmot)	732	Hrnčíři, skláři a pracovníci v příbuzných oborech (ruční výroba)
N34	/zpracovatelé silikátových výrobků (skla, keramiky, porcelánu, stav. hmot)	813	Obsluha pecí a zařízení na výrobu skla, keramiky a obsluha zařízení v příbuzných oborech
N34	/zpracovatelé silikátových výrobků (skla, keramiky, porcelánu, stav. hmot)	8212	Obsluha strojů na výrobu maltovin, vápna, cementu, prefabrikátů, výrobků z betonu, osinko – cementu
N34	/zpracovatelé silikátových výrobků (skla, keramiky, porcelánu, stav. hmot)	8219	Obsluha strojů na výrobu výrobků z jiných materiálů (např. z kamene)
N34	/zpracovatelé silikátových výrobků (skla, keramiky, porcelánu, stav. hmot)	8287	Montážní dělníci montující výrobky z kombinovaných materiálů
N35	/zpracovatelé dřeva, papíru, fotografie, knihaři a polygrafové	7331	Umělečtí zpracovatelé dřeva, kamene, kostí, hlíny a podob. mater. tradič. postupy (výr. růz. předm. pro osob. potřebu, domácnost nebo pro dekorativní účely – lidová tvorba)
N35	/zpracovatelé dřeva, papíru, fotografie, knihaři a polygrafové	734	Polygrafové, knihvazači a pracovníci v příbuzných oborech (kromě obsluhy strojů)
N35	/zpracovatelé dřeva, papíru, fotografie, knihaři a polygrafové	742	Zpracovatelé dřeva, truhláři a dělníci v příbuzných oborech
N35	/zpracovatelé dřeva, papíru, fotografie, knihaři a polygrafové	814	Obsluha zařízení na zpracování dřeva a zařízení v papírnách
N35	/zpracovatelé dřeva, papíru, fotografie, knihaři a polygrafové	8224	Obsluha strojů na výrobu fotografických materiálů (vč. tisku fotografií)
N35	/zpracovatelé dřeva, papíru, fotografie, knihaři a polygrafové	824	Obsluha automatických nebo poloautomatických dřevoobráběcích strojů
N35	/zpracovatelé dřeva, papíru, fotografie, knihaři a polygrafové	825	Obsluha tiskárenských, knihvazačských strojů a strojů na výrobu předmětů z papíru
N35	/zpracovatelé dřeva, papíru, fotografie, knihaři a polygrafové	8284	Montážní dělníci montující výrobky z kovů, pryže a plastů (např. hračky, sportovní potřeby apod.)
N35	/zpracovatelé dřeva, papíru, fotografie, knihaři a polygrafové	8285	Montážní dělníci montující výrobky ze dřeva a podobných materiálů
N36	/zpracovatelé a výrobci textilu, konfekce	7332	Umělečtí řemeslníci zprac. textil, kůži a příbuz. mater. tradič. postupy (výrobci různých předmětů pro osobní potřebu, pro domácnost nebo pro dekorativní účely – lidová tvorba)
N36	/zpracovatelé a výrobci textilu, konfekce	743	Kvalifikovaní výrobci textilií, oděvů a výrobků z kůží, kožešin a kvalifikovaní dělníci v příbuzných oborech
N36	/zpracovatelé a výrobci textilu, konfekce	8261	Obsluha strojů na úpravu vláken, dopřádání a navíjení příze a nití
N36	/zpracovatelé a výrobci textilu, konfekce	8262	Obsluha tkacích a pletacích strojů
N36	/zpracovatelé a výrobci textilu, konfekce	8263	Obsluha šicích a vyšívacích strojů
N36	/zpracovatelé a výrobci textilu, konfekce	8264	Obsluha strojů na bělení, barvení, čištění, praní, žehlení textilu (vč. nepromokavé úpravy textilu)
N36	/zpracovatelé a výrobci textilu, konfekce	8268	Obsluha strojů na výrobu klobouků (vč. obsluhy strojů na výrobu forem na klobouky)
N36	/zpracovatelé a výrobci textilu, konfekce	8269	Obsluha ostatních strojů na výrobu textilních, kožešinových a kožených výrobků jinde neuvedená (např. prýmků, háčkovaných výrobků, ap.)
N36	/zpracovatelé a výrobci textilu, konfekce	8286	Montážní dělníci montující výrobky z kartonu, textilu apod. materiálů
N37	/zpracovatelé kůží a kožešin, obuvníci	744	Zpracovatelé kůží, kožešin a obuvníci
N37	/zpracovatelé kůží a kožešin, obuvníci	8265	Obsluha strojů na úpravu kožešin a kůží (kromě ruční úpravy – hl. třída 7)

Cluster	Name of occupational cluster	ISCO	Name of original ISCO occupation
N37	/zpracovatelé kůží a kožešin, obuvníci	8266	Obsluha strojů na výrobu a dokončovací úpravy obuvi
N37	/zpracovatelé kůží a kožešin, obuvníci	8267	Obsluha strojů na výrobu galanterního a příbuzného zboží (např. sedel, ohlávek apod.)
N38	/zpracovatelé a výrobci potravinář. výrobků	741	Kvalifikovaní zpracovatelé, výrobci potravinářských výrobků
N38	/zpracovatelé a výrobci potravinář. výrobků	827	Obsluha strojů na výrobu potravin a příbuzných výrobků
N39	/opraváři a údržbáři stroj a elektro, ostatní dělníci zpracovat.	723	Mechanici a opraváři strojů a zařízení (bez mechaniků a opravářů elektrických a elektronických strojů a zařízení)
N39	/opraváři a údržbáři stroj a elektro, ostatní dělníci zpracovat.	7242	Mechanici, opraváři a seřizovači elektrických částí automobilů, letadel a lodí
N39	/opraváři a údržbáři stroj a elektro, ostatní dělníci zpracovat.	7243	Mechanici, seřizovači, opraváři elektronic. zařízení (tech. vybav. počít. zabezp. z., z. pro zázn. zv. a obr. vysíl. el. č. hud. n. ap., vč. kontr. a test.)
N39	/opraváři a údržbáři stroj a elektro, ostatní dělníci zpracovat.	7245	Montéři a opraváři rozhlasových a televizních přijímačů, magnetofonů, gramofonů apod. zařízení vč. montérů antén
N39	/opraváři a údržbáři stroj a elektro, ostatní dělníci zpracovat.	7246	Montéři a opraváři silnoproudých elektrických vedení (vč. spojování kabelů)
N39	/opraváři a údržbáři stroj a elektro, ostatní dělníci zpracovat.	7247	Montéři a opraváři slaboproudých elektrických vedení
N39	/opraváři a údržbáři stroj a elektro, ostatní dělníci zpracovat.	829	Obsluha jiných stacionárních zařízení a ostatní montážní dělníci jinde neuvedení
N4	**Stavební dělníci**		
N41	/dělníci hlavní stavební výroby	7121	Zedníci pracující s tradičními materiály (bambus, hlína atd.)
N41	/dělníci hlavní stavební výroby	7122	Zedníci, kameníci, omítkáři
N41	/dělníci hlavní stavební výroby	7123	Betonáři, dělníci specializovaní na pokládání betonových povrchů a teraca
N41	/dělníci hlavní stavební výroby	7124	Tesaři a truhláři
N41	/dělníci hlavní stavební výroby	7125	Stavební montážníci
N41	/dělníci hlavní stavební výroby	7127	Lešenáři
N41	/dělníci hlavní stavební výroby	7129	Ostatní stavební dělníci hlavní stavební výroby a pracovníci v příbuzných oborech jinde neuvedení
N41	/dělníci hlavní stavební výroby	7131	Stavební pokrývači
N41	/dělníci hlavní stavební výroby	7133	Stavební štukatéři
N41	/dělníci hlavní stavební výroby	9313	Pomocní a nekvalifikovaní dělníci na stavbách budov
N42	/dělníci pro dokončovací stav. práce	7132	Stavební podlaháři, parketáři a obkladači
N42	/dělníci pro dokončovací stav. práce	7134	Izolatéři
N42	/dělníci pro dokončovací stav. práce	7135	Sklenáři
N42	/dělníci pro dokončovací stav. práce	7136	Instalatéři, potrubáři, stavební zámečníci, klempíři
N42	/dělníci pro dokončovací stav. práce	7137	Stavební a provozní elektrikáři
N42	/dělníci pro dokončovací stav. práce	7139	Ostatní dělníci zajišťující dokončovací stavební práce a dělníci v příbuzných oborech jinde neuvedení
N42	/dělníci pro dokončovací stav. práce	714	Malíři, lakýrníci, tapetáři, čističi, kominíci a pracovníci v příbuzných oborech
N49	/osádky stav. a zemních strojů, stavba silnic a železnic	7126	Asfaltéři, dlaždiči
N49	/osádky stav. a zemních strojů, stavba silnic a železnic	818	Obsluha strojů a zařízení pro práce na železničním svršku
N49	/osádky stav. a zemních strojů, stavba silnic a železnic	8332	Obsluha zemních a příbuzných strojů
N49	/osádky stav. a zemních strojů, stavba silnic a železnic	8333	Obsluha jeřábů, zdvihacích a podobných manipulačních zařízení (vč. lyžařských vleků, sklápění a zdvihání mostů...)
N49	/osádky stav. a zemních strojů, stavba silnic a železnic	9312	Pomocní a nekvalifikovaní dělníci na stavbách a údržbě silnic, přehrad a na podobných stavbách
N49	/osádky stav. a zemních strojů, stavba silnic a železnic	9314	Figuranti v zeměměřictví a pomocníci při geodetických a kartografických pracích (v terénu)
N5	**Provozní a obsluhující pracovníci**		
N51	/provozní pracovníci dopravy (vč. osádek a řidičů)	4133	Úředníci v dopravě a v přepravě (dispečeři, kontroloři apod.)
N51	/provozní pracovníci dopravy (vč. osádek a řidičů)	5111	Obsluhující pracovníci v dopravě a stevardi (vč. obsluhy lůžkových vozů)

Cluster	Name of occupational cluster	ISCO	Name of original ISCO occupation
N51	/provozní pracovníci dopravy (vč. osádek a řidičů)	5112	Vlakvedoucí, vlakové čety, průvodčí (vč. palubních průvodčí)
N51	/provozní pracovníci dopravy (vč. osádek a řidičů)	831	Řidiči železničních kolejových vozidel a dělníci v příbuzných oborech
N51	/provozní pracovníci dopravy (vč. osádek a řidičů)	832	Řidiči motorových vozidel
N51	/provozní pracovníci dopravy (vč. osádek a řidičů)	834	Lodní posádky a dělníci v příbuzných oborech
N51	/provozní pracovníci dopravy (vč. osádek a řidičů)	9331	Řidiči vozidel poháněných ručně nebo nožně
N52	/provozní prac. pošt, telekom., peněžnictví, pojišť., elektrárenských a plyn. služeb (ne dělníci)	4142	Poštovní doručovatelé, úředníci v třídírnách
N52	/provozní prac. pošt, telekom., peněžnictví, pojišť., elektrárenských a plyn. služeb (ne dělníci)	4211	Pokladníci (v bankách, pojišťovnách, spořitelnách, na poště apod.)
N52	/provozní prac. pošt, telekom., peněžnictví, pojišť., elektrárenských a plyn. služeb (ne dělníci)	4212	Úředníci na přepážkách a směnárníci (v bankách, pojišťovnách, spořitelnách, na poště apod.)
N52	/provozní prac. pošt, telekom., peněžnictví, pojišť., elektrárenských a plyn. služeb (ne dělníci)	4215	Bookmakeři, krupiéři, úředníci sázkových kanceláří
N52	/provozní prac. pošt, telekom., peněžnictví, pojišť., elektrárenských a plyn. služeb (ne dělníci)	4216	Inkasisté (výběrčí dluhů)
N52	/provozní prac. pošt, telekom., peněžnictví, pojišť., elektrárenských a plyn. služeb (ne dělníci)	4219	Ostatní pokladníci a pracovníci v příbuzných oborech jinde neuvedení (např. zastavárníci, půjčovatelé peněz na úrok ap
N52	/provozní prac. pošt, telekom., peněžnictví, pojišť., elektrárenských a plyn. služeb (ne dělníci)	9154	Pracovníci odečítající stav elektroměrů, plynoměrů a vodoměrů
N53	/pracovníci prodeje a předvádění zboží (ne údržbáři a oprav.)	4213	Pokladníci v obchodě, společném stravování apod.
N53	/pracovníci prodeje a předvádění zboží (ne údržbáři a oprav.)	521	Prodavači v obchodech a předváděči zboží
N53	/pracovníci prodeje a předvádění zboží (ne údržbáři a oprav.)	522	Prodavači ve stáncích a na tržištích
N53	/pracovníci prodeje a předvádění zboží (ne údržbáři a oprav.)	523	Manekýni, manekýnky a modelky
N53	/pracovníci prodeje a předvádění zboží (ne údržbáři a oprav.)	911	Pouliční prodavači a pracovníci v příbuzných oborech
N54	/prac. pro osobní a bytové služby a pro další služby	4214	Prodavači vstupenek, jízdenek apod.
N54	/prac. pro osobní a bytové služby a pro další služby	514	Pracovníci zajišťující ostatní osobní služby
N54	/prac. pro osobní a bytové služby a pro další služby	515	Astrologové, jasnovidci a pracovníci v příbuzných oborech
N54	/prac. pro osobní a bytové služby a pro další služby	912	Čističi bot a jiní pouliční nekvalifikovaní pracovníci poskytující služby na ulici
N54	/prac. pro osobní a bytové služby a pro další služby	913	Pomocníci, uklízeči a pradláci
N54	/prac. pro osobní a bytové služby a pro další služby	914	Domovníci, školníci, čističi oken a pracovníci v příbuzných oborech
N54	/prac. pro osobní a bytové služby a pro další služby	9151	Poslíčci, nosiči zavazadel a doručovatelé
N54	/prac. pro osobní a bytové služby a pro další služby	9152	Vrátní, hlídači, uvaděči a šatnářky
N54	/prac. pro osobní a bytové služby a pro další služby	9153	Výběrčí peněz z prodejních automatů
N54	/prac. pro osobní a bytové služby a pro další služby	9159	Ostatní pracovníci v příbuzných oborech jinde neuvedení (např. lepiči plakátů, obchůzkáři veřejného plynového osvětlení)
N54	/prac. pro osobní a bytové služby a pro další služby	916	Sběrači odpadků, metaři a pracovníci v příbuzných oborech
N55	/prov. prac. stravov., ubyt., cest. ruchu	422	Pracovníci poskytující různé informace
N55	/prov. prac. stravov.,ubyt.,cest. ruchu	512	Provozní pracovníci stravování a pracovníci v příbuzných oborech
N56	/skladoví provozní pracovníci	8334	Obsluha vysokozdvižných vozíků (pro nakládání, vykládání, přepravu, zdvihání, stohování zboží a palet se zbožím)

Cluster	Name of occupational cluster	ISCO	Name of original ISCO occupation
N56	/skladoví provozní pracovníci	9339	Pomocní a nekvalifikovaní pracovníci v dopravě, ve skladech, v telekomunikacích a na poštách apod. jinde neuvedení
N59	/ostatní provozní a obsluhující, vč. hasičů	5161	Hasiči, požárníci
N59	/ostatní provozní a obsluhující, vč. hasičů	932	Pomocní a nekvalifikovaní dělníci v průmyslu (ve výrobě)
N59	/ostatní provozní a obsluhující, vč. hasičů	9332	Obsluha povozů a zařízení poháněných zvířaty
N59	/ostatní provozní a obsluhující, vč. hasičů	9333	Vazači a nosiči břemen, přístavní dělníci (dokaři)
N6	**Techničtí pracovníci**		
N61	/techničtí prac. v zeměděl., lesnictví, rybářství a vodním hospodářství	2211	Bakteriologové, biologové, ekologové, zoologové... a odborníci v příbuzných oborech
N61	/techničtí prac. v zeměděl., lesnictví, rybářství a vodním hospodářství	2213	Agronomové, šlechtitelé a odborníci v příbuzných oborech
N61	/techničtí prac. v zeměděl., lesnictví, rybářství a vodním hospodářství	2223	Veterinární lékaři
N61	/techničtí prac. v zeměděl., lesnictví, rybářství a vodním hospodářství	321	Techničtí a laboratorní pracovníci v oblasti biologie, zemědělství a v příbuzných oborech
N61	/techničtí prac. v zeměděl., lesnictví, rybářství a vodním hospodářství	3227	Veterinární asistenti
N62	/bánští a hutní technici	2147	Důlní a hutní inženýři, technologové, metalurgové
N62	/bánští a hutní technici	3117	Důlní a hutní technici
N63	/strojírenští technici	2145	Projektanti a konstruktéři strojních zařízení, strojní inženýři
N63	/strojírenští technici	3115	Strojírenští technici
N64	/elektrotechnici, elektronici a energetici	2143	Projektanti elektrotechnických zařízení, elektroinženýři
N64	/elektrotechnici, elektronici a energetici	2144	projektanti elektronických systémů a telekomunikačních sítí, inženýři – elektronici
N64	/elektrotechnici, elektronici a energetici	3113	Elektrotechnici
N65	/chemičtí technici a techn. při výrobě stavebních hmot	2146	Chemičtí inženýři, technologové
N65	/chemičtí technici a techn. při výrobě stavebních hmot	3116	Chemičtí technici
N66	/stavební technici	2141	Hlavní architekti, architekti a plánovači měst, urbanisté, projektanti měst a obcí, dopravních sítí (kromě bytových architektů – skupina 347)
N66	/stavební technici	2142	Projektanti staveb a areálů, stavební inženýři
N66	/stavební technici	3112	Stavební technici
N67	/techničtí pracovníci výpočetní techniky	213	Vědci a odborníci v oblasti výpočetní techniky
N67	/techničtí pracovníci výpočetní techniky	312	Techničtí pracovníci v oblasti výpočetní techniky
N68	/technici dopravy, pošt a telekomunikací	3114	Elektronici a technici v radiokomunikacích a telekomunikacích
N68	/technici dopravy, pošt a telekomunikací	3133	Obsluha vysílacího telekomunikačního zařízení (vč. obsluhy telegrafu) (kromě obsluhy telefonní ústředny a dálnopisu – hl. třída 4)
N68	/technici dopravy, pošt a telekomunikací	314	Letecký a lodní personál (odborný)
N68	/technici dopravy, pošt a telekomunikací	316	Technici železničního provozu
N69	/ostatní techničtí pracovníci	2148	Kartografové a průzkumníci
N69	/ostatní techničtí pracovníci	2149	Ost. architekti, projektanti, konstruktéři a tech. inženýři jinde neuved. (tvůrčí prac.) (inž. dopravy, technolog. skla, keramiky, kůže…)
N69	/ostatní techničtí pracovníci	3111	Technici ve fyzikálních a příbuzných oborech
N69	/ostatní techničtí pracovníci	3118	Technici v kartografii, kresliči a zeměměřiči
N69	/ostatní techničtí pracovníci	3119	Ostatní techničtí pracovníci jinde neuvedení
N69	/ostatní techničtí pracovníci	3131	Fotografové (vč. uměleckých)

Cluster	Name of occupational cluster	ISCO	Name of original ISCO occupation
N69	/ostatní techničtí pracovníci	3132	Obsluha zařízení pro záznam zvuku, obrazu, operátoři kamery (vč. filmových a televizních)
N69	/ostatní techničtí pracovníci	3134	Obsluha lékařských zařízení
N69	/ostatní techničtí pracovníci	3139	Obsluha ostatních optických a elektronických zařízení jinde neuvedená
N69	/ostatní techničtí pracovníci	315	Bezpečnostní, protipožární, kolaudační technici a technici kontroly zdravotní nezávadnosti a jakosti
N7	**Pracovníci na úseku řízení a správy**		
N71	/vedoucí pracovníci státních a místních orgánů, zastupitelstev	111	Zákonodárci
N71	/vedoucí pracovníci státních a místních orgánů, zastupitelstev	112	Vyšší státní úředníci
N71	/vedoucí pracovníci státních a místních orgánů, zastupitelstev	114	Vedoucí pracovníci politických, zájmových a odborových organizací
N71	/vedoucí pracovníci státních a místních orgánů, zastupitelstev	115	Přednostové, tajemníci a vedoucí pracovníci okresních a obecních úřadů
N72	/vedoucí pracovníci podniků, organizací a organiz. jednotek	121	Ředitelé a prezidenti velkých organizací, podniků, společností (řídí za pomoci alespoň dvou dalších řídících pracovníků)
N72	/vedoucí pracovníci podniků, organizací a organiz. jednotek	122	Vedoucí pracovníci výrobních, provozních dílčích celků velkých organiz., podniků apod.
N72	/vedoucí pracovníci podniků, organizací a organiz. jednotek	123	Vedoucí pracovníci univerzálních dílčích celků (organizačních jednotek, seskupení, útvarů apod. – dále jen útvarů)
N72	/vedoucí pracovníci podniků, organizací a organiz. jednotek	131	Vedoucí, ředitelé malých podniků, organizací
N73	/pracovníci soudů, notářství, prokuratury, advokacie	242	Odborní pracovníci v právní oblasti
N74	/ekonomičtí pracovníci	2122	Statistici
N74	/ekonomičtí pracovníci	241	Vědci a odborní duševní pracovníci v oblasti podnikání a v příbuzných oborech
N74	/ekonomičtí pracovníci	247	Odborní administrativní pracovníci jinde neuvedení
N74	/ekonomičtí pracovníci	342	Zástupci – agenti – obchodní, přepravní, pracovních úřadů a pracovníci v příbuzných oborech
N74	/ekonomičtí pracovníci	343	Odborní administrativní pracovníci
N74	/ekonomičtí pracovníci	412	Úředníci zpracovávající číselné údaje
N75	/odb. prac. obchodní činnosti, cestovního ruchu, ubytování, spol. strav., dopravy, pošt a telek.	341	Odborní pracovníci – zprostředkovatelé obchodních a finančních transakcí
N75	/odb. prac. obchodní činnosti, cestovního ruchu, ubytování, spol. strav., dopravy, pošt a telek.	344	Celní a daňoví pracovníci a pracovníci v příbuzných oborech
N75	/odb. prac. obchodní činnosti, cestovního ruchu, ubytování, spol. strav., dopravy, pošt a telek.	4131	Úředníci ve skladech (vč. vážních)
N75	/odb. prac. obchodní činnosti, cestovního ruchu, ubytování, spol. strav., dopravy, pošt a telek.	4132	Úředníci ve výrobě (např. výrobní plánovači)
N75	/odb. prac. obchodní činnosti, cestovního ruchu, ubytování, spol. strav., dopravy, pošt a telek.	5113	Průvodci (turistických zájezdů, historických a kulturních památek...)
N76	/administrativní pracovníci	411	Kancelářští a manipulační pracovníci, sekretářky, písařky
N76	/administrativní pracovníci	419	Ostatní nižší úředníci jinde neuvedení
N79	/pracovníci policie, ochrany a ostrahy	345	Policejní inspektoři a detektivové
N79	/pracovníci policie, ochrany a ostrahy	5162	Pracovníci bezpečnostních orgánů (např. policisté, strážníci, ostraha, obchůzkáři apod.)
N79	/pracovníci policie, ochrany a ostrahy	5163	Pracovníci nápravné výchovy (vězenští dozorci)
N79	/pracovníci policie, ochrany a ostrahy	5165	Pracovníci ochrany v dopravě
N79	/pracovníci policie, ochrany a ostrahy	5169	Ostatní pracovníci ochrany a ostrahy jinde neuvedení (např. tělesní strážci, plavčíci, polesní apod.)
N8	**Pracovníci školství, kultury, zdravotnictví, vědy, výzkumu a ost. nev.**		
N81	/pedagogičtí pracovníci	2319	Ostatní učitelé na vysokých školách

Cluster	Name of occupational cluster	ISCO	Name of original ISCO occupation
N81	/pedagogičtí pracovníci	232	Učitelé středních škol
N81	/pedagogičtí pracovníci	233	Učitelé základních škol a předškolní výchovy
N81	/pedagogičtí pracovníci	234	Učitelé na speciálních školách
N81	/pedagogičtí pracovníci	235	Učitelé a odborní pedagogičtí pracovníci jinde neuvedení
N81	/pedagogičtí pracovníci	331	Pedagogové v mimoškolních zařízeních
N81	/pedagogičtí pracovníci	332	Pedagogové pro předškolní výchovu
N81	/pedagogičtí pracovníci	333	Pedagogové na speciálních školách a v zařízeních ústavní a ochranné výchovy
N81	/pedagogičtí pracovníci	334	Ostatní pedagogové
N82	/pracovníci tisku, kultury, osvěty a umění	243	Archiváři, knihovníci a odborní pracovníci v příbuzných oborech
N82	/pracovníci tisku, kultury, osvěty a umění	2447	Tlumočníci a překladatelé
N82	/pracovníci tisku, kultury, osvěty a umění	245	Umělečtí pracovníci, novináři a redaktoři
N82	/pracovníci tisku, kultury, osvěty a umění	347	Výkonní pracovníci umění a zábavy
N82	/pracovníci tisku, kultury, osvěty a umění	4141	Řadoví knihovníci, archiváři, evidenční pracovníci
N82	/pracovníci tisku, kultury, osvěty a umění	4143	Korektoři, kódovači a pracovníci v příbuzných oborech
N83	/ošetřovatelé, zdrav. sestry, asistenti, laboranti a technici	3221	Asistenti zdravotničtí
N83	/ošetřovatelé, zdrav. sestry, asistenti, laboranti a technici	3222	Asistenti hygienické služby
N83	/ošetřovatelé, zdrav. sestry, asistenti, laboranti a technici	3223	Dietetici a odborníci pro výživu
N83	/ošetřovatelé, zdrav. sestry, asistenti, laboranti a technici	3224	Optici a optometrici
N83	/ošetřovatelé, zdrav. sestry, asistenti, laboranti a technici	3225	Zubní asistenti
N83	/ošetřovatelé, zdrav. sestry, asistenti, laboranti a technici	3226	Rehabilitační a fyzioterapeutičtí pracovníci (vč. odb. masérů)
N83	/ošetřovatelé, zdrav. sestry, asistenti, laboranti a technici	3228	Farmaceutičtí asistenti
N83	/ošetřovatelé, zdrav. sestry, asistenti, laboranti a technici	3229	Ostatní střední zdravotničtí pracovníci jinde neuvedení
N83	/ošetřovatelé, zdrav. sestry, asistenti, laboranti a technici	323	Odborní ošetřovatelé, zdravotní sestry
N83	/ošetřovatelé, zdrav. sestry, asistenti, laboranti a technici	324	Lidoví léčitelé
N83	/ošetřovatelé, zdrav. sestry, asistenti, laboranti a technici	513	Pečovatelé a pomocní ošetřovatelé
N84	/lékaři, farmaceuti, hygienici a další zdravot. s VŠ vzděláním	2212	Farmakologové, anatomové, biochemici, fyziologové, patologové a odborníci v příbuzných oborech
N84	/lékaři, farmaceuti, hygienici a další zdravot. s VŠ vzděláním	2221	Lékaři, ordináři (kromě zubních lékařů)
N84	/lékaři, farmaceuti, hygienici a další zdravot. s VŠ vzděláním	2222	Zubní lékaři (dentisté)
N84	/lékaři, farmaceuti, hygienici a další zdravot. s VŠ vzděláním	2224	Farmaceuti, magistři v lékárně, lékárníci
N84	/lékaři, farmaceuti, hygienici a další zdravot. s VŠ vzděláním	2225	Hygienici
N85	/sportovní a tělovýchovní prac.	348	Profesionální sportovci a pracovníci ve sportu
N86	/sociální pracovníci	2446	Odborní pracovníci v oblasti sociální péče (odborní sociální pracovníci, kromě řadových – hl. třída 3)
N86	/sociální pracovníci	346	Sociální pracovníci
N87	/pracovníci církevních a nábož. spol.	246	Odborní pracovníci církevních a náboženských institucí (duchovní)
N87	/pracovníci církevních a nábož. spol.	349	Nevysvěcení profesionální pracovníci náboženských společností
N88	/pracovníci vědy, výzkumu a vývoje	211	Vědci a odborníci ve fyzikálních, chemických a příbuzných oborech
N88	/pracovníci vědy, výzkumu a vývoje	2121	Matematici a odborníci v příbuzných oborech
N88	/pracovníci vědy, výzkumu a vývoje	2129	Vědci a odborníci v příbuzných oborech jinde neuvedení
N88	/pracovníci vědy, výzkumu a vývoje	2311	Vědeckopedagogičtí pracovníci

Cluster	Name of occupational cluster	ISCO	Name of original ISCO occupation
N88	/pracovníci vědy, výzkumu a vývoje	2441	Ekonomové – vědečtí pracovníci, specialisté, experti
N88	/pracovníci vědy, výzkumu a vývoje	2442	Sociologové, antropologové, archeologové, geografové, kriminologové a odborníci příbuzných oborů
N88	/pracovníci vědy, výzkumu a vývoje	2443	Filozofové, historici, politologové
N88	/pracovníci vědy, výzkumu a vývoje	2444	Filologové, jazykovědci, grafologové apod.
N88	/pracovníci vědy, výzkumu a vývoje	2445	Psychologové

*Tato tabulka byla laskavě poskytnuta Ing. Jiřím Vojtěchem (VÚOŠ)

Pozn: Z důvodů použití třídníku ze sčítání lidu jsme se mu přizpůsobili – určité potíže to dělá ve skupině N39 (/opraváři a údržbáři stroj a elektro, ostatní dělníci zpracovat.) Tu by podle KZAM bylo možné rozdělit na strojní a elektrotechnickou část a bylo by to i funkční ale je tu i problém – už máme plný počet ve skupině vyčerpán. Možná by šlo N39a a N39b – při podrobnějších propočtech nám to občas dělalo problémy.

Table A.3 Extended Educational Classification

Project code	Level of education	Apprentice ship line (A109)	Line of study (A110)	Specialization	Empl. in '98
1	Without school education (A108=8)	–	–	No	19 459
2	Primary (9 years) (A108=1)	–	–	No	441 139
3	Grammar school with GCE (A108=6)	–	–	No	189 890
4	Apprenticeship (A108=2)	1	–	Machine control and operation	43 786
5		2	–	Mechanical engineering, metallurgy	526 067
6		3	–	Electrical engineering, transport, communication	200 006
7		4	–	Chemistry, food industry	102 225
8		5	–	Textile, clothing industry	158 191
9		6	–	Wood processing, shoe industry	84 330
10		7	–	Construction	274 963
11		8	–	Agriculture and forestry	134 739
12		9	–	Trade, services	367 161
13		10	–	Other	57 128
14	Secondary vocational (A108= 3)	–	1	Natural sciences	2 658
15		–	2	Mechanical engineering	59 175
16		–	3	Electrical engineering	29 777
17		–	4	Construction	22 505
18		–	5	Other technical subjects	26 877
19		–	6	Agriculture, forestry	21 071
20		–	7	Health	16 017
21		–	8	Economics, trade, services	69 140
22		–	9	Law	13 850
23		–	10	Teacher-training	3 410
24		–	11	Other social subjects	6 571
25		–	12	Other sciences and disciplines	1 503
26	Apprenticeship with GCE (A108=4)	1	–	Machine control and operation	1 416
27		2	–	Mechanical engineering, metallurgy	23 124
28		3	–	Electrical engineering, transport, communication	18 917
29		4	–	Chemistry, food industry	7 176
30		5	–	Textile, clothing industry	4 732
31		6	–	Wood processing, shoe industry	4 140
32		7	–	Construction	5 129
33		8	–	Agriculture and forestry	8 630
34		9	–	Trade, services	11 150
35		10	–	Other	5 188

Project code	Level of education	Apprentice ship line (A109)	Line of study (A110)	Specialization	Empl. in '98
36	Secondary vocational with GCE (A108= 5)	–	1	Natural sciences	9 370
37		–	2	Mechanical engineering	234 133
38		–	3	Electrical engineering	135 031
39		–	4	Construction	84 222
40		–	5	Other technical subjects	131 825
41		–	6	Agriculture, forestry	104 639
42		–	7	Health	147 522
43		–	8	Economics, trade, services	387 120
44		–	9	Law	12 785
45		–	10	Teacher-training	61 055
46		–	11	Other social subjects	43 933
47		–	12	Other sciences and disciplines	19 185
48	Higher education (A108=7)	–	1	Natural sciences	20 006
49		–	2	Mechanical engineering	56 988
50		–	3	Electrical engineering	46 827
51		–	4	Construction	38 982
52		–	5	Other technical subjects	44 097
53		–	6	Agriculture, forestry	36 896
54		–	7	Health	45 930
55		–	8	Economics, trade, services	62 801
56		–	9	Law	23 446
57		–	10	Teacher-training	99 799
58		–	11	Other social subjects	36 233
59		–	12	Other sciences and disciplines	20 440

Total   4 864 503

Table A.4: Estimates of 95 % confidence intervals of Employment in a group in 2Q. 1998

Estimates of E in a group		95 % Conf. Interval		Estimated
		E +/−	E +/−	sample size (E*f)
people	*% of total E*	*people*	*%*	*people*
10 000	0,2	2 351	23,5	69
13 800	0,3	2 760	**20,0**	95
16 495	0,3	3 017	18,3	114
18 389	0,4	3 185	17,3	127
20 000	0,4	3 321	16,6	138
24 500	0,5	3 674	**15,00**	169
30 000	0,6	4 063	13,5	207
40 000	0,8	4 687	11,7	276
42 723	0,9	4 842	11,3	294
50 000	1,0	5 235	10,5	345
54 750	1,1	5 475	**10,00**	377
60 000	1,2	5 728	9,5	413
70 000	1,4	6 181	8,8	482
80 000	1,6	6 601	8,3	551
90 000	1,8	6 994	7,8	620
100 000	2,1	7 365	7,4	689
150 000	3,1	8 972	6,0	1 034
200 000	4,1	10 305	5,2	1 378
212 000	4,3	10 596	**5,00**	1 461
300 000	6,2	12 486	4,2	2 067
350 000	7,2	13 412	3,8	2 412
400 000	8,2	14 259	3,6	2 756
450 000	9,2	15 039	3,3	3 101
500 000	10,3	15 763	3,2	3 445
1 000 000	20,5	20 979	2,1	6 890

Notes: 1) Total E = 4,875,000 (populaton aged 15 or more)

2) Relative sample size f = 0.00689

Table A.5: Results of occupational clustering by education (2 Q. 1998)

| # of clusters | The smallest cluster | | | | Clusters out of the indicated limits | | | | | |
| | | | | | (numbers) | | | (percentages) | | |
	Size	95% C.I., +/− [%]	Serial #	ISCO-88	>15%	>10%	>5%	>15%	>10%	>5%
10	94 274	7,6	4	323	0	0	4	0,0	0,0	40,0
11	74 160	8,6	3	233	0	0	5	0,0	0,0	45,5
12	74 160	8,6	3	233	0	0	6	0,0	0,0	50,0
13	74 160	8,6	4	233	0	0	6	0,0	0,0	46,2
14	74 160	8,6	4	233	0	0	8	0,0	0,0	57,1
15	74 160	8,6	4	233	0	0	8	0,0	0,0	53,3
16	42 723	11,3	4	222	0	1	9	0,0	6,3	56,3
17	42 723	11,3	4	222	0	1	10	0,0	5,9	58,8
18	42 723	11,3	4	222	0	1	11	0,0	5,6	61,1
19	42 723	11,3	5	222	0	1	12	0,0	5,3	63,2
20	42 723	11,3	5	222	0	1	12	0,0	5,0	60,0
21	42 723	11,3	5	222	0	1	13	0,0	4,8	61,9
22	42 723	11,3	5	222	0	1	14	0,0	4,5	63,6
23	42 723	11,3	5	222	0	1	15	0,0	4,3	65,2
24	42 723	11,3	5	222	0	2	16	0,0	8,3	66,7
25	42 723	11,3	6	222	0	2	17	0,0	8,0	68,0
26	39 996	11,7	15	514	0	3	18	0,0	11,5	69,2
27	39 996	11,7	16	514	0	3	18	0,0	11,1	66,7
28	18 389	17,3	10	242	1	4	19	3,6	14,3	67,9
29	18 389	17,3	10	242	1	4	21	3,4	13,8	72,4
30	18 389	17,3	10	242	1	5	22	3,3	16,7	73,3
31	18 389	17,3	10	242	1	5	23	3,2	16,1	74,2
32	18 389	17,3	10	242	1	6	24	3,1	18,8	75,0
33	18 389	17,3	11	242	1	7	25	3,0	21,2	75,8
34	18 389	17,3	11	242	1	8	26	2,9	23,5	76,5
35	18 389	17,3	11	242	1	8	28	2,9	22,9	80,0
36	18 389	17,3	11	242	1	8	30	2,8	22,2	83,3
37	18 389	17,3	11	242	1	9	31	2,7	24,3	83,8
38	18 389	17,3	11	242	1	9	33	2,6	23,7	86,8
39	18 389	17,3	11	242	1	9	35	2,6	23,1	89,7
40	18 389	17,3	12	242	1	9	36	2,5	22,5	90,0
41	18 389	17,3	12	242	2	11	37	4,9	26,8	90,2
42	18 389	17,3	12	242	2	12	38	4,8	28,6	90,5
43	18 389	17,3	12	242	2	13	39	4,7	30,2	90,7
44	18 389	17,3	12	242	2	14	40	4,5	31,8	90,9
45	18 389	17,3	12	242	2	14	41	4,4	31,1	91,1
46	18 389	17,3	12	242	2	14	42	4,3	30,4	91,3
47	18 389	17,3	12	242	2	14	44	4,3	29,8	93,6
48	18 389	17,3	12	242	2	14	45	4,2	29,2	93,8
49	16 495	18,3	13	245	3	15	46	6,1	30,6	93,9
50	16 495	18,3	13	245	3	15	47	6,0	30,0	94,0
51	16 495	18,3	13	245	3	16	48	5,9	31,4	94,1
52	16 495	18,3	13	245	3	16	50	5,8	30,8	96,2
53	16 495	18,3	13	245	4	17	51	7,5	32,1	96,2
54	16 495	18,3	13	245	4	18	52	7,4	33,3	96,3
55	16 495	18,3	14	245	4	19	53	7,3	34,5	96,4
56	16 495	18,3	14	245	4	20	54	7,1	35,7	96,4
57	16 495	18,3	14	245	4	21	55	7,0	36,8	96,5
58	16 495	18,3	14	245	4	22	56	6,9	37,9	96,6
59	16 495	18,3	14	245	4	22	57	6,8	37,3	96,6
60	16 495	18,3	14	245	4	24	58	6,7	40,0	96,7

Notes: 1) Correspondence between error limits (E +/−, [%]) and sample size:
Error   15%   10%   5%
Sample   24 500   54 750   212 000

2) Occupations in the smallest cluster

ISCO-88	Title
323	Modern health associate professionals (except nursing)
233	Primary and pre-primary education teaching professionals
222	Health professionals (except nursing)
514	Other personal service workers
242	Legal professionals
245	Writers and creative or performing artists

Table A.6: **Estimates of 95 % confidence intervals of Employment under clustering into 45 occupational groups by type of education (2 Q. 1998)**

Estimates of E in a cluster		95% Conf. Interval		Cluster #	# of occu groups	Approximate cluster size (E*f)
		E +/–	E +/–			
people	*% of total E*	*people*	*%*			*people*
1	**18 389**	0,4	3 185	**17,3**	12	1	127
2	**22 382**	0,5	3 512	**15,7**	16	1	154
3	**28 838**	0,6	3 984	**13,8**	9	1	199
4	**30 385**	0,6	4 089	**13,5**	31	1	209
5	**35 147**	0,7	4 396	**12,5**	37	1	242
6	**39 996**	0,8	4 687	**11,7**	24	1	276
7	**41 149**	0,8	4 753	**11,6**	40	1	284
8	**42 723**	0,9	4 842	**11,3**	7	1	294
9	**43 722**	0,9	4 898	**11,2**	36	1	301
10	**50 066**	1,0	5 238	**10,5**	32	1	345
11	**50 117**	1,0	5 241	**10,5**	28	1	345
12	**50 912**	1,0	5 282	**10,4**	39	2	351
13	**52 770**	1,1	5 376	**10,2**	15	1	364
14	**54 019**	1,1	5 439	**10,1**	22	1	372
15	**58 538**	1,2	5 659	**9,7**	6	1	403
16	**59 987**	1,2	5 728	**9,5**	43	1	413
17	**62 931**	1,3	5 865	**9,3**	19	1	434
18	**74 160**	1,5	6 359	**8,6**	10	1	511
19	**74 618**	1,5	6 378	**8,5**	25	1	514
20	**83 333**	1,7	6 735	**8,1**	38	1	574
21	**90 832**	1,9	7 026	**7,7**	20	1	626
22	**92 825**	1,9	7 101	**7,6**	8	7	640
23	**94 274**	1,9	7 155	**7,6**	17	1	650
24	**94 323**	1,9	7 157	**7,6**	21	1	650
25	**96 339**	2,0	7 231	**7,5**	45	1	664
26	**99 868**	2,0	7 360	**7,4**	11	2	688
27	**100 356**	2,1	7 377	**7,4**	1	3	691
28	**112 047**	2,3	7 786	**6,9**	35	1	772
29	**120 324**	2,5	8 061	**6,7**	30	1	829
30	**121 341**	2,5	8 094	**6,7**	44	1	836
31	**126 144**	2,6	8 249	**6,5**	34	1	869
32	**134 919**	2,8	8 523	**6,3**	3	2	930
33	**140 897**	2,9	8 704	**6,2**	4	6	971
34	**168 436**	3,5	9 489	**5,6**	13	6	1 161
35	**169 796**	3,5	9 526	**5,6**	23	1	1 170
36	**171 464**	3,5	9 571	**5,6**	29	1	1 181
37	**172 482**	3,5	9 598	**5,6**	33	1	1 188
38	**183 055**	3,8	9 877	**5,4**	14	1	1 261
39	**190 344**	3,9	10 064	**5,3**	41	4	1 311
40	**199 535**	4,1	10 294	**5,2**	18	1	1 375
41	**201 113**	4,1	10 333	**5,1**	5	1	1 386
42	**212 547**	4,4	10 609	**5,0**	42	1	1 464
43	**220 384**	4,5	10 794	**4,9**	27	11	1 518
44	**241 732**	5,0	11 279	**4,7**	2	41	1 666
45	**263 198**	5,4	11 742	**4,5**	26	1	1 813

Total: 4,792,757
Mean: 105,506

Mean: 8.4

Total: 119

Notes: 1) Total E = 4,875,000 (populaton aged 15 or more)
2) Relative sample size f = 0.00689

Table A.7: Structure of occupational clusters in 2 Q. 94 and 2 Q. 98

Occupational composition of clusters

1994 Cluster	ISCO-88	Prj code	Esample	Epopul	1998 Cluster	ISCO-88	Prj code	Esample	Epopul
1	11	1	408	70 840	1	11	1	308	42 409
1	516	63	341	60 925	1	711	73	126	26 467
2	111	2	8	1 018	1	831	106	213	31 479
2	112	3	15	2 721	2	111	2	36	4 255
2	114	4	11	2 139	2	112	3	35	5 201
2	115	5	33	5 289	2	114	4	8	1 226
2	121	6	22	4 002	2	115	5	37	4 366
2	211	10	70	12 042	2	121	6	27	4 067
2	212	11	15	2 269	2	211	10	70	9 684
2	213	12	129	23 621	2	212	11	12	1 748
2	221	14	58	9 247	2	221	14	49	6 370
2	231	16	59	10 177	2	243	23	37	3 853
2	234	19	57	8 295	2	246	26	9	168
2	235	20	59	9 479	2	313	30	36	6 456
2	243	23	44	6 778	2	314	31	24	3 718
2	246	26	5	763	2	324	37	1	75
2	247	27	78	12 026	2	333	40	38	5 617
2	313	30	50	7 931	2	346	47	47	6 544
2	314	31	33	6 241	2	347	48	57	8 387
2	324	37	1	251	2	348	49	45	6 749
2	333	40	33	4 809	2	349	50	5	701
2	346	47	30	4 556	2	511	58	103	16 236
2	347	48	75	13 465	2	513	60	113	15 940
2	348	49	20	3 776	2	515	62	1	202
2	349	50	3	453	2	523	66	2	222
2	515	62	0	0	2	611	67	130	17 636
2	523	66	1	193	2	613	69	52	7 136
2	613	69	46	7 112	2	615	71	12	1 534
2	615	71	4	487	2	621	72	36	4 194
2	621	72	34	4 479	2	731	81	74	11 088
2	733	83	41	7 259	2	733	83	11	1 959
2	818	96	13	2 166	2	734	84	73	10 578
2	822	98	45	8 338	2	744	88	58	8 256
2	824	100	22	3 288	2	811	89	51	8 549
2	834	109	8	1 427	2	813	91	67	9 692
2	911	110	12	1 846	2	815	93	75	11 423
2	912	111	3	524	2	817	95	91	13 055
3	122	7	305	53 774	2	818	96	8	1 319
3	123	8	212	38 558	2	822	98	42	6 018
4	131	9	821	134 545	2	824	100	27	3 156
5	214	13	344	63 919	2	825	101	62	9 711
6	222	15	237	39 084	2	834	109	6	1 198
7	232	17	197	31 604	2	911	110	21	3 359
8	233	18	487	81 602	2	912	111	1	83
9	241	21	282	50 432	3	122	7	420	60 917
9	244	24	181	29 678	3	341	42	493	74 002

100

1994					1998				
Cluster	ISCO-88	Prj code	Esample	Epopul	Cluster	ISCO-88	Prj code	Esample	Epopul
10	242	22	92	15 368	4	123	8	219	30 280
11	245	25	109	17 004	4	213	12	163	26 049
11	312	29	190	31 571	4	312	29	203	32 065
11	315	32	139	25 461	4	315	32	144	20 987
11	334	41	143	24 487	4	316	33	86	14 150
11	342	43	145	24 822	4	345	46	116	17 366
11	344	45	99	15 962	5	131	9	1 374	201 113
11	345	46	123	21 334	6	214	13	370	58 538
12	311	28	1 217	211 938	7	222	15	279	42 723
13	316	33	74	11 961	8	231	16	86	9 843
13	511	58	97	16 078	8	234	19	71	9 917
13	731	81	78	12 485	8	235	20	62	8 481
13	734	84	71	12 061	8	245	25	148	16 495
13	744	88	84	13 705	8	331	38	102	14 709
13	814	92	95	14 319	8	332	39	39	6 740
13	815	93	64	12 956	8	334	41	178	26 640
13	817	95	52	9 110	9	232	17	221	28 838
13	825	101	56	10 941	10	233	18	519	74 160
14	321	34	343	53 734	11	241	21	378	57 061
15	322	35	153	25 447	11	244	24	289	42 807
16	323	36	592	97 145	12	242	22	120	18 389
17	331	38	76	11 584	13	247	27	101	16 104
17	332	39	82	13 752	13	342	43	283	44 705
18	341	42	408	73 452	13	344	45	156	22 259
18	421	56	288	49 771	13	414	54	216	31 727
19	343	44	1 279	206 855	13	419	55	222	33 328
20	411	51	379	64 297	13	422	57	132	20 313
21	412	52	510	81 601	14	311	28	1 202	183 055
22	413	53	616	99 005	15	321	34	366	52 770
23	414	54	187	31 846	16	322	35	149	22 382
23	419	55	143	24 762	17	323	36	621	94 274
23	422	57	124	19 540	18	343	44	1 352	199 535
24	512	59	973	157 956	19	411	51	402	62 931
25	513	60	95	17 455	20	412	52	602	90 832
25	522	65	99	18 440	21	413	53	668	94 323
25	611	67	128	21 940	22	421	56	371	54 019
25	614	70	123	18 479	23	512	59	1 126	169 796
25	732	82	151	23 196	24	514	61	256	39 996
25	813	91	58	10 975	25	516	63	489	74 618
25	823	99	103	18 108	26	521	64	1 785	263 198
25	827	103	151	24 397	27	522	65	109	16 900
25	916	115	71	11 390	27	614	70	158	23 771
26	514	61	147	24 068	27	732	82	128	18 942
26	714	76	181	30 831	27	814	92	153	22 014
27	521	64	1 479	249 891	27	816	94	138	20 009
28	612	68	485	67 633	27	823	99	126	17 906
29	711	73	86	19 006	27	827	103	138	18 933
29	811	89	63	16 335	27	829	105	140	21 217

101

1994						1998				
Cluster	**ISCO-88**	**Prj code**	**Esample**	**Epopul**		**Cluster**	**ISCO-88**	**Prj code**	**Esample**	**Epopul**
29	831	106	216	35 212		27	914	113	187	27 337
30	712	74	1 143	183 815		27	916	115	84	12 199
31	713	75	571	98 606		27	921	116	142	21 156
32	721	77	298	49 729		28	612	68	387	50 117
32	812	90	144	29 402		29	712	74	1 131	171 464
32	821	97	199	34 340		30	713	75	776	120 324
33	722	78	1 164	190 500		31	714	76	199	30 385
34	723	79	975	160 150		32	721	77	337	50 066
35	724	80	746	126 204		33	722	78	1 149	172 482
36	741	85	261	42 584		34	723	79	834	126 144
37	742	86	220	36 274		35	724	80	721	112 047
38	743	87	560	90 774		36	741	85	306	43 722
39	816	94	188	33 443		37	742	86	234	35 147
39	828	104	208	34 664		38	743	87	579	83 333
39	829	105	151	22 578		39	812	90	157	24 864
39	914	113	171	25 628		39	821	97	181	26 048
40	826	102	331	56 252		40	826	102	299	41 149
41	832	107	1 263	207 616		41	828	104	384	54 051
42	833	108	452	68 116		41	915	114	317	42 748
43	913	112	776	131 557		41	931	117	231	35 644
44	915	114	370	61 579		41	933	119	371	57 901
44	921	116	274	37 472		42	832	107	1 420	212 547
44	931	117	250	40 484		43	833	108	422	59 987
45	932	118	603	91 454		44	913	112	843	121 341
45	933	119	441	71 301		45	932	118	654	96 339

Table 9-a: Ordering by cluster number

1994					1998				
Cluster	# occ	Esample	Epopul	Errors	Cluster	# occ	Esample	Epopul	Errors
1	2	749	131 763	17,3	1	3	647	100 355	7,4
2	35	1 137	188 447	15,7	2	41	1 689	241 711	4,7
3	2	517	92 330	13,8	3	2	913	134 918	6,3
4	1	821	134 545	13,5	4	6	931	140 892	6,2
5	1	344	63 919	12,5	5	1	1 374	201 113	5,1
6	1	237	39 084	11,7	6	1	370	58 538	9,7
7	1	197	31 604	11,6	7	1	279	42 723	11,3
8	1	487	81 601	11,3	8	7	686	92 821	7,6
9	2	463	80 110	11,2	9	1	221	28 838	13,8
10	1	92	15 367	10,5	10	1	519	74 159	8,6
11	7	948	160 637	10,5	11	2	667	99 866	7,4
12	1	1 217	211 938	10,4	12	1	120	18 388	17,3
13	9	671	113 611	10,2	13	6	1 110	168 433	5,6
14	1	343	53 733	10,1	14	1	1 202	183 054	5,4
15	1	153	25 446	9,7	15	1	366	52 770	10,2
16	1	592	97 144	9,5	16	1	149	22 381	15,7
17	2	158	25 335	9,3	17	1	621	94 273	7,6
18	2	696	123 223	8,6	18	1	1 352	199 535	5,2
19	1	1 279	206 855	8,5	19	1	402	62 930	9,3
20	1	379	64 296	8,1	20	1	602	90 831	7,7
21	1	510	81 601	7,7	21	1	668	94 323	7,6
22	1	616	99 005	7,6	22	1	371	54 019	10,1
23	3	454	76 146	7,6	23	1	1 126	169 795	5,6
24	1	973	157 956	7,6	24	1	256	39 995	11,7
25	9	979	164 377	7,5	25	1	489	74 617	8,5
26	2	328	54 898	7,4	26	1	1 785	263 198	4,5
27	1	1 479	249 891	7,4	27	11	1 503	220 378	4,9
28	1	485	67 633	6,9	28	1	387	50 117	10,5
29	3	365	70 553	6,7	29	1	1 131	171 464	5,6
30	1	1 143	183 814	6,7	30	1	776	120 324	6,7
31	1	571	98 605	6,5	31	1	199	30 385	13,5
32	3	641	113 468	6,3	32	1	337	50 066	10,5
33	1	1 164	190 499	6,2	33	1	1 149	172 481	5,6
34	1	975	160 149	5,6	34	1	834	126 143	6,5
35	1	746	126 204	5,6	35	1	721	112 047	6,9
36	1	261	42 583	5,6	36	1	306	43 722	11,2
37	1	220	36 273	5,6	37	1	234	35 146	12,5
38	1	560	90 773	5,4	38	1	579	83 332	8,1
39	4	718	116 310	5,3	39	2	338	50 912	10,4
40	1	331	56 251	5,2	40	1	299	41 149	11,6
41	1	1 263	207 616	5,1	41	4	1 303	190 342	5,3
42	1	452	68 116	5,0	42	1	1 420	212 547	5,0
43	1	776	131 556	4,9	43	1	422	59 986	9,5
44	3	894	139 534	4,7	44	1	843	121 340	6,7
45	2	1 044	162 753	4,5	45	1	654	96 339	7,5

Table 9-b: Ordering by population employment

1994					1998				
Cluster	# occ	Esample	Epopul	Errors	Cluster	# occ	Esample	Epopul	Errors
10	1	92	15 367	18,4	12	1	120	18 388	17,3
17	2	158	25 335	16,6	16	1	149	22 381	15,7
15	1	153	25 446	14,6	9	1	221	28 838	13,8
7	1	197	31 604	14,3	31	1	199	30 385	13,5
37	1	220	36 273	13,3	37	1	234	35 146	12,5
6	1	237	39 084	12,4	24	1	256	39 995	11,7
36	1	261	42 583	12,2	40	1	299	41 149	11,6
14	1	343	53 733	12,0	7	1	279	42 723	11,3
26	2	328	54 898	11,9	36	1	306	43 722	11,2
40	1	331	56 251	11,1	32	1	337	50 066	10,5
5	1	344	63 919	11,1	28	1	387	50 117	10,5
20	1	379	64 296	11,0	39	2	338	50 912	10,4
28	1	485	67 633	10,8	15	1	366	52 770	10,2
42	1	452	68 116	10,7	22	1	371	54 019	10,1
29	3	365	70 553	10,2	6	1	370	58 538	9,7
23	3	454	76 146	10,1	43	1	422	59 986	9,5
9	2	463	80 110	9,9	19	1	402	62 930	9,3
8	1	487	81 601	9,1	10	1	519	74 159	8,6
21	1	510	81 601	9,1	25	1	489	74 617	8,5
38	1	560	90 773	8,6	38	1	579	83 332	8,1
3	2	517	92 330	8,2	20	1	602	90 831	7,7
16	1	592	97 144	8,1	8	7	686	92 821	7,6
31	1	571	98 605	8,0	17	1	621	94 273	7,6
22	1	616	99 005	8,0	21	1	668	94 323	7,6
32	3	641	113 468	8,0	45	1	654	96 339	7,5
13	9	671	113 611	7,8	11	2	667	99 866	7,4
39	4	718	116 310	7,8	1	3	647	100 355	7,4
18	2	696	123 223	7,4	35	1	721	112 047	6,9
35	1	746	126 204	7,1	30	1	776	120 324	6,7
43	1	776	131 556	7,1	44	1	843	121 340	6,7
1	2	749	131 763	6,9	34	1	834	126 143	6,5
4	1	821	134 545	6,7	3	2	913	134 918	6,3
44	3	894	139 534	6,5	4	6	931	140 892	6,2
24	1	973	157 956	6,0	13	6	1 110	168 433	5,6
34	1	975	160 149	5,9	23	1	1 126	169 795	5,6
11	7	948	160 637	5,9	29	1	1 131	171 464	5,6
45	2	1 044	162 753	5,9	33	1	1 149	172 481	5,6
25	9	979	164 377	5,7	14	1	1 202	183 054	5,4
30	1	1 143	183 814	5,6	41	4	1 303	190 342	5,3
2	35	1 137	188 447	5,5	18	1	1 352	199 535	5,2
33	1	1 164	190 499	5,4	5	1	1 374	201 113	5,1
19	1	1 279	206 855	5,3	42	1	1 420	212 547	5,0
41	1	1 263	207 616	5,2	27	11	1 503	220 378	4,9
12	1	1 217	211 938	4,9	2	41	1 689	241 711	4,7
27	1	1 479	249 891	4,7	26	1	1 785	263 198	4,5

Table A.10

Cluster	ISCO-88	Occupation	KZAM-95
1	011	011 Armed forces	011
1	711	711 Miners, shot-firers, stonecutters and carvers	711
1	831	831 Locomotive engine-drivers and related workers	831
2	111	111 Legislators	111
2	112	112 Senior government officials	112
2	113	113 Traditional chiefs and heads of villages	
2	114	114 Senior officials of special interest organizations	114
2	121	121 Directors and chief executives	121
2	211	211 Physicists, chemists and related professionals	211
2	212	212 Mathematicians, statisticians and related professionals	212
2	221	221 Life science professionals	221
2	243	243 Archivists, librarians and related information professionals	243
2	246	246 Religious professionals	246
2	313	313 Optical and electronic equipment operators	313
2	314	314 Ship and aircraft controllers and technicians	314
2	324	324 Traditional medicine practitioners and faith-healers	324
2	333	333 Special education teaching associate professionals	333
2	346	346 Social work associate professionals	346
2	347	347 Artistic, entertainment and sports associate professionals	347
2	348	348 Religious associate professionals	348
2	511	511 Travel attendants and related workers	511
2	513	513 Personal care and related workers	513
2	515	515 Astrologers, fortune-tellers and related workers	515
2	523	523 Stall and market salespersons	523
2	611	611 Market gardeners and crop growers	611
2	613	613 Market-oriented crop and animal producers	613
2	615	615 Fishery workers, hunters and trappers	615
2	621	621 Subsistence agricultural and fishery workers	621
2	731	731 Precision workers in metal and related materials	731
2	733	733 Handicraft workers in wood, textile, leather and related materials	733
2	734	734 Printing and related trades workers	734
2	744	744 Felt, leather and shoemaking trades workers	744
2	811	811 Mining and mineral-processing plant operators	811
2	813	813 Glass, ceramics and related plant operators	813
2	815	815 Chemical processing plant operators	815
2	817	817 Automated assembly-line and industrial robot operators	817
2	822	822 Chemical products machine operators	822
2	824	824 Wood products machine operators	824
2	825	825 Printing, binding and paper products machine operators	825
2	834	834 Ships' deck crews and related workers	834
2	911	911 Street vendors and related workers	911
2	912	912 Shoe cleaning and other street services' elementary occupations	912
3	122	122 Production and operations department managers	122
3	341	341 Finance and sales associate professionals	341
4	123	123 Other departmental managers	123
4	213	213 Computing professionals	213

Cluster	ISCO-88	Occupation	KZAM-95
4	312	312 Computer associate professionals	312
4	315	315 Safety and quality inspectors	315
4	345	345 Police inspectors and detectives	345
5	131	131 General managers	131
6	214	214 Architects, engineers and related professionals	214
7	222	222 Health professionals (except nursing)	222
8	231	231 College, university and higher education teaching professionals	231
8	234	234 Special education teaching professionals	234
8	235	235 Other teaching professionals	235
8	245	245 Writers and creative or performing artists	245
8	331	331 Primary education teaching associate professionals	331
8	332	332 Pre-primary education teaching associate professionals	332
8	334	334 Other teaching associate professionals	334
9	232	232 Secondary education teaching professionals	232
10	233	233 Primary and pre-primary education teaching professionals	233
11	241	241 Business professionals	241
11	244	244 Social sciences and related professionals	244
12	242	242 Legal professionals	242
13	342	342 Business services agents and trade brokers	342
13	344	344 Customs, tax and related government associate professionals	344
13	414	414 Library, mail and related clerks	414
13	419	419 Other office clerks	419
13	422	422 Client information clerks	422
14	311	311 Physical and engineering science technicians	311
15	321	321 Life science technicians and related associate professionals	321
16	322	322 Modern health associate professionals (except nursing)	322
17	323	323 Nursing and midwifery associate professionals	323
18	343	343 Administrative associate professionals	343
19	411	411 Secretaries and keyboard-operating clerks	411
20	412	412 Numerical clerks	412
21	413	413 Material-recording and transport clerks	413
22	421	421 Cashiers, tellers and related clerks	421
23	512	512 Housekeeping and restaurant services workers	512
24	514	514 Other personal service workers	514
25	516	516 Protective services workers	516
26	521	521 Shop salespersons and demonstrators	521
27	522	522 Outside (Open air) markets salespersons	522
27	614	614 Forestry and related workers	614
27	732	732 Potters, glass-makers and related trades workers	732
27	814	814 Wood processing and papermaking plant operators	814
27	816	816 Power production and related plant operators	816
27	823	823 Rubber and plastic products machine operators	823
27	827	827 Food and related products machine operators	827
27	829	829 Other machine operators and assemblers	829
27	914	914 Building caretakers, window and related cleaners	914
27	916	916 Garbage collectors and related labourers	916
27	921	921 Agricultural, fishery and related labourers	921
28	612	612 Market-oriented animal producers and related workers	612

Cluster	ISCO-88	Occupation	KZAM-95
29	712	712 Building frame and related trades workers	712
30	713	713 Building finishers and related trades workers	713
31	714	714 Painters, building structure cleaners and related trade workers	714
32	721	721 Metal moulders, welders, sheet-metalworkers, structural-metal preparers and related traders workers	721
33	722	722 Blacksmiths, toolmakers and related trades workers	722
34	723	723 Machinery mechanics and fitters	723
35	724	724 Electrical and electronic equipment mechanics and fitters	724
36	741	741 Food processing and related trades workers	741
37	742	742 Wood treaters, cabinet-makers and related trades workers	742
38	743	743 Textile, garment and related trades workers	743
39	812	812 Metal-processing plant operators	812
39	821	821 Metal and mineral products machine operators	821
40	826	826 Textile, fur and leather products machine operators	826
41	828	828 Assemblers	828
41	915	915 Messengers, porters, doorkeepers and related workers	915
41	931	931 Mining and construction labourers	931
41	933	933 Transport labourers and freight handlers	933
42	832	832 Motor vehicle drivers	832
43	833	833 Agricultural and other mobile plant operators	833
44	913	913 Domestic and related helpers, cleaners and launderers	913
45	932	932 Manufacturing labourers	932

Table A.11 Coding bridge linking LFS-type educational clasification with UIV-type classification

Zařazení skupin oborů a kmenových oborů KKOV do oborů vyučení a studia ve VŠPS

Nejvyšší dosažené vzdělání podle VŠPS

8.1	základní
8.2	vyučen
8.3	střední odborné
8.4	vyučen s maturitou
8.5	úplné střední odborné
8.6	úplné střední všeobecné
8.7	vysokoškolské
8.8	bez školního vzdělání

Obory vyučení dle VŠPS

9.1	řízení a obsluha strojů
9.2	strojírenství, hutnictví
9.3	elektrotech.,doprava,spoje
9.4	chemie, potravinářství
9.5	textil, oděvnictví
9.6	zpracování dřeva, výroba obuvi
9.7	stavebnictví
9.8	zemědělství a lesní hospodářství
9.9	obchod služby
9.10	ostatní

Obory studia podle VŠPS

10.1	přírodní vědy
10.2	strojírenství
10.3	elektrotechnika
10.4	stavebnictví
10.5	ostatní technické obory
10.6	zemědělství
10.7	zdravotnictví
10.8	ekonomika, obchod, služby
10.9	právní vědy
10.10	učitelství
10.11	ostatní společenské obory
10.12	ostatní vědy a nauky

Přiřazení kategorií vzdělání KKOV ke kategoriím nejvyšší dosažené vzdělání ve VŠPS
Nejvyšší dosažené vzdělání podle VŠPS

VŠPS	VŠPS	kategorie KKOV
8.1	základní	**C**
8.2	vyučen	**E, H**
8.3	střední odborné	**D, J**
8.4	vyučen s maturitou	**L**
8.5	úplné střední odborné	**M, N**
8.6	úplné střední všeobecné	**K**
8.7	vysokoškolské	**R, T, V**
8.8	bez školního vzdělání	**A, B**

Table A.12 Coding bridge linking LFS-type educational clasification with UIV-type clasification

Zařazení skupin oborů a kmenových oborů KKOV do oborů vyučení podle VŠPS
jsou sem zařazeny jak kategorie vyučen, tak vyučen s maturitou (vč. nástaveb)

VŠPS	Název oboru vyučení **VŠPS**	Kód	**Název kmenového oboru vzdělání (skupiny) KKOV**
9.1	9.1 řízení a obsluha strojů	21-51-E, H	Horník, hornické práce
9.1	(JKOV: 21)	23-65-E, H	Strojník, práce při obsluze strojů
9.1		23-67-E, H	Seřizovač textilních strojů, seřizovací práce
9.1		21-42-L	Těžba a zpracování surovin
9.1		23-46-L	Obsluha strojů a zařízení
9.2	9.2 strojírenství, hutnictví	21-52-E, H	Hutník, hutnické práce
9.2	(JKOV: 22, 23, 24)	21-53-E, H	Modelář, modelářské práce
9.2		21-54-E, H	Formíř, formířské práce
9.2		21-55-E, H	Slévač, slévačské práce
9.2		23-51-E, H	Zámečník, zámečnické práce a údržba
9.2		23-52-E, H	Nástrojař, nástrojařské práce
9.2		23-53-E, H	Rytec kovů, rytecké práce
9.2		23-54-E, H	Kovotepec, kovotepecké práce, výroba kovové bižuterie
9.2		23-55-E, H	Klempíř, klempířské práce ve strojírenství
9.2		23-56-E, H	Obráběč kovů, obráběčské práce
9.2		23-57-E, H	Strojní kovář, kovářské práce
9.2		23-58-E, H	Úpravář kovů, úpravářské práce
9.2		23-59-E, H	Povrchová úprava, práce při povrchové úpravě
9.2		23-61-E, H	Lakýrník, lakýrnické práce
9.2		23-62-E, H	Optik
9.2		23-63-E, H	Hodinář, hodinářské práce
9.2		23-64-E, H	Strojní mechanik, montérské práce
9.2		23-66-E, H	Mechanik opravář, opravářské práce
9.2		23-68-E, H	Automechanik, technické práce v autoservisu
9.2		23-69-E,H	Puškař
9.2		23-71-E, H	Nožíř
9.2		21-43-L	Hutní výroba a druhovýroba
9.2		21-44-L	Slévárenská výroba
9.2		23-41-L	Strojírenství
9.2		23-42-L	Automatizace ve strojírenství
9.2		23-43-L	Strojírenská výroba
9.2		23-44-L	Montáž strojů a zařízení
9.2		23-45-L	Servis a opravy strojů a zařízení
9.2		23-69-L	Puškař
9.2		*39-08-L/501*	*Požární ochrana*
9.3	9.3 elektrotrotechnika, doprava, spoje	26-H, E, L	Elektrotechnika, telekomunikační a výpočetní technika
9.3	(JKOV: 26,37)	**37-H, E, L**	**Doprava a spoje**
9.3		*39-41-L/501*	*Elektrotechnika a strojírenství*
9.4	9.4 chemie, potravináářství	**28-H, E, L**	**Technickáá chemie a chemie silikátů**
9.4	(JKOV: 27, 28, 29, 34)	**29-H, E, L**	**Potravinářství a potravinářská chemie**
9.4		**34-H, E, L**	**Polygrafie, zpracování papíru, filmu a fotografie**

VŠPS	Název oboru vyučení VŠPS	Kód	Název kmenového oboru vzdělání (skupiny) KKOV
9.5	9.5 textil, oděvnictví (JKOV:31)	**31-H, E, L**	**Textilní výroba a oděvnictví**
9.6	9.6 zpracov. dřeva, výroba obuvi	**32-H, E, L**	**Koželná a obuvnická výroba a zpracování plastů**
9.6	(JKOV: 32, 33)	**33-H, E, L**	**Zpracování dřeva a výroba hudebních nástrojů**
9.7	9.7 stavebnictví (JKOV:36)	**36-H, E, L**	**Stavebnictví, geodézie a kartografie**
9.8	9.8 zemědělství a lesní hospod.	**41-H, E, L**	**Zemědělství a lesnictví**
9.8	(JKOV: 42, 43, 45)		
9.9	9.9 obchod, služby	**65-H, E, L**	**Gastronomie, hotelnictví a turismus**
9.9	(JKOV: 63, 64	**66-H, E, L**	**Obchod**
9.9		**69-H, E, L**	**Osobní a provozní služby**
9.10	9.10 ostatní	**53-H, E, L**	**Zdravotnictví**
9.10	(JKOV: 55 , 82 a ostatní nezařazené jinde)	**63-H, E, L ***	**Ekonomika a administrativa**
9.10		**16-L ***	**Ekologie a životní prostředí**
9.10		**64-L ***	**Podnikání v oborech, odvětví**
9.10		**68-L ***	**Právo, právní a veřejnosprávní činnost**
9.10		**72-L ***	**Publicistika, knihovnictví a informatika**
9.10		**74-H, E, L ***	**Tělesná kultura, tělovýchova a sport**
9.10		**75-L ***	**Pedagogika, učitelství a sociální péče**
9.10		**78-H ***	**Rodinná přííprava**
9.10		**82-H, E, L**	**Umění a užité umění**

Poznámky:

1. Učební obory s maturitou a nástavbové obory – ze zkušeností s VŠPS je zřejmé, že je zařazují do učebních oborů
– alespoň ty čtyřleté studijní SOU, jak to dělají s nástavbami si nedovoluji odhadnout a nejde to vydedukovat

2. Označení JKOV se vztahuje k situaci do roku 1984, pak bylo jiné a jsou mnohé navíc –
i když je přesně určeno co patří do kategorie ostatní (55 a 85) dávám tam i vše ostatní (označeno *)
upozorňuji, že jde o velká množství žáků ve skupině KKOV 63 a 64

3. Skupina 34 Polygrafie atd. je podle názvu nelogicky zatříděna, ale tehdy měla kód 06 – tedy jako chemie
a patřila tedy do oboru vyučení VŠPS s názvem chemie, potravinářství

tučné písmo – skupiny kmenových oborů
obyčejné písmo – kmenové obory
kurziva – jednotlivé obory vzdělání

U SOU se jedná o obory JKOV, které mají na 5. místě 0, 2, 4

Table A.13   Coding bridge linking LFS-type educational classification with UIV-type classification

Přiřazení kmenových oborů KKOV do oborů vyučení podle VŠPS

21-51-E, H	9.1	Horník, hornické práce
23-65-E, H	9.1	Strojník, práce při obsluze strojů
23-67-E, H	9.1	Seřizovač textilních strojů, seřizovací práce
21-42-L	9.1	Těžba a zpracování surovin
23-46-L	9.1	Obsluha strojů a zařízení
21-52-E, H	9.2	Hutník, hutnické práce
21-53-E, H	9.2	Modelář, modelářské práce
21-54-E, H	9.2	Formíř, formířské práce
21-55-E, H	9.2	Slévač, slévačské práce
23-51-E, H	9.2	Zámečník, zámečnické práce a údržba
23-52-E, H	9.2	Nástrojař, nástrojařské práce
23-53-E, H	9.2	Rytec kovů, rytecké práce
23-54-E, H	9.2	Kovotepec, kovotepecké práce, výroba kovové bižuterie
23-55-E, H	9.2	Klempíř, klempířské práce ve strojírenství
23-56-E, H	9.2	Obráběč kovů, obráběčské práce
23-57-E, H	9.2	Strojní kovář, kovářské práce
23-58-E, H	9.2	Úpravář kovů, úpravářské práce
23-59-E, H	9.2	Povrchová úprava, práce při povrchové úpravě
23-61-E, H	9.2	Lakýrník, lakýrnické práce
23-62-E, H	9.2	Optik
23-63-E, H	9.2	Hodinář, hodinářské práce
23-64-E, H	9.2	Strojní mechanik, montérské práce
23-66-E, H	9.2	Mechanik opravář, opravářské práce
23-68-E, H	9.2	Automechanik, technické práce v autoservisu
23-69-E, H	9.2	Puškař
23-71-E, H	9.2	Nožíř
21-43-L	9.2	Hutní výroba a druhovýroba
21-44-L	9.2	Slévárenská výroba
23-41-L	9.2	Strojírenství
23-42-L	9.2	Automatizace ve strojírenství
23-43-L	9.2	Strojírenská výroba
23-44-L	9.2	Montáž strojů a zařízení
23-45-L	9.2	Servis a opravy strojů a zařízení
23-69-L	9.2	Puškař
39-08-L/501	9.3	*Požární ochrana*
26-51-E, H	9.3	Elektrikář, elektrotechnické práce
26-52-E, H	9.3	Mechanik elektrotechnických zařízení
26-53-E, H	9.3	Mechanik elektronických zařízení
26-54-E, H	9.3	Montér elektrorozvodných sítí
26-55-E, H	9.3	Mechanik automatizační techniky
26-56-E, H	9.3	Mechanik zabezpečovací techniky
26-57-E, H	9.3	Autoelektrikář
26-58-E, H	9.3	Mechanik telekomunikační techniky
26-59-E, H	9.3	Mechanik telekomunikačních sítí
37-51-E, H	9.3	Manipulant poštovního provozu a přepravy
37-52-E, H	9.3	Železničář, práce v dopravě
26-41-L	9.3	Elektrotechnika
26-42-L	9.3	Silnoproudá elektrotechnika
26-43-L	9.3	Elektronika
26-44-L	9.3	Automatizace
26-45-L	9.3	Telekomunikace
26-46-L	9.3	Aplikovaná elektronika
26-47-L	9.3	Výpočetní technika
37-41-L	9.3	Provoz, organizace a ekonomika dopravy
37-42-L	9.3	Provoz, organizace a ekonomika pošt
39-41-L/501	9.3	*Elektrotechnika a strojírenství*
28-51-E, H	9.4	Chemik – laborant, práce v chemické laboratoři

28-52-E, H	9.4	Chemik, práce v chemické výrobě
28-53-E, H	9.4	Farmaceutická výroba
28-54-E, H	9.4	Výrobce a zpracovatel silikátových vláken
28-55-E, H	9.4	Gumař-plastikář, práce v gumárenské a plastikářské výrobě
28-56-E, H	9.4	Výrobce papíru, papírenské práce
28-57-E, H	9.4	Keramik, keramické práce
28-58-E, H	9.4	Sklář, sklářské práce
28-59-E, H	9.4	Výroba stavebních materiálů
28-61-E, H	9.4	Brusič skla, brusič technického a šperkového kamene
28-62-E, H	9.4	Malíř skla a keramiky
28-63-E, H	9.4	Výrobce bižuterie, bižuterní práce
28-64-E, H	9.4	Výrobce ozdobných předmětů, vánočních ozdob a zapínadel
29-51-E, H	9.4	Potravinář, potravinářské práce
29-52-E, H	9.4	Mlynář, mlynářské práce
29-53-E, H	9.4	Pekař, pekařské práce
29-54-E, H	9.4	Cukrář, cukrovinkář, cukrářské práce
29-55-E, H	9.4	Mlékař, mlékařské práce
29-56-E, H	9.4	Řezník-uzenář, řeznické a uzenářské práce
29-57-E, H	9.4	Sladovník, pivovarník, pivovarnické práce
29-58-E, H	9.4	Konzervář, konzervárenské práce
29-59-E, H	9.4	Biochemik pro lihovarskou výrobu a výrobu vín
34-51-E, H	9.4	Sazeč, sazečské práce
34-52-E, H	9.4	Tiskař na polygrafických strojích, tiskařské práce
34-53-E, H	9.4	Reprodukční grafik, litografické a montážní práce
34-54-E, H	9.4	Polygrafická výroba
34-55-E, H	9.4	Filmový laborant
34-56-E, H	9.4	Fotograf, fotografické práce
34-57-E, H	9.4	Knihař, knihařské práce
28-42-L	9.4	Průmyslová chemie
28-43-L	9.4	Analytická chemie aplikovaná
28-44-L	9.4	Aplikovaná chemie
28-45-L	9.4	Sklářská výroba
28-46-L	9.4	Keramická výroba
28-47-L	9.4	Bižuterní výroba a výroba ozdobných předmětů
29-41-L	9.4	Potravinářství
29-42-L	9.4	Analýza potravin
29-43-L	9.4	Technologie sacharidů
29-44-L	9.4	Technologie masa
29-45-L	9.4	Kvasná technologie
29-46-L	9.4	Technologie mléka
29-47-L	9.4	Technologie tuků
29-48-L	9.4	Konzervárenská technologie
34-41-L	9.4	Polygrafie
34-42-L	9.4	Obalová technika, zpracování papíru
34-51-L	9.4	Sazeč, sazečské práce
34-52-L	9.4	Tiskař na polygrafických strojích, tiskařské práce
34-53-L	9.4	Reprodukční grafik, litografické a montážní práce
31-51-E, H	9.5	Přadlák, přadelnické práce
31-52-E, H	9.5	Plsťař, plsťařské práce
31-53-E, H	9.5	Tkadlec, tkalcovské práce, výroba koberců
31-54-E, H	9.5	Pletař, pletařské práce
31-55-E, H	9.5	Prýmkař, prýmkařské práce
31-56-E, H	9.5	Textilní chemik, zušlechťovací práce
31-57-E, H	9.5	Výrobce textilií, textilní výroba
31-58-E, H	9.5	Krejčí, krejčovské práce
31-59-E, H	9.5	Švadlena, šití oděvů, prádla a rukavic
31-61-E, H	9.5	Strojní vyšívačka
31-62-E, H	9.5	Kloboučník, kloboučnické práce
31-41-L	9.5	Textilnictví
31-42-L	9.5	Zušlechťování textilií

Přiřazení kmenových oborů KKOV do oborů vyučení podle VŠPS

31-43-L	9.5	Oděvnictví
32-41-E	9.6	Zpracování usní, plastů a pryže
32-51-E, H	9.6	Koželužský chemik, zpracování kůže
32-52-E, H	9.6	Brašnář, brašnářské práce
32-53-E, H	9.6	Kožešník, kožešnické práce
32-54-E, H	9.6	Obuvník, obuvnické práce
32-55-E, H	9.6	Rukavičkář, rukavičkářské práce
32-56-E, H	9.6	Sedlář, sedlářské práce
32-57-E, H	9.6	Svrškař, svrškařské práce
32-58-E, H	9.6	Výroba obuvi a kožené galanterie
32-59-E, H	9.6	Kopytář
32-61-E, H	9.6	Výrobce ortopedicko-protetických pomůcek
33-51-E, H	9.6	Bednář, bednářské práce
33-52-E, H	9.6	Kartáčník, kartáčnické práce
33-53-E, H	9.6	Košíkář, košíkářské práce
33-54-E, H	9.6	Mechanik hudebních nástrojů
33-55-E, H	9.6	Rámař – pozlacovač
33-56-E, H	9.6	Truhlář, truhlářské práce
33-57-E, H	9.6	Zpracování dřeva, výroba kancelářských potřeb, výroba sportovních potřeb
33-58-E, H	9.6	Zpracovatel přírodních pletiv
33-59-E, H	9.6	Čalouník, čalounické práce
32-41-L	9.6	Zpracování usní, plastů a pryže
32-42-L	9.6	Kožedělná výroba
32-43-L	9.6	Kožešnická výroba
32-44-L	9.6	Výroba obuvi
33-41-L	9.6	Dřevařství
33-42-L	9.6	Nábytkářství
33-43-L	9.6	Výroba hudebních nástrojů
36-44-E, H	9.7	Stavební provoz
36-51-E, H	9.7	Dlaždič-cestář, dlaždičské práce
36-52-E, H	9.7	Instalatér, instalatérské práce
36-53-E, H	9.7	Izolatér, izolatérské práce
36-54-E, H	9.7	Kameník, kamenické práce
36-55-E, H	9.7	Klempíř, klempířské práce ve stavebnictví
36-56-E, H	9.7	Kominík, kominické práce
36-57-E, H	9.7	Malíř-natěrač, malířské a natěračské práce
36-58-E, H	9.7	Montér-vodopotrubář
36-59-E, H	9.7	Podlahář, podlahářské práce
36-61-E, H	9.7	Silničář, silničářské práce
36-62-E, H	9.7	Sklenář, sklenářské práce
36-63-E, H	9.7	Štukatér, štukatérské práce
36-64-E, H	9.7	Tesař, tesařské práce
36-65-E, H	9.7	Vodař-meliorátor, meliorátorské práce
36-66-E, H	9.7	Suché montáže
36-67-E, H	9.7	Zedník, kamnář, zednické práce, stavební práce
36-68-E, H	9.7	Železobetonář, železobetonářské práce
36-69-E, H	9.7	Pokrývač, pokrývačské práce
36-41-L	9.7	Pozemní stavitelství
36-42-L	9.7	Dopravní a vodohospodářské stavitelství
36-44-L	9.7	Stavební provoz
36-45-L	9.7	Technická zařízení budov
36-46-L	9.7	Geodézie a kartografie
36-47-L	9.7	Stavebnictví
41-51-E, H	9.8	Zemědělec, zemědělské práce
41-52-E, H	9.8	Zahradník, zahradnické práce
41-53-E, H	9.8	Chovatel zvířat, chovatelské a zpracovatelské práce
41-54-E, H	9.8	Kovář, podkovář, kovářské a podkovářské práce
41-55-E, H	9.8	Opravář zemědělských strojů, opravářské práce
41-56-E, H	9.8	Lesní výroba, lesnické práce
41-57-E, H	9.8	Zpracovatel dřeva

Přiřazení kmenových oborů KKOV do oborů vyučení podle VŠPS

41-41-L	9.8	Obecné zemědělství
41-42-L	9.8	Pěstování rostlin
41-43-L	9.8	Chov hospodářských zvířat
41-44-L	9.8	Zahradnictví
41-45-L	9.8	Zemědělská a lesnická technika
41-46-L	9.8	Lesní hospodářství
65-51-E, H	9.9	Kuchař-číšník, práce ve společném stravování
65-52-E, H	9.9	Kuchař, kuchařské práce
65-53-E, H	9.9	Číšník, servírka
66-51-E, H	9.9	Prodavač, obchodník, obchodní provoz
66-52-E, H	9.9	Aranžér, propagační práce
66-53-E, H	9.9	Skladník, práce ve skladu
69-51-E, H	9.9	Kadeřník
69-52-H	9.9	Kosmetička
69-53-E, H	9.9	Provoz služeb
69-54-E, H	9.9	Práce v čistírnách a prádelnách
69-55-E, H	9.9	Pečovatelské práce
65-41-L	9.9	Gastronomie
65-42-L	9.9	Hotelnictví a turismus
66-41-L	9.9	Provoz obchodu
66-42-L	9.9	Propagace
66-43-L	9.9	Knihkupectví
66-44-L	9.9	Skladové hospodářství
69-41-L	9.9	Osobní služby
69-42-L	9.9	Provozní služby
69-43-L	9.9	Pečovatelské služby
53-41-E, H	9.10	Ošetřovatelství
63-51-H	9.10	Technickoadministrativní pracovník, technickoadministrativní práce
63-52-H	9.10	Zpracování technické dokumentace
74-41-H	9.10	Tělesná kultura
78-41-E, H	9.10	Rodinná příprava
78-51-E, H	9.10	Odborná základní příprava
82-48-H	9.10	Oceňování, uložení a prodej uměleckých předmětů
82-51-H	9.10	Výtvarné a uměleckořemeslné práce
16-01-L	9.10	Ekologie a ochrana prostředí
53-44-L	9.10	Technik ve zdravotnictví
63-41-L	9.10	Ekonomika a podnikání
63-42-L	9.10	Administrativa
63-43-L	9.10	Finančnictví a bankovnictví
64-41-L	9.10	Podnikání v oborech
64-42-L	9.10	Organizace a management v odvětví
64-43-L	9.10	Ekonomika odvětví (oborů)
68-42-L	9.10	Bezpečnostní právní činnost
68-43-L	9.10	Veřejnosprávní činnost
72-42-L	9.10	Publicistika
74-41-L	9.10	Tělesná kultura
75-31-L	9.10	Předškolní a mimoškolní pedagogika
75-41-L	9.10	Sociální činnost
82-41-L	9.10	Výtvarná a uměleckořemeslná tvorba
82-42-L	9.10	Konzervátorství a restaurátorství
82-48-L	9.10	Oceňování, uložení a prodej uměleckých předmětů
82-51-L	9.10	Výtvarné a uměleckořemeslné práce

Table A.14 Coding bridge linking LFS-type educational classification with UIV-type classification

Zařazení skupin oborů a kmenových oborů a oborů KKOV do oborů studia podle VŠPS

VŠPS	Název oboru studia VŠPS	Kód	Název skupiny, kmen. oboru či oboru vzdělání KKOV	
10.1	10.1 přírodní vědy	**11-R, T, V**	**Matematické obory**	10.10.1
10.1	(JKOV: 1)	**12-R, T, V**	**Geologické obory**	10.10.1
10.1		**13-R, T, V**	**Geografické obory**	10.10.1
10.1		**14-R, T, V**	**Chemické obory**	10.10.1
10.1		**15-R, T, V**	**Biologické obory**	10.10.1
10.1		**16-M, N, R, T, V**	**Ekologie a ochrana životního prostředí**	10.10.1
10.1		**17-R, T, V**	**Fyzikální obory**	10.10.1
10.2	10.2 strojírenství	**23-R, T, V**	**Strojírenství a strojírenská výroba**	10.10.2
10.2	(JKOV: 23)	23-41-J, M, N	Strojírenství	10.10.2
10.2		23-42-J, M, N	Automatizace ve strojírenství	10.10.2
10.2		*23-45-M/001*	*Strojírenství – diagnostika motorových vozidel*	10.10.2
10.2		*23-45-M/002*	*Strojník pro požární techniku*	10.10.2
10.2		*23-45-M/003*	*Strojník požární techniky*	10.10.2
10.3	10.3 elektrotechnika	**26-R, T, V**	**Elektrotechnika, telekomunikační a výpočetní technika**	10.10.3
10.3	(JKOV: 26)	*26-41-M/002*	*Elektrotechnika*	10.10.3
10.3		*26-42-M/001*	*Zařízení silnoproudé elektrotechniky*	10.10.3
10.3		*26-42-M/002*	*Zařízení silnoproudé elektrotechniky – elektroenergetika*	10.10.3
10.3		*26-42-M/003*	*Zařízení silnoproudé elektrotechniky – elekt. stroje a přístr.*	10.10.3
10.3		26-43-J, M, N	Elektronika	10.10.3
10.3		26-44-J, M, N	Automatizace	10.10.3
10.3		*26-46-M/001*	*Obrazová a zvuková technika – technické zaměření*	10.10.3
10.3		*26-46-M/002*	*Obrazová a zvuková technika – technologickoorganizační zam.*	10.10.3
10.3		*26-46-M/004*	*Obrazová a zvuková technika*	10.10.3
10.3		26-47-J, M, N	Výpočetní technika	10.10.3
10.4	10.4 stavebnictví (JKOV: 36)	**36-J, M, N, R, T, V**	**Stavebnictví, geodézie a kartografie**	10.10.4
10.5	10.5 ostatní technické obory	**21-J, M, N, R, T, V**	**Hornictví a hornická geologie, hutnictví a slévárenství**	10.10.5
10.5	(JKOV: 21, 22, 27, 28, 29, 31,	**28-J, M, N, R, T, V**	**Technická chemie a chemie silikátů**	10.10.5
10.5	32, 33, 34, 35, 37, 39)	**29-J, M, N, R, T, V**	**Potravinářství a potravinářská chemie**	10.10.5
10.5		**31-J, M, N, R, T, V**	**Textilní výroba a oděvnictví**	10.10.5
10.5		**32-J, M, N, R, T, V**	**Kožedělná a obuvnická výroba a zpracování plastů**	10.10.5
10.5		**33-J, M, N, R, T, V**	**Zpracování dřeva a výroba hudebních nástrojů**	10.10.5
10.5		**34-J, M, N, R, T, V**	**Polygrafie, zpracování papíru, filmu a fotografie**	10.10.5
10.5		**35-R, T, V**	**Architektura a urbanismus**	10.10.5
10.5		**37-J, M, N, R, T, V**	**Doprava a spoje**	10.10.5
10.5		*23-45-M/004*	*Silniční doprava*	10.10.5
10.5		*23-45-M/005*	*Silniční doprava – provoz a údržba vozidel*	10.10.5
10.5		*23-45-M/006*	*Silniční doprava – diagnostika motorových vozidel*	10.10.5
10.5		*23-45-N/002*	*Diagnostika silničních vozidel*	10.10.5
10.5		*26-41-M/003*	*Elektrotechnická zařízení v dopravě*	10.10.5
10.5		*26-41-M/004*	*Elektrotechnická zařízení v dopravě – sdělovací a zab. techn.*	10.10.5
10.5		*26-42-M/004*	*Elektrická trakce v dopravě*	10.10.5
10.5		*26-42-M/005*	*Elektrická trakce v dopravě – technika a provoz kolej. vozidel*	10.10.5
10.5		*26-42-M/006*	*Elektrická trakce v dopravě – údržba a opravy kolej. vozidel*	10.10.5
10.5		*26-45-M/001*	*Spojová technika*	10.10.5
10.5		*26-45-M/002*	*Spojová technika – telekomunikace*	10.10.5
10.5		*26-45-M/003*	*Spojová technika – radiokomunikace*	10.10.5
10.5		*26-45-M/004*	*Digitální telekomunikační technika*	10.10.5
10.5		*26-46-M/003*	*Zabezpečovací a sdělovací technika v dopravě*	10.10.5
10.5		*26-46-M/005*	*Zabezpeč. a sdělovací technika v dopravě – zabezp. technika*	10.10.5
10.5		*26-46-M/006*	*Zabezpeč. a sdělovací technika v dopravě - sdělov. technika*	10.10.5
10.5		**39-R, T, V**	**Speciální a interdisciplinární technické obory**	10.10.5
10.5		39-08-M	Požární ochrana a průmyslová bezpečnost	10.10.5
10.5		39-41-J, M, N	Technický interdisciplinární	10.10.5

VŠPS	Název oboru studia VŠPS	Kód	Název skupiny, kmen. oboru či oboru vzdělání KKOV	
10.6	10.6 zemědělství (JKOV: 4)	**41-J, M, N, R, T, V**	**Zemědělství a lesnictví**	10.10.6
10.6		**43-J, M, N, R, T, V**	**Veterinářství a veterinární prevence**	10.10.6
10.7	10.7 zdravotnictví	**51-R, T, V**	**Lékařství**	10.10.7
10.7	(JKOV: 5)	**52-R, T, V**	**Farmacie**	10.10.7
10.7		**53-J, M, N, R, T, V**	**Zdravotnictví**	10.10.7
10.8	10.8 ekonomika, obchod, služby	**62-R, T, V**	**Ekonomie**	10.10.8
10.8	(JKOV: 62,63)	**63-J, M, N**	**Ekonomika a administrativa**	10.10.8
10.8		**64-J, M, N**	**Podnikání v oborech, odvětví**	10.10.8
10.8		**65-J, M, N**	**Gastronomie, hotelnictví a turismus**	10.10.8
10.8		**66-J, M, N**	**Obchod**	10.10.8
10.8		**69-J, M, N**	**Osobní a provozní služby**	10.10.8
10.9	10.9 právní vědy (JKOV: 68)	**68-J, M, N, R, T, V**	**Právo, právní a veřejnosprávní činnost**	10.10.9
10.10	10.10 učitelství (JKOV: 75,76)	**75-J, M, N, R, T, V**	**Pedagogika, učitelství a sociální péče**	10.10.10
10.11	10.11 ostatní společenské obory	**67-R, T, V**	**Politologie**	10.10.11
10.11	(JKOV: 61, 67, 71, 72, 73, 74, 77)	**61-R, T, V**	**Filozofie, teologie**	10.10.11
10.11		**71-R, T, V**	**Obory z oblasti historie**	10.10.11
10.11		**72-J, M, N, R, T, V**	**Publicistika, knihovnictví a informatika**	10.10.11
10.11		**73-R, T, V**	**Filologie**	10.10.11
10.11		**74-M, R, T, V**	**Tělesná kultura, tělovýchova a sport**	10.10.11
10.11		**77-R, T, V**	**Obory z oblasti psychologie**	10.10.11
10.11		**78-D, J, M**	**Obecně odborná příprava**	10.10.11
10.12	10.12 ostatní vědy a nauky	**81-R, T, V**	**Teorie umění**	10.10.12
10.12	(JKOV: 8)	**82-J, M, N, R, T, V**	**Umění a užité umění**	10.10.12

Problémy a poznámky:

1. Management je zařazen do skupiny 10.8 i když je na rozmezí mezi ekonomickými a technickými obory

2. Gymnázijní vzdělávání není zařazeno, je odlišeno v třídění podle dosaženého vzdělání

3. Rodiné školy a lycea jsou zařazeny do 10.11

> tučné písmo – skupiny kmenových oborů
>
> obyčejné písmo – kmenové obory
>
> kurziva – jednotlivé obory vzdělání

U SOŠ se jedná o obory JKOV mající na 5. místě 3, 6

U VOŠ se jedná o obory JKOV mající na 5. místě 7

U VŠŠ se jedná o obory JKOV mající na 5. místě 7–9

Gymnázia mají na 5. místě 5

Table A.15 School Graduates According to the LFS classification

ABSOLVENTI
Nejvyšší dosažené vzdělání podle VŠPS

		1993/94	1994/98	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04
8.1	**základní**	**154 935**	**134 241**	**8 642**	**116 420**	**113 292**	**114 468**	**113 650**	**117 380**	**120 270**	**120 380**	**119 260**
	ZŠ – poslední ročník	149 409	128 191	5 852	111 266	107 997	109 356	108 500	112 400	115 400	115 700	114 600
	zvláštní škola, spec. ZŠ	5 526	6 050	2 790	5 154	5 295	5 112	5 150	4 980	4 870	4 680	4 660
8.2	**vyučen**	**70 030**	**76 069**	**74 198**	**62 257**	**56 465**	**9 509**	**41 400**	**43 600**	**42 250**	**43 800**	**45 150**
	OU, spec. SOU	3 449	4 129	4 605	4 268	4 270	2 721	4 000	4 500	4 800	4 500	4 500
	SOU, U	66 581	71 940	69 593	57 989	52 195	6 788	37 400	39 100	37 450	39 300	40 650
8.3	**střední odborné**	**2 895**	**2 795**	**2 380**	**1 572**	**1 004**	**1 035**	**950**	**1 050**	**1 020**	**1 100**	**1 100**
	praktická škola	439	531	736	889	809	877	850	1 000	1 000	1 000	1 000
	SOŠ bez mat.	2 456	2 264	1 644	683	195	158	100	50	20	100	100
8.4	**vyučen s maturitou**	**9 144**	**9 383**	**17 216**	**23 901**	**28 601**	**20 253**	**12 820**	**4 780**	**11 820**	**12 070**	**11 620**
	SOU s mat.	7 241	6 297	7 451	7 800	7 394	6 428	2 500	3 800	6 350	6 400	5 850
	nástavby	1 895	3 016	9 750	16 069	21 163	13 814	10 300	950	5 450	5 650	5 750
	spec. SOU	8	70	15	32	44	11	20	30	20	20	20
8.5	**úplné střední odborné**	**42 134**	**45 442**	**51 017**	**53 785**	**56 173**	**56 180**	**18 700**	**54 500**	**51 900**	**50 350**	**49 900**
	SOŠ s mat.	35 357	37 644	42 699	47 735	51 854	49 350	10 900	46 200	43 950	43 250	42 800
	konzervatoře	327	314	476	448	381	418	500	350	350	450	550
	VOŠ	17	336	966	1 587	2 994	6 159	7 200	7 700	7 300	6 400	6 300
	PMS	6 285	6 863	6 569	3 639	623	0	0	0	0	0	0
	spec. SOŠ, konz.	148	285	307	376	321	253	100	250	300	250	250
8.6	**úplné střední všeobecné**	**24 644**	**19 078**	**20 353**	**23 894**	**22 899**	**21 187**	**11 730**	**23 540**	**18 995**	**24 290**	**26 040**
	G	24 612	19 052	20 309	23 857	22 855	21 155	11 700	23 500	18 950	24 250	26 000
	spec. G	32	26	44	37	44	32	30	40	45	40	40
8.7	**vysokoškolské**	**16 639**	**16 682**	**18 398**	**20 942**	**23 262**	**23 582**	**25 900**	**25 100**	**25 150**	**26 700**	**27 750**
8.8	**bez školního vzdělání**	**5 595**	**5 914**	**9 096**	**8 503**	**8 688**	**8 624**	**8 510**	**8 570**	**8 520**	**8 550**	**8 380**
	zvl. škola dříve než v posl. ročníku	947	1 233	2 950	2 122	2 097	1 751	1 710	1 670	1 620	1 550	1 480
	ZŠ, zvl. škola dříve než v posl. ročníku	4 648	4 681	6 146	6 381	6 591	6 873	6 800	6 900	6 900	7 000	6 900

Přednostně podle typu školy, gymnázia včetně lyceí, v oborech jsou podle oborů
u oborů bez VÚ v letech ……., přednostně podle oborů
čísla se mohou lišit od souhrnných čísel v tab. podle oborů (z důvodu různé metodiky započítávání lyceí, praktických škol, ……)

Table A.16 School Graduates According to the LFS classification
ABSOLVENTI
Nejvyšší dosažené vzdělání podle VŠPS

	Obory vyučení dle VŠPS	1993/94	1994/98	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04
9.1	řízení a obsluha strojů	348	195	118	93	47	0	0	0	0	0	0
9.2	strojírenství, hutnictví	19 450	16 513	14 810	12 078	11 552	2 955	8 470	8 740	8 910	9 200	9 350
9.3	elektrotech., doprava, spoje	8 790	8 549	9 470	8 021	8 387	4 048	4 390	6 090	7 370	7 610	7 740
9.4	chemie, potravinářství	5 102	6 060	5 628	4 506	4 246	954	2 750	3 060	3 320	3 440	3 490
9.5	textil, oděvnictví	6 091	6 798	6 803	6 159	5 255	1 349	2 140	1 800	1 810	1 870	1 900
9.6	zpracování dřeva, výroba obuvi	4 785	5 634	5 933	5 751	5 971	1 405	3 770	3 280	3 600	3 720	3 780
9.7	stavebnictví	10 730	11 580	11 167	9 515	8 018	2 113	4 230	4 170	3 890	4 020	4 090
9.8	zemědělství a lesní hospodářství	7 003	6 551	5 653	4 681	3 970	1 062	3 080	3 070	3 450	3 560	3 620
9.9	obchod služby	15 563	21 764	24 905	23 521	24 182	7 570	17 150	15 650	18 880	19 510	19 810
9.10	ostatní	755	1 801	6 922	11 833	13 448	8 711	8 240	2 520	2 840	2 940	2 990

Table A.17 School Graduates According to the LFS classification
ABSOLVENTI
Nejvyšší dosažené vzdělái podle VŠPS

	Obory studia podle VŠPS – celkem	1994	1995	1996	1997	1998	1999	1999/2000	2000/01	2001/02	2002/03	2003/04
10.1	přírodní vědy	989	1 133	1 105	1 504	1 635	1 602	1 680	1 970	2 010	2 140	2 170
10.2	strojírenství	6 256	5 272	5 894	6 354	7 064	3 124	2 460	4 030	4 780	4 830	4 890
10.3	elektrotechnika	4 545	3 616	4 854	4 931	5 851	4 776	2 390	5 900	6 570	6 510	6 550
10.4	stavebnictví	4 259	3 237	3 086	3 572	3 221	3 957	2 340	4 240	4 570	4 560	4 570
10.5	ostatní technické obory	5 927	5 458	5 651	5 753	7 024	5 871	3 290	6 100	6 890	6 930	7 000
10.6	zemědělství	6 002	5 301	4 695	4 972	5 012	3 780	2 120	3 950	4 150	4 140	4 190
10.7	zdravotnictví	9 878	8 639	7 786	7 383	6 915	6 931	3 810	6 890	7 000	6 890	6 890
10.8	ekonomika, obchod, služby	13 829	16 642	20 864	24 462	26 843	33 427	15 960	32 760	26 980	26 910	26 950
10.9	právní vědy	875	1 188	1 576	1 749	1 872	2 340	1 560	3 200	3 030	3 010	3 040
10.10	učitelství	4 698	4 348	4 859	4 840	4 674	5 102	4 710	5 380	6 130	6 180	6 350
10.11	ostatní společenské obory	3 500	8 604	9 372	8 581	8 206	6 797	2 600	2 910	2 740	2 840	2 920
10.12	ostatní vědy a nauky	1 339	1 472	1 714	1 880	2 143	2 263	1 780	2 320	2 220	2 210	2 230

Rozpočítání podle SOŠ a VOŠ × VŠ:

SOŠ, VOŠ		1993/94	1994/98	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04
10.1	přírodní vědy	66	52	69	150	191	259	110	310	420	410	400
10.2	strojíírenství	4 826	4 257	4 830	5 442	5 927	1 679	260	1 910	2 640	2 560	2 540
10.3	elektrotechnika	3 246	2 863	3 839	3 687	4 352	3 487	680	4 290	4 930	4 790	4 750
10.4	stavebnictví	3 034	2 517	2 213	2 615	2 173	2 764	1 160	3 090	3 420	3 330	3 300
10.5	ostatní technické obory	4 637	3 951	4 069	4 093	5 066	3 906	750	3 610	4 410	4 290	4 250
10.6	zemědělství	4 826	4 128	3 627	3 563	3 607	2 834	620	2 550	2 720	2 640	2 620
10.7	zdravotnictví	8 147	6 830	6 059	5 623	5 370	5 353	2 610	5 760	5 850	5 680	5 630
10.8	ekonomika, obchod, služby	10 835	13 214	16 860	19 572	20 903	26 933	9 530	26 110	20 530	19 950	19 770
10.9	právní vědy	439	623	828	764	734	1 064	520	2 280	2 080	2 020	2 000
10.10	učitelství	1 636	987	1 418	1 257	1 227	1 742	930	2 070	2 630	2 560	2 540
10.11	ostatní společenské obory	2 774	7 672	8 011	6 953	6 115	4 695	470	850	670	650	640
10.12	ostatní vědy a nauky	992	1 134	1 235	1 320	1 529	1 672	1 160	1 720	1 620	1 570	1 560

VŠ		1994	1995	1996	1997	1998	1999	1999/2000	2000/01	2001/02	2002/03	2003/04
10.1	přírodní vědy	923	1 081	1 036	1 354	1 444	1 343	1 570	1 660	1 590	1 730	1 770
10.2	strojírenství	1 430	1 015	1 064	912	1 137	1 445	2 200	2 120	2 140	2 270	2 350
10.3	elektrotechnika	1 299	753	1 015	1 244	1 499	1 289	1 710	1 610	1 640	1 720	1 800
10.4	stavebnictví	1 225	720	873	957	1 048	1 193	1 180	1 150	1 150	1 230	1 270
10.5	ostatní technické obory	1 290	1 507	1 582	1 660	1 958	1 965	2 540	2 490	2 480	2 640	2 750
10.6	zemědělství	1 176	1 173	1 068	1 409	1 405	946	1 500	1 400	1 430	1 500	1 570
10.7	zdravotnictví	1 731	1 809	1 727	1 760	1 545	1 578	1 200	1 130	1 150	1 210	1 260
10.8	ekonomika, obchod, služby	2 994	3 428	4 004	4 890	5 940	6 494	6 430	6 650	6 450	6 960	7 180
10.9	právní vědy	436	565	748	985	1 138	1 276	1 040	920	950	990	1 040
10.10	učitelství	3 062	3 361	3 441	3 583	3 447	3 360	3 780	3 310	3 500	3 620	3 810
10.11	ostatní společenské obory	726	932	1 361	1 628	2 091	2 102	2 130	2 060	2 070	2 190	2 280
10.12	ostatní vědy a nauky	347	338	479	560	614	591	620	600	600	640	670

Table B.1   Eployment by age groups

Group	Empl in '98
25–29	590 666
30–34	549 195
35–39	581 221
40–44	541 751
45–49	672 849
50–54	711 528
55–59	631 949
60–64	284 498
65–69	86 575
Total	*4 650 233*

Table B.2 Population projections

Age	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
0	89 758	91 427	93 505	95 785	98 536	101 192	103 068	104 375	104 870	105 140	105 082	105 033	104 565
1–4	381 723	365 367	361 127	364 668	369 343	378 143	387 924	397 507	406 102	412 445	416 407	418 440	419 125
5–9	622 814	602 928	570 825	532 328	502 723	472 390	457 883	455 867	461 800	469 300	480 800	492 483	503 382
10–14	656 116	648 207	642 726	640 836	633 625	624 160	604 478	572 606	534 327	504 893	474 716	460 302	458 328
15–19	732 630	698 769	681 754	671 368	661 237	656 846	649 105	643 787	642 027	634 935	625 574	605 990	574 233
20–24	908 534	887 704	851 268	810 510	772 148	733 080	699 604	682 876	672 699	662 732	658 454	650 822	645 578
25–29	774 149	823 946	865 599	896 318	913 091	911 213	890 914	855 119	814 968	777 137	738 558	705 485	688 979
30–34	693 969	685 475	690 217	706 980	734 881	778 620	828 583	870 441	901 341	918 315	916 719	896 781	861 405
35–39	646 351	671 115	688 537	698 389	704 152	695 330	687 520	692 826	709 936	737 980	781 608	831 301	872 869
40–44	744 681	710 668	679 817	653 470	635 990	644 357	669 326	687 028	697 166	703 180	694 775	687 323	692 723
45–49	806 658	802 165	791 752	777 958	759 985	735 090	702 170	672 411	647 046	630 336	638 918	663 674	681 205
50–54	774 377	787 320	810 494	805 329	794 548	786 432	782 595	773 051	760 196	743 223	719 454	687 793	659 196
55–59	582 791	617 834	633 926	678 121	721 462	743 724	756 710	779 439	775 263	765 701	758 600	755 516	746 955
60–64	451 718	453 837	470 685	490 138	513 918	548 143	581 717	597 650	640 165	681 810	703 648	716 642	738 673
65–69	462 872	452 418	436 799	423 171	412 107	409 995	413 045	429 552	448 332	470 997	503 323	535 033	550 725
70–74	408 343	404 918	406 433	405 556	404 825	397 936	390 369	378 524	368 331	360 315	360 044	364 223	380 292
75–79	305 238	321 812	326 960	326 509	323 502	322 086	321 209	324 425	325 621	326 752	322 869	318 427	310 582
80–84	114 524	114 346	131 327	157 248	183 708	208 603	220 883	225 860	227 368	227 058	228 028	229 210	233 492
85–89	90 967	92 954	87 688	78 214	68 421	59 870	62 110	73 337	88 994	104 514	118 795	126 517	130 400
90–94	24 181	26 457	28 643	30 618	32 606	34 376	35 680	33 727	30 039	26 424	23 557	25 840	31 675
95+	3 754	3 899	4 067	4 427	4 845	5 315	5 950	6 528	7 094	7 671	8 204	8 667	8 198
Total	**10 276 148**	**10 263 566**	**10 254 149**	**10 247 941**	**10 245 653**	**10 246 901**	**10 250 843**	**10 256 936**	**10 263 685**	**10 270 858**	**10 278 133**	**10 285 502**	**10 292 580**

Table B.3 Short-term unemployed (<1 year) in 1999

Project code	Level of education	Apprentices hip line (A109)	Line of study (A110)	Specialization	U
1	Without school education (A108=8)	–	–	No	1 542
2	Primary (9 years) (A108=1)	–	–	No	39 123
3	Grammar school with GCE (A108=6)	–	–	No	5 417
4	Apprenticeship (A108=2)	1	–	Machine control and operation	1 583
5		2	–	Mechanical engineering, metallurgy	20 205
6		3	–	Electrical engineering, transport, communication	7 741
7		4	–	Chemistry, food industry	5 389
8		5	–	Textile, clothing industry	8 272
9		6	–	Wood processing, shoe industry	3 753
10		7	–	Construction	15 584
11		8	–	Agriculture and forestry	9 708
12		9	–	Trade, services	20 619
13		10	–	Other	4 056
14	Secondary vocational (A108= 3)	–	1	Natural sciences	0
15		–	2	Mechanical engineering	2 669
16		–	3	Electrical engineering	719
17		–	4	Construction	756
18		–	5	Other technical subjects	712
19		–	6	Agriculture, forestry	1 178
20		–	7	Health	445
21		–	8	Economics, trade, services	3 723
22		–	9	Law	721
23		–	10	Teacher-training	212
24		–	11	Other social subjects	318
25		–	12	Other sciences and disciplines	206
26	Apprenticeship with GCE (A108=4)	1	–	Machine control and operation	0
27		2	–	Mechanical engineering, metallurgy	1 314
28		3	–	Electrical engineering, transport, communication	702
29		4	–	Chemistry, food industry	250
30		5	–	Textile, clothing industry	107
31		6	–	Wood processing, shoe industry	67
32		7	–	Construction	256
33		8	–	Agriculture and forestry	468
34		9	–	Trade, services	547
35		10	–	Other	0

Project code	Level of education	Apprentices hip line (A109)	Line of study (A110)	Specialization	U
36	Secondary vocational with GCE (A108= 5)	–	1	Natural sciences	59
37		–	2	Mechanical engineering	6 558
38		–	3	Electrical engineering	2 945
39		–	4	Construction	1 094
40		–	5	Other technical subjects	4 667
41		–	6	Agriculture, forestry	3 650
42		–	7	Health	2 334
43		–	8	Economics, trade, services	14 940
44		–	9	Law	62
45		–	10	Teacher-training	2 208
46		–	11	Other social subjects	655
47		–	12	Other sciences and disciplines	199
48	Higher education (A108=7)	–	1	Natural sciences	47
49		–	2	Mechanical engineering	1 194
50		–	3	Electrical engineering	420
51		–	4	Construction	316
52		–	5	Other technical subjects	311
53		–	6	Agriculture, forestry	432
54		–	7	Health	69
55		–	8	Economics, trade, services	1 675
56		–	9	Law	191
57		–	10	Teacher-training	824
58		–	11	Other social subjects	747
59		–	12	Other sciences and disciplines	630

Total **204 589**

Table B.4   Calculation of our Macroeconomic Scenarios

Employment by four main sectors

	1993	1994	1995	1996	1997	1998	1999
LA	378522	338929,38	326222,57	308264,15	284779,48	266936,34	251995,71
LT	1667653,9	1627537,6	1617141	1599492,6	1554695,9	1519919,7	1475430,6
LN	1749810,8	1875659,9	1943488,9	1999801,3	2039367,4	2015614,3	1970945,6
LG	1068765,1	108057,1	1068381,3	1063522,8	1060537,1	1062032,4	1066868

Yearly growth rate of shares (1993–1995) / **Yearly growth rate of shares (1996–1999)**

	(1993–1995)		(1996–1999)	
LA	0		0	
LT	−0,012147	−0,013489	−0,006367	−0,005464
LN	0,0221121	0,0275254	0,0046473	0,000589
LG	0		0	

Neutral Scenario (Employment by four main sectors)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
LA	378522	338929,38	326222,57	308264,15	284779,48	266936,34	251995,71	251995,71	251995,71	251995,71	251995,71	251995,71	251995,71
LT	1667653,9	1627537,6	1617141	1599492,6	1554695,9	1519919,7	1475430,6	1475430,6	1475430,6	1475430,6	1475430,6	1475430,6	1475430,6
LN	1749810,8	1875659,9	1943488,9	1999801,3	2039367,4	2015614,3	1970945,6	1970945,6	1970945,6	1970945,6	1970945,6	1970945,6	1970945,6
LG	1068765,1	1080571	1068381,3	1063522,8	1060537,1	1062032,4	1066868	1066868	1066868	1066868	1066868	1066868	1066868

Optimistic Scenario (Employment by four main sectors)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
LA	378522	338929,38	326222,57	308264,15	284779,48	266936,34	251995,71	251995,71	251995,71	251995,71	251995,71	251995,71	251995,71
LT	1667653,9	1627537,6	1617141	1599492,6	1554695,9	1519919,7	1475430,6	1457509	1439805,1	1422316,2	1405039,8	1387973,2	1371113,9
LN	1749810,8	1875659,9	1943488,9	1999801,3	203936,4	2015614,3	1970945,6	2014527,3	2059072,7	2104603,2	2151140,4	2198706,6	2247324,6
LG	1068765,1	1080571	1068381,3	1063522,8	1060537,1	1062032,4	1066868	1066868	1066868	1066868	1066868	1066868	1066868

Total

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Employment	4864751,8	4922697,9	4955233,7	4971080,9	4939379,9	4864502,7	4765239,8						
Labour force							5236527,3	5236527,3	5236527,3	5236527,3	5236527,3	5236527,3	5236527,3

* Assume total labour force in 1999 is Empl./(1−0.09), unemployment rate 9%.
* Assume total labour force in 2000,..,2005 is the same as in year 1999

Total employment

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Neutral	4864751,8	4922697,9	4955233,7	4971080,9	4939379,9	4864502,7	4765239,8	4765239,8	4765239,8	4765239,8	4765239,8	4765239,8	4765239,8
Optimistic	4864751,8	4922697,9	4955233,7	4971080,9	4939379,9	4864502,7	4765239,8	4790900	4817741,5	4845783,1	4875043,8	4905543,5	4937302,2

Unemployment

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Neutral							0,09	0,090	0,090	0,090	0,090	0,090	0,090
Optimistic							0,09	0,085	0,080	0,075	0,069	0,063	0,057

SHARES
Neutral Scenario

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
LA	0,08	0,07	0,07	0,06	0,06	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05
LT	0,34	0,33	0,33	0,32	0,31	0,31	0,31	0,31	0,31	0,31	0,31	0,31	0,31
LN	0,36	0,38	0,39	0,40	0,41	0,41	0,41	0,41	0,41	0,41	0,41	0,41	0,41
LG	0,22	0,22	0,22	0,21	0,21	0,22	0,22	0,22	0,22	0,22	0,22	0,22	0,22

Optimistic Scenario

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
LA	0,08	0,07	0,07	0,06	0,06	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05
LT	0,34	0,33	0,33	0,32	0,31	0,31	0,31	0,30	0,30	0,29	0,29	0,28	0,28
LN	0,36	0,38	0,39	0,40	0,41	0,41	0,41	0,42	0,43	0,43	0,44	0,45	0,46
LG	0,22	0,22	0,22	0,21	0,21	0,22	0,22	0,22	0,22	0,22	0,22	0,22	0,22

GROWTH
Neutral Scenario (Employment by four main sectors)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
LA	–	−10,5	−3,7	−5,5	−7,6	−6,3	−5,6	0,0	0,0	0,0	0,0	0,0	0,0
LT	–	−2,4	−0,6	−1,1	−2,8	−2,2	−2,9	0,0	0,0	0,0	0,0	0,0	0,0
LN	–	7,2	3,6	2,9	2,0	−1,2	−2,2	0,0	0,0	0,0	0,0	0,0	0,0
LG	–	1,1	−1,1	−0,5	−0,3	0,1	5	0,0	0,0	0,0	0,0	0,0	0,0

Optimistic Scenario (Employment by four main sectors)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
LA	–	−10,5	−3,7	−5,5	−7,6	−6,3	−5,6	0,0	0,0	0,0	0,0	0,0	0,0
LT	–	−2,4	−0,6	−1,1	−2,8	−2,2	−2,9	−1,2	−1,2	−1,2	−1,2	−1,2	−1,2
LN	–	7,2	3,6	2,9	2,0	−1,2	−2,2	2,2	2,2	2,2	2,2	2,2	2,2
LG	–	1,1	−1,1	−0,5	−0,3	0,1	0,5	0,0	0,0	0,0	0,0	0,0	0,0

Table B.5   ROA-CR Results based on the Fixed-Coefficient Repl. Demand and Neutral Employment

Edu	Name	Expansion Demand	Repla-cement Demand	School Leavers	Short-Term Unemp-loyment	Job Ope-nings	Shor-tage	IFLM	IFRP
1	Without education	17975	525	0	1542	18500	16959	0,56	0,56
2	Primary education	−191123	24147	0	39123	24147	−14976	1,04	1,87
3	Grammar school with exam	−1494	22763	42635	5417	22763	−25289	1,13	1,14
4	AP Machine control and operation	2448	4235	0	1583	6683	5100	0,88	0,88
5	AP Mechanical engineering, metallurgy	−37165	63704	34361	20205	63704	9138	0,98	1,05
6	AP Electrical engineering, transport, communication	−12415	29989	25539	7741	29989	−3291	1,01	1,07
7	AP Chemistry, food industry	5442	18310	12354	5389	23752	6009	0,95	0,95
8	AP Textile, clothing industry	5715	24616	7323	8272	30331	14736	0,92	0,92
9	AP Wood processing, shoe industry	10522	11864	13962	3753	22386	4671	0,95	0,95
10	AP Construction	53174	29017	15692	15584	82191	50915	0,85	0,85
11	AP Agriculture and forestry	17923	17418	12908	9708	35341	12725	0,92	0,92
12	AP Trade, services	32592	48397	69999	20619	80990	−9629	1,02	1,02
13	AP Other	2674	8068	15023	4056	10742	−8337	1,12	1,12
14	SV Natural sciences	1356	627	84	0	1983	1899	0,50	0,50
15	SV Mechanical engineering	−13024	6051	496	2669	6051	2885	0,96	1,19
16	SV Electrical engineering	1590	3031	974	719	4620	2927	0,91	0,91
17	SV Construction	2694	3896	716	756	6590	5118	0,82	0,82
18	SV Other technical subjects	−2714	3144	868	712	3144	1564	0,95	1,04
19	SV Agriculture, forestry	−2566	779	558	1178	779	−957	1,06	1,26
20	SV Health	−513	1382	1278	445	1382	−341	1,02	1,05
21	SV Economics, trade, services	−10003	5154	4797	3723	5154	−3365	1,05	1,23
22	SV Law	5797	1204	445	721	7001	5834	0,73	0,73
23	SV Teacher-training	−423	1049	538	212	1049	299	0,93	1,03
24	SV Other social subjects	2877	787	166	318	3665	3181	0,59	0,59
25	SV Other sciences and disciplines	−389	0	382	206	0	−588	1,45	2,05
26	APE Machine control and operation	44	21	0	0	65	65	0,94	0,94
27	APE Mechanical engineering, metallurgy	5975	3639	0	1314	9614	8300	0,75	0,75
28	APE Electrical engineering, transport, communication	6100	2481	0	702	8580	7878	0,73	0,73
29	APE Chemistry, food industry	4295	956	0	250	5250	5001	0,54	0,54
30	APE Textile, clothing industry	2783	1176	0	107	3960	3853	0,56	0,56
31	APE Wood processing, shoe industry	1654	859	0	67	2513	2446	0,63	0,63

Edu	Name	Expansion Demand	Replacement Demand	School Leavers	Short-Term Unemployment	Job Openings	Shortage	IFLM	IFRP
32	APE Construction	1365	1313	0	256	2677	2421	0,65	0,65
33	APE Agriculture and forestry	4389	1059	0	468	5448	4981	0,62	0,62
34	APE Trade, services	4369	2022	0	547	6392	5844	0,70	0,70
35	APE Other	3349	584	0	0	3933	3933	0,58	0,58
36	SVE Natural sciences	−336	1983	1403	59	1983	521	0,96	0,98
37	SVE Mechanical engineering	2722	31225	5899	6558	33947	21490	0,92	0,92
38	SVE Electrical engineering	28377	11539	7985	2945	39916	28986	0,84	0,84
39	SVE Construction	7120	11201	6644	1094	18321	10583	0,90	0,90
40	SVE Other technical subjects	20322	16108	10442	4667	36430	21321	0,87	87
41	SVE Agriculture, forestry	16907	16936	7449	3650	33843	22744	0,83	0,83
42	SVE Health	5816	27273	22609	2334	33088	8146	0,95	0,95
43	SVE Economics, trade, services	89773	35482	77901	14940	125255	32414	0,94	0,94
44	SVE Law	5977	1811	8301	62	7787	−576	1,03	1,03
45	SVE Teacher-training	−3966	5811	7511	2208	5811	−3908	1,06	1,12
46	SVE Other social subjects	7251	6494	3103	655	13745	9987	0,82	0,82
47	SVE Other sciences and disciplines	2948	2626	6570	199	5574	−1195	1,05	1,05
48	HE Natural sciences	−6888	1990	8320	47	1990	−6377	1,28	1,84
49	HE Mechanical engineering	1431	7048	11080	1194	8479	−3795	1,06	1,06
50	HE Electrical engineering	5603	4714	8480	420	10317	1417	0,97	0,97
51	HE Construction	−1153	9132	5980	316	9132	2836	0,95	0,97
52	HE Other technical subjects	15514	5486	12900	311	21000	7789	0,87	0,87
53	HE Agriculture, forestry	4357	4687	7400	432	9044	1212	0,97	0,97
54	HE Health	2548	5983	5950	69	8531	2512	0,95	0,95
55	HE Economics, trade, services	13130	5615	33670	1675	18745	−16600	1,20	1,20
56	HE Law	6380	1323	4940	191	7702	2571	0,92	92
57	HE Teacher-training	15807	8836	18020	824	24643	5799	0,95	95
58	HE Other social subjects	7178	2254	10730	747	9432	−2045	1,04	104
59	HE Other sciences and disciplines	4419	1708	3130	630	6127	2366	0,91	91

AP – Aprenticeship education
SV – Secondary vocational education
APE – Aprenticeship education with graduate exam (GCE)
SVE – Secondary vocational education with graduate exam
IFLM – Indicator of Future Labour Market Prospects
IFRP – Indicator of Future Recruitment Prospects

Table B.6-a: Similarity (competition) indices between two types of Education with respect to Occupation structure in 1994

For row/column of educations see Table 3

	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18	c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35	c36	c37	c38	c39	c40	c41	c42	c43	c44	c45	c46	c47	c48	c49	c50	c51	c52	c53	c54	c55	c56	c57	c58	c59
r1	1,0																																																										
r2	0,3	1,0																																																								
r3	0,7	0,3	1,0																																																							
r4	0,3	0,5	0,2	1,0																																																						
r5	0,2	0,5	0,2	0,8	1,0																																																					
r6	0,2	0,4	0,2	0,6	0,5	1,0																																																				
r7	0,3	0,6	0,3	0,3	0,3	0,2	1,0																																																			
r8	0,2	0,6	0,2	0,2	0,2	0,2	0,4	1,0																																																	
r9	0,1	0,5	0,2	0,3	0,3	0,2	0,3	0,2	1,0																																																
r10	0,1	0,3	0,1	0,2	0,3	0,2	0,2	0,1	0,7	1,0																																															
r11	0,4	0,7	0,3	0,8	0,6	0,5	0,5	0,3	0,4	0,3	1,0																																														
r12	0,3	0,5	0,3	0,2	0,2	0,2	0,6	0,4	0,2	0,1	0,3	1,0																																												
r13	0,3	0,7	0,3	0,6	0,6	0,4	0,5	0,4	0,4	0,3	0,7	0,4	1,0																																											
r14	0,3	0,5	0,2	0,7	0,6	0,4	0,2	0,2	0,3	0,3	0,7	0,2	0,4	1,0																																										
r15	0,3	0,5	0,3	0,8	1,0	0,5	0,3	0,2	0,3	0,2	0,6	0,2	0,6	0,6	1,0																																									
r16	0,2	0,3	0,2	0,4	0,4	1,0	0,2	0,1	0,2	0,1	0,4	0,2	0,4	0,3	0,4	1,0																																							
r17	0,2	0,3	0,2	0,3	0,4	0,3	0,1	0,7	0,9	0,4	0,4	0,3	0,4	0,4	0,2	0,2	1,0																																					
r18	0,4	0,7	0,5	0,5	0,4	0,5	0,5	0,7	0,4	0,2	0,6	0,4	0,7	0,5	0,5	0,4	0,4	1,0																																				
r19	0,4	0,7	0,3	0,7	0,6	0,5	0,4	0,3	0,5	0,3	1,0	0,7	0,6	0,6	0,3	0,4	0,6	0,4	1,0																																		
r20	0,1	0,2	0,2	0,1	0,1	0,1	0,2	0,1	0,2	0,2	0,2	0,2	0,3	0,1	0,1	0,1	0,1	0,3	0,2	1,0																																	
r21	0,7	0,5	0,8	0,2	0,2	0,2	0,6	0,4	0,2	0,1	0,4	0,7	0,4	0,3	0,3	0,2	0,2	0,6	0,4	0,2	1,0																																
r22	0,5	0,4	0,6	0,1	0,1	0,2	0,6	0,4	0,2	0,1	0,3	0,9	0,4	0,2	0,2	0,1	0,2	0,4	0,2	0,2	0,9	1,0																														
r23	0,2	0,3	0,4	0,4	0,3	0,3	0,2	0,1	0,2	0,2	0,4	0,2	0,3	0,3	0,3	0,2	0,2	0,3	0,4	0,2	0,3	0,3	1,0																													
r24	0,4	0,5	0,6	0,2	0,3	0,3	0,4	0,3	0,1	0,1	0,4	0,3	0,2	0,5	0,6	0,1	0,3	0,5	0,2	0,1	0,6	0,5	0,2	1,0																											
r25	0,3	0,5	0,5	0,5	0,4	0,3	0,4	0,3	0,3	0,1	0,6	0,3	0,6	0,5	0,4	0,3	0,3	0,7	0,6	0,2	0,5	0,4	0,3	0,7	1,0																										
r26	0,1	0,1	0,2	0,3	0,4	0,3	0,1	0,1	0,2	0,1	0,2	0,1	0,2	0,3	0,5	0,2	0,3	0,4	0,2	0,1	0,1	0,1	0,1	0,0	0,1	1,0																									
r27	0,3	0,3	0,3	0,7	0,8	0,5	0,2	0,1	0,2	0,2	0,5	0,2	0,5	0,6	0,9	0,4	0,4	0,5	0,5	0,1	0,3	0,2	0,3	0,3	0,4	0,7	1,0																							
r28	0,2	0,3	0,3	0,4	0,4	0,9	0,3	0,1	0,2	0,2	0,4	0,2	0,5	0,3	0,4	0,4	0,3	0,4	0,3	0,5	0,1	0,2	0,1	0,2	0,3	0,8	0,5	1,0																						
r29	0,2	0,3	0,3	0,2	0,2	0,3	0,5	0,2	0,2	0,1	0,3	0,2	0,6	0,2	0,3	0,3	0,3	0,6	0,4	0,3	0,3	0,3	0,1	0,4	0,5	0,4	0,4	0,4	1,0																					
r30	0,4	0,4	0,5	0,4	0,3	0,2	0,5	0,2	0,2	0,1	0,4	0,3	0,4	0,4	0,5	0,2	0,2	0,5	0,4	0,3	0,3	0,3	0,4	0,3	0,4	0,1	0,3	0,3	0,1	1,0																				
r31	0,4	0,5	0,4	0,4	0,5	0,3	0,4	0,2	0,6	0,4	0,6	0,4	0,4	0,5	0,5	0,2	0,5	0,6	0,6	0,2	0,4	0,4	0,3	0,4	0,4	0,4	0,5	0,3	0,3	0,4	1,0																			
r32	0,1	0,3	0,2	0,3	0,3	0,3	0,1	0,1	0,5	0,7	0,3	0,1	0,3	0,3	0,3	0,2	0,7	0,3	0,3	0,7	0,1	0,1	0,3	0,1	0,2	0,4	0,3	0,3	0,2	0,1	0,4	1,0																		
r33	0,4	0,5	0,4	0,4	0,3	0,4	0,2	0,1	0,1	0,1	0,5	0,4	0,4	0,5	0,4	0,2	0,2	0,5	0,5	0,2	0,4	0,2	0,5	0,6	0,1	0,3	0,5	0,4	0,3	0,2	0,6	0,1	1,0																	
r34	0,3	0,3	0,4	0,1	0,1	0,2	0,7	0,3	0,1	0,1	0,2	0,9	0,3	0,2	0,1	0,2	0,1	0,3	0,2	0,1	0,7	0,8	0,2	0,4	0,3	0,0	0,2	0,2	0,3	0,2	0,3	0,1	0,3	1,0																	
r35	0,2	0,2	0,4	0,2	0,1	0,2	0,2	0,2	0,2	0,1	0,3	0,3	0,5	0,4	0,2	0,2	0,2	0,4	0,3	0,3	0,3	0,4	0,3	0,3	0,1	0,2	0,3	0,4	0,3	0,3	0,3	0,1	0,3	0,3	0,1																
r36	0,3	0,2	0,6	0,2	0,2	0,2	0,3	0,1	0,1	0,1	0,2	0,1	0,3	0,4	0,2	0,3	0,5	0,3	0,2	0,1	0,4	0,2	0,3	0,4	0,6	0,5	0,4	0,7	0,3	0,4	0,3	0,5	0,1	0,3	1,0															
r37	0,3	0,2	0,5	0,4	0,4	0,3	0,2	0,1	0,1	0,1	0,2	0,3	0,4	0,4	0,6	0,3	0,4	0,6	0,3	0,1	0,3	0,2	0,2	0,3	0,4	0,9	0,7	0,5	0,5	0,3	0,5	0,4	0,3	0,2	0,3	0,8	1,0														
r38	0,2	0,2	0,5	0,3	0,3	0,7	0,2	0,1	0,1	0,1	0,2	0,2	0,2	0,4	0,8	0,3	0,5	0,5	0,2	0,1	0,3	0,2	0,2	0,3	0,7	0,5	0,8	0,5	0,3	0,3	0,4	0,3	0,3	0,2	0,3	0,6	0,8	1,0													
r39	0,2	0,1	0,5	0,1	0,2	0,2	0,2	0,1	0,1	0,1	0,2	0,1	0,2	0,2	0,3	0,2	0,4	0,5	0,2	0,1	0,2	0,2	0,1	0,2	0,2	0,8	0,5	0,4	0,5	0,2	0,4	0,2	0,3	0,7	0,9	0,7	0,9	0,7	1,0													
r40	0,4	0,4	0,7	0,3	0,3	0,3	0,3	0,3	0,3	0,1	0,4	0,3	0,4	0,4	0,5	0,4	0,3	0,7	0,4	0,2	0,5	0,4	0,3	0,5	0,5	0,7	0,6	0,5	0,6	0,5	0,6	0,4	0,5	0,3	0,4	0,8	0,9	0,8	0,9	1,0												
r41	0,5	0,4	0,7	0,3	0,3	0,3	0,4	0,3	0,2	0,1	0,5	0,3	0,5	0,4	0,4	0,2	0,3	0,6	0,6	0,3	0,6	0,5	0,3	0,5	0,6	0,2	0,4	0,3	0,6	0,4	0,5	0,2	0,7	0,3	0,3	0,8	0,5	0,4	0,4	0,7	1,0												
r42	0,1	0,0	0,1	0,0	0,0	0,0	0,1	0,0	0,1	0,0	0,1	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,1	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,1	0,1	0,1	0,0	0,0	0,0	0,1	0,0	0,0	0,1	0,1	0,1	1,0											
r43	0,8	0,2	0,9	0,1	0,1	0,1	0,2	0,1	0,1	0,0	0,1	0,2	0,1	0,1	0,1	0,1	0,1	0,3	0,2	0,1	0,8	0,6	0,2	0,5	0,3	0,0	0,1	0,1	0,2	0,3	0,2	0,0	0,3	0,2	0,4	0,3	0,2	0,3	0,4		0,6	0,1	1,0										
r44	0,7	0,2	0,7	0,1	0,2	0,2	0,3	0,1	0,1	0,1	0,2	0,4	0,2	0,2	0,2	0,2	0,1	0,3	0,2	0,1	0,7	0,7	0,2	0,4	0,4	0,2	0,3	0,2	0,3	0,3	0,3	0,1	0,3	0,4	0,2	0,5	0,4	0,4	0,4	0,5	0,5	0,1	0,9	1,0									
r45	0,1	0,0	0,2	0,0	0,0	0,0	0,1	0,0	0,1	0,1	0,0	0,0	0,1	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,8	0,1	0,1	0,0	0,0	0,0	0,1	0,1	0,2	0,0	0,1	0,0	0,3	0,1	0,1	0,1	0,1	0,2	0,1	0,0	0,1	0,1	1,0									
r46	0,4	0,2	0,6	0,2	0,2	0,2	0,2	0,1	0,1	0,1	0,2	0,1	0,3	0,2	0,2	0,2	0,2	0,4	0,3	0,2	0,4	0,3	0,4	0,5	0,5	0,2	0,3	0,3	0,3	0,4	0,3	0,2	0,3	0,2	0,4	0,4	0,4	0,4	0,6	0,1	0,4	0,0	0,4	0,2	0,2	1,0								
r47	0,6	0,4	0,8	0,4	0,3	0,3	0,3	0,3	0,2	0,2	0,4	0,2	0,6	0,3	0,4	0,3	0,3	0,7	0,5	0,2	0,6	0,4	0,4	0,6	0,7	0,3	0,5	0,4	0,5	0,6	0,4	0,2	0,4	0,2	0,5	0,5	0,5	0,4	0,5	0,7	0,6	0,1	0,6	0,6	0,2	0,8	1,0								
r48	0,1	0,1	0,3	0,0	0,0	0,1	0,1	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,2	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,1	0,1	0,2	0,1	0,2	0,4	0,3	0,3	0,4	0,3	0,0	0,2	0,2	0,6	0,4	0,6	0,4	1,0								
r49	0,1	0,0	0,4	0,1	0,1	0,1	0,1	0,0	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,2	0,1	0,1	0,2	0,1	0,1	0,2	0,2	0,4	0,3	0,2	0,3	0,3	0,2	0,1	0,2	0,1	0,2	0,4	0,7	0,5	0,7	0,6	0,3	0,0	0,2	0,2	0,1	0,4	0,3	0,5	1,0							
r50	0,2	0,1	0,5	0,1	0,1	0,1	0,1	0,0	0,1	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,2	0,2	0,1	0,1	0,1	0,3	0,3	0,3	0,4	0,3	0,3	0,3	0,4	0,3	0,2	0,3	0,2	0,3	0,5	0,7	0,6	0,7	0,6	0,3	0,0	0,2	0,3	0,1	0,5	0,4	0,6	0,9	1,0							
r51	0,1	0,0	0,2	0,0	0,0	0,0	0,1	0,1	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,2	0,1	0,1	0,1	0,1	0,1	0,3	0,2	0,2	0,2	0,1	0,1	0,1	0,1	0,1	0,1	0,3	0,5	0,4	0,4	0,6	0,4	0,2	0,0	0,1	0,1	0,1	0,3	0,2	0,3	0,9	0,8	1,0						
r52	0,2	0,1	0,6	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,2	0,3	0,2	0,3	0,5	0,2	0,1	0,3	0,2	0,1	0,3	0,3	0,6	0,4	0,4	0,5	0,4	0,3	0,2	0,3	0,1	0,3	0,7	0,8	0,7	0,9	0,8	0,5	0,0	0,4	0,4	0,1	0,5	0,5	0,6	0,8	0,9	0,7	1,0					
r53	0,3	0,1	0,5	0,1	0,1	0,1	0,1	0,1	0,1	0,0	0,1	0,1	0,2	0,2	0,1	0,1	0,2	0,3	0,2	0,2	0,4	0,2	0,2	0,3	0,3	0,1	0,2	0,2	0,5	0,3	0,2	0,1	0,4	0,2	0,3	0,6	0,4	0,3	0,4	0,5	0,7	0,1	0,4	0,4	0,1	0,4	0,4	0,7	0,5	0,5	0,4	0,6	1,0					
r54	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,2	1,0				
r55	0,3	0,1	0,6	0,1	0,1	0,1	0,1	0,1	0,1	0,0	0,1	0,0	0,1	0,1	0,1	0,1	0,1	0,3	0,1	0,1	0,4	0,2	0,1	0,3	0,3	0,1	0,1	0,2	0,3	0,1	0,1	0,1	0,2	0,3	0,3	0,4	0,3	0,4	0,4	0,4	0,4	0,0	0,5	0,4	0,1	0,4	0,4	0,6	0,5	0,5	0,3	0,6	0,7	0,0	1,0			
r56	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,1	0,0	0,0	0,1	0,0	0,1	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,0	0,0	0,2	0,1	0,2	0,1	0,2	0,2	0,2	0,1	0,2	0,2	0,0	0,2	1,0		
r57	0,1	0,0	0,2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,1	0,1	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,3	0,1	0,0	0,0	0,0	0,1	0,0	0,0	0,1	0,1	0,1	0,1	0,7	0,1	0,1	0,0	0,0	0,0	0,0	0,2	0,2	0,0	0,2	0,0	0,2	0,0	0,2	1,0		
r58	0,2	0,1	0,4	0,1	0,1	0,1	0,1	0,1	0,0	0,0	0,1	0,1	0,2	0,1	0,1	0,1	0,1	0,2	0,1	0,1	0,2	0,1	0,3	0,3	0,1	0,1	0,2	0,2	0,2		0,1	0,2	0,1	0,2	0,3	0,2	0,2	0,2	0,3		0,2	0,0	0,3	0,2	0,8	0,5	0,5	0,3	0,3		0,2	0,4	0,4	0,0	0,5	0,1	0,4	1,0	
r59	0,2	0,1	0,4	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,2	0,1	0,2	0,1	0,1	0,1	0,1	0,2	0,2	0,1	0,2	0,1	0,2	0,3	0,3	0,1	0,2	0,3	0,2	0,5	0,2	0,1	0,2	0,1	0,2	0,3	0,3	0,3	0,2	0,3	0,3	0,0	0,2	0,2	0,1	0,8	0,5	0,6	0,4	0,5	0,3	0,5	0,5	0,2	0,6	0,2	0,2	0,8	1,0

Table B.6-b: Similarity (competition) indices between two types of Education with respect to Occupation structure in 1999

For row/colum codes of educations see Table 3

	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18	c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35	c36	c37	c38	c39	c40	c41	c42	c43	c44	c45	c46	c47	c48	c49	c50	c51	c52	c53	c54	c55	c56	c57	c58	c59
r1	1,0																																																									
r2	0,9	1,0																																																									
r3	0,3	0,3	1,0																																																							
r4	0,6	0,5	0,2	1,0																																																						
r5	0,6	0,5	0,2	0,8	1,0																																																				
r6	0,4	0,4	0,2	0,6	0,5	1,0																																																			
r7	0,5	0,6	0,3	0,3	0,3	0,3	1,0																																																		
r8	0,5	0,6	0,3	0,3	0,2	0,2	0,5	1,0																																																	
r9	0,4	0,4	0,1	0,3	0,3	0,2	0,3	0,2	1,0																																																
r10	0,4	0,4	0,1	0,3	0,4	0,3	0,2	0,1	0,8	1,0																																															
r11	0,7	0,7	0,3	0,8	0,7	0,5	0,5	0,4	0,4	0,4	1,0																																														
r12	0,5	0,5	0,4	0,2	0,2	0,2	0,8	0,5	0,2	0,1	0,4	1,0																																													
r13	0,7	0,7	0,3	0,8	0,6	0,4	0,6	0,5	0,4	0,3	0,7	0,5	1,0																																											
r14	0,6	0,5	0,2	0,8	0,6	0,5	0,3	0,5	0,3	0,3	0,8	0,2	0,5	1,0																																									
r15	0,6	0,5	0,2	0,8	0,9	0,6	0,3	0,2	0,3	0,4	0,7	0,2	0,5	0,7	1,0																																								
r16	0,3	0,3	0,2	0,5	0,4	1,0	0,3	0,2	0,2	0,4	0,4	0,2	0,4	0,3	0,5	1,0																																						
r17	0,4	0,4	0,2	0,4	0,2	0,8	0,9	0,4	0,3	0,4	0,4	0,1	0,3	0,4	0,4	0,1	1,0																																				
r18	0,7	0,7	0,5	0,5	0,4	0,4	0,5	0,7	0,4	0,4	0,6	0,5	0,7	0,5	0,5	0,4	0,4	1,0																																		
r19	0,6	0,7	0,4	0,7	0,6	0,5	0,5	0,4	0,6	0,4	0,9	0,4	0,7	0,7	0,6	0,4	0,4	0,6	1,0																																
r20	0,3	0,4	0,3	0,3	0,3	0,3	0,3	0,2	0,6	0,6	0,4	0,3	0,4	0,3	0,3	0,4	0,7	0,5	0,5	1,0																														
r21	0,5	0,6	0,7	0,3	0,3	0,3	0,8	0,5	0,2	0,1	0,4	0,9	0,6	0,2	0,3	0,3	0,3	0,6	0,5	0,3	1,0																													
r22	0,4	0,5	0,4	0,2	0,2	0,2	0,8	0,5	0,2	0,1	0,4	1,0	0,5	0,2	0,2	0,2	0,2	0,5	0,4	0,2	0,9	1,0																											
r23	0,5	0,5	0,5	0,2	0,2	0,2	0,3	0,5	0,1	0,1	0,3	0,4	0,4	0,3	0,2	0,2	0,2	0,6	0,3	0,3	0,5	0,4	1,0																									
r24	0,5	0,5	0,5	0,3	0,2	0,3	0,7	0,7	0,2	0,1	0,3	0,6	0,6	0,4	0,2	0,3	0,2	0,6	0,3	0,2	0,7	0,7	0,5	1,0																							
r25	0,5	0,5	0,5	0,2	0,2	0,3	0,3	0,3	0,1	0,1	0,3	0,4	0,4	0,2	0,2	0,3	0,2	0,5	0,3	0,1	0,5	0,4	0,6	0,4	1,0																					
r26	0,4	0,4	0,2	0,8	0,8	0,5	0,2	0,1	0,2	0,2	0,7	0,1	0,5	0,6	0,8	0,3	0,2	0,3	0,6	0,2	0,2	0,1	0,1	0,1	0,1	1,0																			
r27	0,5	0,4	0,3	0,7	0,9	0,5	0,3	0,2	0,3	0,3	0,5	0,2	0,4	0,5	0,9	0,4	0,4	0,4	0,5	0,3	0,3	0,2	0,2	0,2	0,2	0,8	1,0																	
r28	0,3	0,3	0,3	0,6	0,4	0,9	0,3	0,2	0,3	0,3	0,4	0,2	0,4	0,3	0,5	1,0	0,4	0,4	0,4	0,4	0,3	0,2	0,5	0,3	0,3	0,4	0,3	1,0															
r29	0,3	0,3	0,4	0,3	0,3	0,3	0,7	0,2	0,3	0,3	0,4	0,6	0,4	0,3	0,4	0,3	0,4	0,3	0,4	0,3	0,6	0,6	0,2	0,4	0,2	0,2	0,4	0,3	1,0												
r30	0,5	0,6	0,3	0,5	0,5	0,4	0,4	0,4	0,7	0,7	0,2	0,6	0,6	0,5	0,4	0,3	0,2	0,8	0,6	0,3	0,6	0,6	0,6	0,4	0,4	0,4	0,3	0,4	0,1	1,0										
r31	0,3	0,4	0,4	0,4	0,3	0,3	0,3	0,1	0,7	0,6	0,4	0,1	0,3	0,4	0,4	0,3	0,6	0,4	0,6	0,5	0,3	0,1	0,1	0,2	0,1	0,3	0,4	0,3	0,5	0,2	1,0								
r32	0,2	0,2	0,2	0,3	0,4	0,3	0,2	0,1	0,6	0,7	0,2	0,2	0,2	0,1	0,4	0,4	0,8	0,3	0,3	0,7	0,2	0,1	0,2	0,2	0,1	0,2	0,5	0,4	0,4	0,1	0,6	1,0							
r33	0,5	0,5	0,6	0,5	0,5	0,3	0,6	0,3	0,3	0,3	0,3	0,2	0,3	0,3	0,3	0,3	0,4	0,6	0,3	0,5	0,7	0,6	0,4	0,5	0,4	0,4	0,6	0,4	0,6	0,5	0,5	0,4	1,0						
r34	0,3	0,4	0,5	0,1	0,1	0,2	0,7	0,4	0,2	0,1	0,3	1,0	0,5	0,1	0,1	0,2	0,2	0,4	0,3	0,2	0,9	1,0	0,4	0,6	0,4	0,1	0,2	0,5	0,5	0,5	0,1	0,2	0,6	1,0					
r35	0,5	0,5	0,6	0,4	0,4	0,4	0,5	0,4	0,3	0,3	0,5	0,5	0,7	0,3	0,4	0,6	0,5	0,4	0,6	0,3	0,4	0,3	0,5	0,5	0,3	0,6	0,3	0,3	0,4	0,3	0,5	0,3	0,5	0,5	1,0				
r36	0,2	0,2	0,5	0,3	0,2	0,2	0,3	0,2	0,1	0,1	0,3	0,3	0,3	0,3	0,2	0,2	0,2	0,3	0,3	0,2	0,4	0,3	0,2	0,4	0,2	0,1	0,3	0,3	0,5	0,3	0,5	0,3	0,5	0,3	0,3	1,0			
r37	0,3	0,3	0,6	0,4	0,4	0,4	0,3	0,2	0,2	0,2	0,3	0,3	0,3	0,3	0,2	0,2	0,2	0,4	0,3	0,4	0,3	0,3	0,4	0,3	0,4	0,3	0,4	0,3	0,3	0,3	0,4	0,5	0,6	0,3	0,4	0,6	1,0		
r38	0,2	0,2	0,5	0,4	0,3	0,7	0,3	0,1	0,2	0,2	0,3	0,2	0,3	0,2	0,4	0,7	0,3	0,4	0,4	0,3	0,3	0,2	0,3	0,4	0,3	0,2	0,5	0,8	0,4	0,3	0,4	0,5	0,4	0,2	0,4	0,5	0,9	1,0	
r39	0,2	0,2	0,5	0,2	0,2	0,2	0,2	0,1	0,3	0,3	0,4	0,3	0,4	0,3	0,3	0,4	0,3	0,4	0,4	0,3	0,3	0,3	0,3	0,3	0,3	0,4	0,3	0,6	0,9	0,8	0,4	0,6	0,4	0,2	0,3	0,6	0,9	0,8	1,0
r40	0,4	0,4	0,7	0,5	0,4	0,4	0,4	0,3	0,3	0,2	0,4	0,3	0,5	0,4	0,5	0,4	0,3	0,6	0,6	0,4	0,5	0,4	0,4	0,5	0,3	0,3	0,5	0,5	0,6	0,5	0,6	0,5	0,6	0,4	0,5	0,7	0,9	0,8	0,8
r41	0,4	0,4	0,8	0,5	0,4	0,3	0,4	0,3	0,3	0,2	0,5	0,4	0,5	0,5	0,4	0,3	0,3	0,6	0,6	0,4	0,6	0,5	0,4	0,4	0,5	0,3	0,4	0,4	0,5	0,5	0,6	0,3	0,7	0,4	0,6	0,7	0,6	0,5	0,5
r42	0,0	0,0	0,1	0,1	0,0	0,0	0,0	0,0	0,1	0,1	0,0	0,0	0,1	0,0	0,0	0,1	0,0	0,0	0,1	0,6	0,0	0,0	0,0	0,0	0,0	0,1	0,1	0,0	0,0	0,1	0,1	0,3	0,1	0,0	0,0	0,1	0,0	0,0	0,1
r43	0,2	0,2	0,9	0,1	0,1	0,1	0,3	0,2	0,1	0,0	0,1	0,3	0,2	0,1	0,1	0,1	0,1	0,4	0,2	0,2	0,7	0,4	0,4	0,4	0,5	0,1	0,2	0,2	0,3	0,3	0,3	0,1	0,6	0,4	0,5	0,3	0,4	0,3	0,3
r44	0,2	0,2	0,9	0,2	0,2	0,4	0,2	0,1	0,1	0,1	0,2	0,4	0,3	0,2	0,2	0,2	0,2	0,4	0,3	0,1	0,7	0,5	0,3	0,5	0,3	0,2	0,4	0,3	0,4	0,4	0,4	0,2	0,7	0,5	0,6	0,3	0,5	0,4	0,3
r45	0,0	0,0	0,3	0,0	0,0	0,0	0,1	0,0	0,1	0,0	0,0	0,1	0,1	0,0	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,1	0,2	0,1	0,1	0,0	0,0	0,0	0,1	0,1	0,1	0,0	0,0	0,1	0,3	0,1	0,1	0,1	0,2
r46	0,2	0,2	0,8	0,2	0,2	0,2	0,2	0,2	0,1	0,1	0,2	0,2	0,3	0,1	0,2	0,2	0,2	0,3	0,3	0,2	0,4	0,3	0,3	0,4	0,3	0,1	0,3	0,3	0,4	0,3	0,5	0,4	0,3	0,4	0,6	0,4	0,6	0,4	0,6
r47	0,3	0,4	0,7	0,4	0,3	0,3	0,4	0,3	0,2	0,2	0,4	0,4	0,4	0,3	0,4	0,4	0,3	0,5	0,5	0,4	0,6	0,5	0,4	0,5	0,4	0,2	0,5	0,4	0,6	0,5	0,5	0,4	0,6	0,4	0,6	0,6	0,7	0,6	0,6
r48	0,1	0,1	0,5	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,2	0,1	0,1	0,2	0,1	0,2	0,2	0,0	0,2	0,2	0,3	0,4	0,2	0,3	0,3	0,3	0,2	0,2	0,4	0,7	0,7	0,7
r49	0,1	0,1	0,5	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,3	0,2	0,2	0,1	0,2	0,2	0,1	0,2	0,3	0,3	0,4	0,2	0,3	0,3	0,3	0,2	0,2	0,4	0,7	0,7	0,7
r50	0,1	0,1	0,5	0,1	0,1	0,1	0,2	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,2	0,1	0,2	0,2	0,2	0,1	0,1	0,2	0,2	0,1	0,2	0,2	0,3	0,3	0,2	0,4	0,3	0,3	0,1	0,3	0,4	0,7	0,7	0,7
r51	0,1	0,0	0,3	0,1	0,1	0,1	0,1	0,0	0,1	0,0	0,0	0,1	0,1	0,0	0,1	0,1	0,1	0,2	0,1	0,1	0,1	0,1	0,1	0,1	0,2	0,0	0,2	0,2	0,2	0,1	0,1	0,2	0,1	0,1	0,2	0,3	0,5	0,4	0,6
r52	0,1	0,1	0,5	0,1	0,1	0,1	0,1	0,1	0,1	0,0	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,3	0,2	0,2	0,2	0,1	0,2	0,2	0,3	0,0	0,3	0,3	0,3	0,2	0,3	0,3	0,3	0,2	0,3	0,5	0,7	0,6	0,7
r53	0,1	0,1	0,6	0,2	0,1	0,1	0,2	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,4	0,2	0,2	0,3	0,2	0,2	0,4	0,1	0,3	0,2	0,3	0,2	0,3	0,4	0,3	0,4	0,2	0,4	0,6	0,6	0,5	0,6
r54	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
r55	0,1	0,1	0,6	0,1	0,1	0,1	0,1	0,1	0,1	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,3	0,2	0,1	0,3	0,1	0,2	0,2	0,1	0,0	0,2	0,2	0,2	0,2	0,2	0,2	0,3	0,2	0,3	0,3	0,4	0,4	0,4
r56	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,1	0,1	0,0	0,0	0,1	0,1	0,0	0,1	0,1	0,1	0,0	0,0	0,2	0,0	0,1	0,1	0,1
r57	0,0	0,0	0,3	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,1	0,1	0,0	0,1	0,0	0,1	0,1	0,1	0,1	0,2	0,1	0,1	0,2	0,2	0,9	0,4	0,6
r58	0,1	0,1	0,4	0,1	0,1	0,1	0,1	0,1	0,1	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,2	0,1	0,1	0,2	0,1	0,2	0,3	0,1	0,0	0,2	0,1	0,2	0,1	0,1	0,1	0,2	0,1	0,3	0,2	0,7	0,5	0,7
r59	0,1	0,1	0,4	0,1	0,1	0,1	0,1	0,1	0,1	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,2	0,1	0,2	0,2	0,1	0,2	0,2	0,3	0,0	0,3	0,2	0,3	0,2	0,2	0,2	0,2	0,2	0,3	0,3	0,4	0,4	0,4

	c40	c41	c42	c43	c44	c45	c46	c47	c48	c49	c50	c51	c52	c53	c54	c55	c56	c57	c58	c59
r40	1,0																			
r41	0,7	1,0																		
r42	0,2	0,2	1,0																	
r43	0,5	0,7	0,1	1,0																
r44	0,6	0,7	0,1	0,8	1,0															
r45	0,2	0,1	0,0	0,1	0,2	1,0														
r46	0,4	0,7	0,1	0,6	0,7	0,3	1,0													
r47	0,8	0,7	0,1	0,5	0,7	0,2	0,8	1,0												
r48	0,7	0,4	0,0	0,3	0,4	0,1	0,3	0,4	1,0											
r49	0,7	0,4	0,0	0,3	0,4	0,1	0,5	0,6	0,6	1,0										
r50	0,7	0,4	0,0	0,3	0,5	0,1	0,5	0,6	0,9	0,9	1,0									
r51	0,5	0,3	0,0	0,2	0,2	0,1	0,3	0,3	0,4	0,8	0,7	1,0								
r52	0,7	0,5	0,1	0,4	0,5	0,1	0,6	0,7	0,7	0,9	0,9	0,8	1,0							
r53	0,7	0,7	0,1	0,5	0,5	0,2	0,6	0,7	0,7	0,7	0,7	0,5	0,9	1,0						
r54	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,1	0,0	0,1	0,0	0,1	0,2	1,0						
r55	0,5	0,5	0,0	0,6	0,6	0,1	0,5	0,6	0,5	0,7	0,6	0,4	0,7	0,7	0,0	1,0				
r56	0,1	0,1	0,2	0,2	0,0	0,2	0,0	0,1	0,1	0,1	0,2	0,1	0,2	0,2	0,0	0,2	1,0			
r57	0,2	0,3	0,0	0,1	0,2	0,0	0,2	0,2	0,0	0,2	0,0	0,2	0,0	0,2	0,0	0,2	0,0	1,0		
r58	0,5	0,4	0,3	0,6	0,5	0,1	0,5	0,6	0,1	0,4	0,8	0,6	0,5	0,5	0,1	0,5	0,1	0,4	1,0	
r59	0,5	0,4	0,0	0,3	0,4	0,2	0,7	0,6	0,8	0,7	0,7	0,4	0,8	0,8	0,1	0,6	0,1	0,3	0,8	1,0

Table B.6-c: Difference in Similarity (competition) indices between two types of Education wrt. occupation structure 1994–1999

For row/colum codes of educations see Table 3

	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18	c19	c20	c21	c22	c23	c24	c25	c26	c27	c28	c29	c30	c31	c32	c33	c34	c35	c36	c37	c38	c39	c40	c41	c42	c43	c44	c45	c46	c47	c48	c49	c50	c51	c52	c53	c54	c55	c56	c57	c58	c59
r1	0,0																																																										
r2	-0,5	0,0																																																									
r3	0,5	0,0	0,0																																																								
r4	-0,3	0,0	0,0	0,0																																																							
r5	-0,4	0,0	0,0	0,1	0,0																																																						
r6	-0,2	0,0	0,0	0,0	0,0	0,0																																																					
r7	-0,2	0,0	0,0	-0,1	0,0	0,0	0,0																																																				
r8	-0,3	0,0	0,0	-0,1	0,0	0,0	-0,1	0,0																																																		
r9	-0,3	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0																																																	
r10	-0,2	0,0	0,0	-0,1	-0,1	-0,1	0,0	0,0	-0,2	0,0																																																
r11	-0,3	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	0,0	-0,1	0,0																																														
r12	-0,2	-0,1	-0,1	-0,1	0,0	0,0	-0,1	-0,1	0,0	0,0	-0,1	0,0																																													
r13	-0,4	0,0	0,0	-0,1	0,0	0,0	-0,1	-0,1	0,0	0,0	0,0	-0,2	0,0																																												
r14	-0,2	-0,1	0,1	-0,1	0,0	0,0	0,0	-0,3	0,0	0,0	-0,1	0,1	-0,1	0,0																																											
r15	-0,3	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	-0,1	0,0	0,0	0,0	0,0																																										
r16	-0,1	0,0	0,0	-0,1	-0,1	0,0	-0,1	0,0	-0,1	-0,2	-0,1	-0,1	0,0	0,0	-0,1	0,0																																									
r17	-0,3	-0,1	0,0	0,0	0,0	0,0	-0,1	-0,1	-0,1	0,0	0,0	-0,1	0,0	0,1	0,0	-0,2	0,0																																						
r18	-0,3	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	-0,1	0,1	-0,1	0,0	0,0	-0,1	0,0																																			
r19	-0,3	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	-0,1	-0,1	0,1	-0,1	0,0	-0,1	0,0	0,0	0,0	0,0	0,0																																		
r20	-0,2	-0,2	-0,1	-0,2	-0,2	-0,2	-0,1	-0,1	-0,4	-0,4	-0,2	-0,1	-0,1	-0,2	-0,2	-0,2	-0,4	-0,2	-0,3	0,0																																	
r21	0,2	0,0	0,1	0,0	0,0	0,0	-0,2	-0,1	0,0	0,0	0,0	-0,2	-0,2	0,1	0,0	0,0	-0,1	0,0	-0,1	-0,2	0,0																																
r22	0,1	-0,1	0,2	-0,1	-0,1	-0,2	-0,1	0,0	0,0	0,0	-0,1	-0,1	0,2	0,0	-0,1	-0,1	0,0	0,1	0,0	-0,1	0,0	0,0																															
r23	-0,3	-0,2	-0,1	0,2	0,1	0,1	-0,2	-0,4	0,1	0,1	0,1	-0,2	-0,1	0,0	0,1	0,0	0,0	-0,3	0,1	-0,2	-0,1	-0,1	0,0																														
r24	-0,1	0,0	0,0	-0,1	-0,2	-0,2	-0,4	0,0	0,0	0,0	0,0	-0,3	0,0	-0,1	0,1	-0,1	-0,1	0,1	0,0	0,0	-0,3	-0,1	-0,2	-0,3	0,0																												
r25	-0,3	0,0	0,0	0,3	0,2	0,0	0,1	-0,1	0,2	0,1	0,3	-0,1	0,3	0,3	0,2	-0,1	0,0	0,2	0,3	0,0	0,0	0,0	-0,3	0,3	0,0																											
r26	-0,3	-0,2	0,0	-0,4	-0,2	-0,1	-0,1	-0,1	-0,1	-0,1	-0,4	0,0	-0,3	-0,3	-0,3	-0,1	0,2	0,1	-0,4	-0,1	0,0	0,1	0,0	-0,1	0,0	0,0																										
r27	-0,3	-0,1	0,0	0,1	-0,1	0,0	0,0	-0,1	0,0	-0,1	0,0	0,0	0,1	0,1	0,0	0,0	0,0	0,1	0,0	-0,2	0,0	0,0	0,0	0,0	0,2	-0,1	0,0																									
r28	-0,1	0,0	0,0	0,0	0,0	-0,1	0,0	0,0	0,0	0,0	-0,2	-0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0																													
r29	-0,1	0,0	-0,1	-0,1	-0,1	-0,1	-0,2	-0,1	-0,1	-0,2	0,0	-0,4	0,2	-0,1	-0,1	0,0	-0,2	0,2	-0,1	0,0	-0,3	-0,3	-0,1	-0,1	0,3	0,1	-0,1	0,1	0,1	0,0																							
r30	-0,1	-0,2	0,0	-0,2	-0,1	-0,1	-0,2	-0,2	-0,1	-0,1	-0,2	-0,4	-0,3	-0,2	-0,1	-0,1	-0,1	-0,2	-0,2	-0,2	-0,2	-0,3	-0,3	-0,2	0,0	-0,3	-0,1	0,0	-0,3	0,0																						
r31	0,0	0,1	0,1	0,1	0,0	0,0	0,1	0,1	-0,2	-0,2	0,2	0,3	0,0	0,2	0,1	-0,1	-0,1	0,1	0,0	-0,3	0,2	0,2	0,2	0,2	0,3	0,2	0,1	0,0	-0,2	0,2	0,0																					
r32	-0,1	0,1	0,0	0,0	-0,2	-0,1	0,0	0,0	-0,1	0,0	0,0	-0,1	0,2	-0,1	-0,2	-0,1	-0,1	0,1	0,0	0,0	-0,1	-0,1	0,1	-0,1	0,1	0,2	-0,2	-0,2	-0,2	0,0	-0,2	0,0																				
r33	-0,1	0,0	-0,2	-0,1	-0,1	-0,2	-0,1	-0,2	-0,1	-0,2	-0,1	-0,2	0,1	-0,2	0,1	-0,1	-0,1	0,1	0,0	-0,2	-0,3	-0,2	-0,1	0,0	-0,1	-0,4	-0,3	0,0	-0,2	0,0	0,1	-0,3	0,0																			
r34	0,0	-0,1	-0,1	0,0	0,0	0,0	0,0	0,0	-0,2	0,0	0,0	-0,1	-0,1	-0,2	0,1	0,0	0,0	-0,1	0,0	-0,2	-0,1	-0,2	-0,1	-0,2	-0,2	0,0	0,0	0,0	-0,3	-0,3	0,2	-0,1	-0,3	0,0																		
r35	-0,2	-0,2	-0,3	-0,2	-0,2	-0,3	-0,3	-0,3	-0,1	-0,1	-0,2	-0,3	0,2	0,0	-0,1	-0,2	0,0	0,2	0,2	-0,3	-0,2	-0,3	0,2	-0,1	-0,2	-0,2	-0,3	-0,2	-0,3	0,2	-0,1	-0,2	-0,2	0,0																	
r36	0,1	0,0	0,1	0,0	0,1	0,0	-0,1	-0,1	0,0	0,0	0,0	-0,1	-0,1	0,0	0,1	0,0	0,1	0,0	0,2	0,0	0,0	0,0	0,0	0,0	0,2	0,5	0,2	0,1	0,2	0,0	-0,1	0,0	0,0	-0,1	0,0	0,0																	
r37	0,0	0,0	-0,1	0,0	0,0	-0,1	0,0	0,0	0,0	0,0	0,0	-0,1	0,0	0,1	0,1	0,0	0,0	0,1	-0,1	-0,2	-0,1	-0,1	-0,1	-0,1	0,1	0,6	0,2	0,0	0,0	0,0	0,1	-0,2	-0,2	-0,1	0,1	0,0																
r38	0,0	0,0	-0,1	0,0	0,0	-0,1	0,0	0,0	0,0	-0,1	-0,1	0,0	0,0	0,0	0,1	0,0	0,1	0,0	0,0	-0,1	-0,2	0,0	0,0	0,0	0,5	0,1	0,0	0,0	0,0	-0,2	-0,2	0,0	-0,1	0,1	-0,1	0,0															
r39	0,0	0,0	0,0	-0,1	0,0	-0,1	-0,1	0,0	-0,1	0,0	-0,1	-0,1	0,0	0,0	0,0	-0,1	0,0	0,0	0,0	-0,1	-0,2	0,0	0,0	0,2	0,7	0,2	0,0	0,1	0,0	0,0	-0,2	-0,2	0,1	0,0	0,0	0,0														
r40	0,0	0,0	0,0	-0,1	-0,1	0,0	0,0	0,0	0,0	0,0	-0,1	-0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,1	-0,2	0,0	0,0	0,0	0,2	0,4	0,1	0,0	0,1	0,0	0,0	-0,1	-0,1	0,0	-0,1	0,1	0,0	0,0	0,0													
r41	0,1	0,0	-0,1	-0,1	-0,1	-0,1	0,0	0,0	0,0	-0,1	0,0	-0,1	0,0	-0,1	-0,1	0,0	0,0	0,0	0,0	-0,1	0,0	0,0	-0,1	0,1	0,1	-0,1	-0,1	0,0	0,2	-0,1	0,0	-0,1	0,0	-0,1	0,2	0,0	-0,1	-0,1	-0,1	-0,1	0,0												
r42	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	0,3	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,3	0,0	0,0	0,0	0,0	0,0	0,0																		
r43	0,6	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	-0,1	0,0	0,0	0,0	-0,1	-0,1	0,0	0,0	0,0	0,0	-0,1	0,0	0,1	0,2	-0,2	0,1	-0,2	-0,1	0,0	0,0	-0,1	0,0	-0,1	-0,1	-0,3	-0,1	-0,3	0,1	-0,1	-0,1	0,0	-0,1	-0,1	0,0	0,0										
r44	0,5	-0,1	0,0	0,0	0,0	0,0	-0,1	-0,1	-0,1	-0,1	-0,1	-0,1	-0,2	0,0	0,0	0,0	0,0	0,0	-0,1	-0,1	0,2	0,1	0,0	0,0	0,0	-0,1	-0,1	-0,2	-0,2	0,0	-0,1	-0,1	-0,4	0,0	-0,3	0,1	-0,1	-0,1	0,0	-0,1	-0,2	0,0	0,0	0,0								
r45	0,1	0,0	-0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,5	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	-0,1	0,0																			
r46	0,2	0,0	-0,2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	-0,1	0,0	-0,1	0,0	0,2	0,1	0,0	0,0	0,0	0,0	-0,1	0,0	-0,1	-0,1	0,0	0,0	0,0	-0,1	0,0	0,0	-0,2	0,0	-0,3	-0,1	0,0							
r47	0,3	0,0	0,0	0,0	0,0	-0,1	-0,1	0,0	0,0	0,0	0,0	-0,2	0,1	0,0	0,0	-0,1	-0,1	0,1	0,0	-0,2	0,0	0,0	0,0	0,3	0,1	0,0	0,0	-0,1	0,1	-0,1	-0,2	-0,2	-0,2	0,0	-0,1	-0,2	-0,1	-0,1	-0,1	0,1	-0,1	0,0	0,0	0,0							
r48	0,1	0,0	-0,1	-0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	-0,1	0,0	0,0	0,0	0,2	-0,1	0,0	0,0	0,0	-0,1	-0,1	0,0	-0,1	0,0	-0,1	0,0	-0,1	0,0	0,0	-0,1	-0,1	-0,3	-0,2	0,0	0,0						
r49	0,0	0,0	-0,1	-0,1	0,0	0,0	-0,1	0,0	-0,1	0,0	0,0	-0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,1	-0,1	-0,1	0,0	0,0	0,1	0,4	-0,1	0,0	-0,1	0,1	0,0	-0,1	-0,2	-0,1	0,0	0,0	-0,1	-0,1	0,0	-0,2	-0,1	0,0	-0,1	-0,2	-0,1	-0,1	-0,3	-0,2	0,0				
r50	0,1	0,1	0,0	-0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	-0,1	0,0	0,0	0,0	0,1	0,1	0,0	0,1	0,0	0,0	0,2	0,0	0,0	0,0	0,1	0,0	-0,1	0,0	0,0	-0,1	-0,1	-0,1	0,0	-0,2	-0,1	0,0	0,0	0,0	0,0	0,0			
r51	0,0	0,0	-0,1	-0,1	0,0	0,0	0,0	0,0	0,0	-0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	0,0	0,3	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	0,0	-0,1	-0,1	-0,1	0,0	-0,1	-0,1	0,1	0,1	0,0		
r52	0,2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,1	0,0	0,1	0,2	0,0	-0,1	0,1	0,1	-0,1	0,0	0,1	0,0	0,6	0,1	0,1	0,1	0,2	0,1	-0,1	0,0	0,0	0,0	0,2	0,2	0,1	0,2	0,1	0,0	0,0	0,0	-0,1	0,0	-0,1	-0,1	-0,1	-0,1	-0,1	0,0	
r53	0,2	0,0	-0,1	-0,1	-0,1	-0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	-0,1	0,0	0,0	0,0	-0,1	0,0	0,1	0,1	0,1	-0,1	0,0	-0,1	-0,1	0,2	0,1	-0,1	-0,2	0,1	0,0	-0,1	0,0	-0,2	-0,2	-0,2	-0,2	-0,1	-0,2	-0,1	-0,1	-0,1	-0,2	-0,1	-0,2	-0,2	-0,2	0,0
r54	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	-0,1	0,0	-0,1	0,0	0,0
r55	0,2	0,0	-0,1	-0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,1	-0,1	0,2	0,1	0,0	-0,1	0,0	0,1	0,2	-0,1	-0,1	-0,1	0,1	0,0	0,1	-0,1	-0,1	0,0	0,0	-0,1	0,0	-0,1	-0,2	0,0	-0,1	-0,2	-0,1	-0,1	-0,1	-0,1	0,0
r56	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,5	0,0	0,0	0,0	-0,1	0,0	-0,1	-0,1	0,0	0,0	0,0	-0,1	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
r57	0,1	0,0	-0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,2	0,1	0,0	0,1	0,0	0,1	0,0	0,0	0,0	-0,1	0,0	0,0	-0,1	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,0
r58	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,1	0,0	0,2	0,1	0,0	0,1	0,0	0,0	0,0	0,1	-0,1	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,1	0,0	-0,2	-0,2	-0,1	-0,1	-0,2	-0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0
r59	0,1	0,0	-0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,2	0,1	0,1	-0,1	0,1	-0,1	0,3	0,0	-0,1	0,0	0,0	0,0	-0,1	-0,1	-0,1	-0,2	-0,2	-0,1	0,0	-0,1	-0,2	2,0	0,1	-0,1	-0,2	-0,3	-0,3	-0,2	-0,4	-0,2	0,0	0,0	0,1	0,0	0,0	0,0

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REGULAR FORECASTING OF TRAINING NEEDS: Comparative analysis, elaboration and application of methodology – Poland

Zbigniew Strzelecki

Witold Orłowski

Andrzej Karpiński

Stefan M. Kwiatkowski

Eugeniusz Kwiatkowski

Mieczysław Kabaj

Janusz Witkowski

Elżbieta Drogosz-Zabłocka

Małgorzata Kałaska

■ INTRODUCTION

A qualification-based labour demand forecast system is presently being built in Poland. Such a system enables several aims to be achieved. First of all, it provides the basis to specify educational and training tasks. It also enables an earlier preparation and organization of additional education and retraining for jobs less demanded in the labour market, as well as building a system of training for jobs with a high demand increase which is not met by the education system.

The Polish team of the "Laboratory project" cooperating with the government team prepared methodological assumptions of the forecast, and verified these forecast methods in practice based on the Polish labour market. We believe that forecasting the educational and training needs should take place on the basis of several types of qualification-based labour demand forecasts and simulations. Their methodological assumptions are presented in this report (part II). The results of the verifications are presented in part III. Part IV contains conclusions and recommendations.

■ METHODOLOGY

1. Surveying demand for labour by qualification through enterprises

■ 1.1 The necessity for a survey on the demand for labour

The changes on the Polish labour market, on the one hand determined by necessary restructuring of the economy and the rationalization of employment, and on the other hand by significant demographic pressure, has resulted in the growing significance of a complex range of information concerning the basic labour market features (events taking place on the labour market). Actually, the main problem is the creation of a system of information on the labour market, which will meet the current needs of the market economy. Work concerning this issue in Poland is mainly being carried out by the Central Statistical Office (CSO).

The labour market is characterised by two overlaying segments: the labour force supply and the demand for work. Labour force means the number of people interested in and ready to undertake work. Demand for labour means the number of jobs offered by the economy in particular socio-economic conditions. Interrelations between the labour force supply and demand for labour are very strongly influenced by market mechanisms. The demand side is more dynamic, thus it is more sensitive to these mechanisms. The size and structure of the demand for labour depends on many factors, including the demand for goods and services, economic condition of enterprises, and the cost of labour. The most favourable situation for the economy is harmonization of both these components i. e. the demand for labour and labour force supply. Market mechanisms are expected to ensure quantitative and qualitative adjustment of the labour supply and demand for labour force. Experience of many market-economy countries shows that this task is by no means easy to achieve. It implies that evaluation of the labour market requires information on both labour force resources and a demand for labour force.

Nevertheless, it does not mean that we can be satisfied with just general knowledge concerning the number of people interested in employment and the number of jobs offered in the economy. The other aspect of labour market analysis should take into consideration different categories of supply and demand from the point of view of actual (quantitative) utilisation of labour resources and management of existing jobs. From this perspective of the global labour resources, supply i. e. the labour force (according to the international statistics) or economically active population (according to the Polish terminology), can be divided into two categories: the employed and the unemployed. In the case of demand for labour, a total (global) number of jobs created by economy consists of jobs already being utilised and job offers. Thus, a complex labour market analysis should consider all the above-mentioned categories of the labour force supply and the demand for labour.

Each of these categories of the labour force supply and demand for labour should also be analysed from different perspectives. Five of them are particularly important i. e.: qualification, demographic, territorial, organisational and labour conditions. This means that analysis of events in the labour market should not be limited only to quantitative relations between labour force supply and the demand for labour by basic categories (employed, unemployed, occupied and offered jobs). The position of these relations from demographic and occupational perspectives should also be analysed, regarding the location of jobs and labour resources, and the organization of the economy (e. g. type of activity, economic or ownership sectors) as well as physical, economic and social working conditions (expected and real).

Thus, a complex analysis of the labour market doubtlessly requires thorough information concerning both sides of the labour market: supply and demand. At the beginning of the transition period the main research effort was directed solely towards selected labour market categories. Much less research interest was devoted to particular aspects of labour demand. Subsequent phases of transformation showed, though, that lack of complete information concerning different categories of labour demand significantly limited the possibility of drawing practical conclusions from labour market events. Analysis of the demand for labour should include all the above-mentioned labour demand categories, not just quantitatively but structurally as well.

◼ 1.2 Categories of labour demand and sources of information

The capability of the economy in the area of new job creation plays a particularly important role from the point of view of active labour market policy. Thus, complex analysis is necessary, not only of the changes in the demand for labour that have already occurred (a retrospective approach) but also of anticipated changes in labour demand within the defined time perspective. In the past few years, a retrospective analysis of the demand for labour has been dominant in Poland.

As was stressed before, distinguishing between the two categories of demand is necessary both for analytical and decision-making purposes. These categories consist of satisfied and unsatisfied demand. The first one means jobs already taken, while the other means vacancies (job offers). In Poland surveys of a satisfied demand for labour are much more common.

In this area the CSO has been carrying out surveys on the employed population, however this doesn't exactly correspond with job positions. Nevertheless, we can distinguish several categories of the employed, which are to some extend covered by job positions. Firstly, we must consider people employed formally (subjected to regular surveys) and people employed

in the hidden economy. In both these fields of the economy we have to deal with people employed in one or more jobs, and moreover, with people who perform formal work and informal work. On the basis of the results of these surveys of the employed population, we can estimate the number of "full-time posts" (labour units) or the "physical" (despite working time range) number of jobs in the economy. Both these aspects of satisfied demand are very important: quantitative and structural (in view of the basic labour market characteristic features). The CSO surveys of the employed are carried out from exactly these perspectives, i. e. territorial, occupational, organizational and demographic.

The other part of the demand for labour covers job vacancies. With the retrospective approach, information on vacancies is collected for a defined moment or a period of time (month, quarter etc.). Due to compulsory legal regulations, all vacancies should be reported, and thus registered, in Poviat labour offices. This is the basic source of information on vacancies, available for many years with a monthly frequency. However, it doesn't ensure complete statistical data. Registered job offers tend to be inferior, ones for which it is more difficult to recruit candidates as a result of strenuous working conditions, low pay or other drawbacks. The most interesting job offers are rarely reported to labour offices, due to the fact that employers can find people interested in these jobs directly within the organization, through acquaintances or in some other way. Job offers from so called "small" units, or created through self-employment, are also not included in job offer registers.

In order to expand knowledge of the demand side of the labour market, the Central Statistical Office initiated the implementation of a nation-wide survey on the demand for labour in the enterprise sector in 1995. It was the first such survey in Poland and it still is unique on a nation-wide scale. This is the significant feature of that survey, as the majority of other initiatives concerning surveys on the demand for labour carried out so far have covered selected local or regional labour markets.

1.3 Survey of the demand for labour in the enterprise sector

The demand for labour means the number and structure of jobs offered by the economy under particular socio-economic conditions. From the point of view of global equilibrium on the labour market, the most important element is the total number of jobs. Jobs are created by entities of the national economy. This consists mainly of enterprises, i. e. units maintaining economic accountability, and so-called "budgetary sphere" units.

The majority of people employed in the national economy work in economic entities. Moreover, these entities are responsible for decisions concerning the size of enterprises, measured by the number of employees, as well as the required qualification structure of their staff. Taking the above points into consideration, the CSO decided that a survey of the demand for labour should first and foremost cover entities maintaining economic activity (see chart).

Budgetary sphere units have decidedly less influence on the general changes in the demand for labour. Moreover, these changes are to some extent "predictable", as the size of employment in these units is fixed annually in budgetary law. These legal restrictions are not usually exceeded.

Thus, the survey of the demand for labour was directed towards the enterprise sector, because this accounts for the majority of those employed, and it is also the area with the highest elasticity in the creation of jobs. Actually, managers of enterprises decide both about the number of work places and qualification structure of staff, as well as about the growth potential of companies, which determines demand for new employees. The first experimental

survey was completed in 1995. Subsequent surveys were carried out in the years 1996–1998 (the next survey is scheduled to cover the year 2000). The first three surveys covered only large units in the enterprise sector (over 50 employees in manufacturing, mining or quarrying companies, or over 20 employees in other types of company, i. e. forestry and sea fishing, electricity, gas and water supply, construction, trade and repair, transport, storage and communication, real estate and business activities, other municipal, social and individual services and hotels and restaurants). The last survey conducted in 1998 took into account large and medium-sized units, which means entities with six or more employees. Large and medium-sized enterprises will also be included in further surveys, which as of 2000 means units with nine or more employees. The fact that the survey of the demand for labour is a full-scale survey should be underlined as very significant regarding its purpose.

The survey is a questionnaire survey, allowing enterprises to express their opinions both about changes in the number of employees and the reasons for these changes. A few groups of questions concerning demand for labour in the reference year and anticipated changes in the following year were included in the questionnaire. Regarding current demand, there is a large range of information covering the following issues:

■ number of contracts terminated, and new employees hired, in the company,
■ main reasons for changes in the number of employees (16 groups of reasons),
■ occupations with the highest amount of hiring,
■ occupations with the highest outflow of employees,
■ occupations for which finding employees was most difficult for enterprises,
■ most desirable staff skills in the enterprise,
■ number and occupation structure of job vacancies at the end of November,
■ number of the newly created jobs in the reference year.

Information on anticipated changes in the number of employees in the next year includes:
■ number of contract terminations and new employees hired, and the reasons for this,
■ occupations with the highest number of terminations,
■ occupations for which new employment is anticipated.

The significance of this survey is confirmed not only by its wide subject range but also by its nation-wide scale. Because the survey is assumed to be a full-scale survey, the number of participating entities is very high. In 1998, 84,000 companies were included in the survey. They were mainly from private sector (94 %). Over 5.2 million people were employed in all entities covered by the survey.

The survey provides opportunities for analysis which are particularly significant. Whereas quantitative changes can be characterised, it is also possible to determine the main reasons for these changes. The structural aspect of the demand for labour can also be analysed. Such information is sought after, as it is much lacking during such times of dynamic change in Poland. We can also draw conclusions on the character of these changes, which often take a different course than one could expect. A good example is the high labour mobility, both occupational and the physical movement of employees, which has been taking place in Poland. However, it doesn't lead to significant net effects. The character of the changes taking place is explained by several factors, above all the following:
■ significant structural changes: as a result, the demand for labour created by extended production is offset by restructuring of industries and organizational changes in particular enterprises,

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- still high demand for qualified workers, which is slowing changes in the qualification structure of those employed,
- dominant role of the private sector, which is more disintegrated than the public sector in creating new jobs,
- unequal development chances for various branches of economy, especially the weak position of segments that were leaders under the previous system,
- inadequate education system, which is unable to keep up with the changing labour market,
- still huge regional differences in economic conditions, and the consequential opportunities for creation of new jobs,
- the economic situation of the country is still in undergoing a period of stabilization, but this fact is not always taken into consideration in the forecasts of many enterprises.

All these factors confirm the need for constant monitoring of the demand for labour in the different segments of economy. The survey of the demand for labour by occupations through enterprises offers knowledge of the short-term compatibility and discrepancies in the demand and supply structure in the labour market. Thus, it allows for current needs regarding the structure of education and training.

SURVEY OF THE DEMAND FOR LABOUR

Enterprise sector

| *hiring* | *terminations* | *recruitment difficulties* |

The so called "large" and "medium-sized" units

| *reasons* | *occupation* | *education* | *skills* |

Vacancies

| *occupation* | *education* |

Projection

| *hiring* | *terminations* |

| *reasons* | *education* | *occupation* |
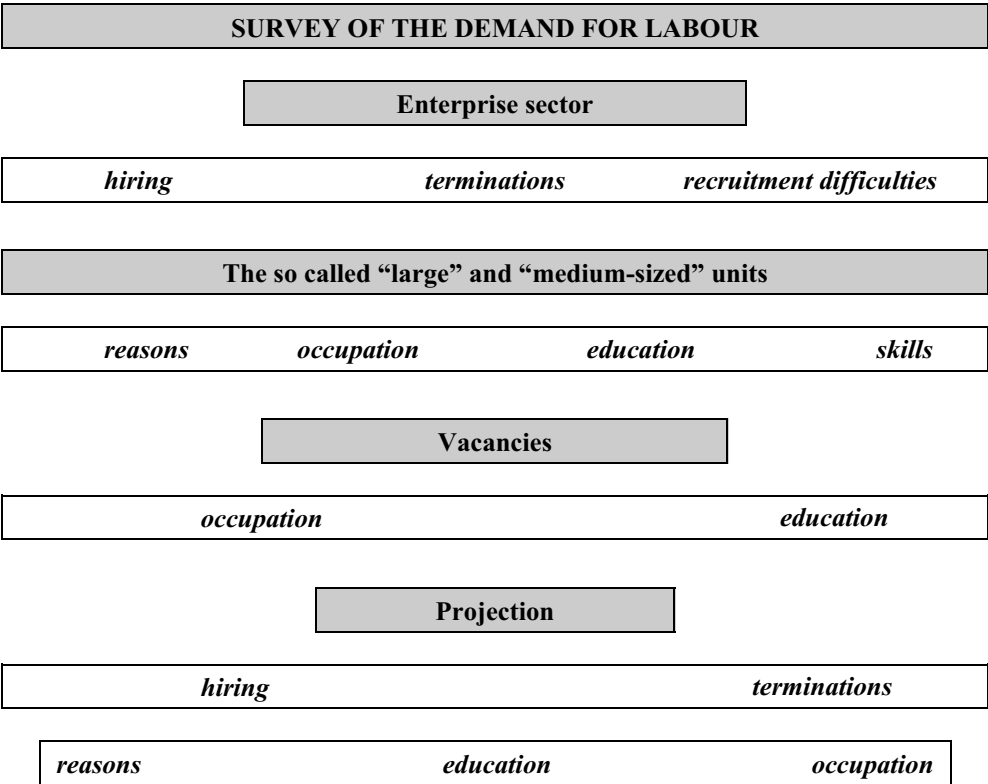
2. Applying the analogous method

The analogous method can be used as a supplement to the model based on the medium-term macroeconomic model. This is useful, particularly in light of the significant changes taking place in the internal structure of the analysed aggregates, or when econometric models fail or are hindered by a larger margin of error.

1) Using the analogous method is further justified by the empirically confirmed fact that at the current stage such standardising factors as:
a) needs and requirements connected with the functioning of a modern market economy,
b) universal aspects of technological progress and of modern technologies

have a stronger impact than specific features of natural, economic and social conditions in individual countries. It causes the direction of change (growth-decline), in sectors of employment or in the smallest groups of analysis in different countries, to be convergent in the majority of analysed cases. This phenomenon has been presented in existing literature on the subject.[36]

Upon making the above-mentioned assumptions we can apply the following analytical procedure:

a) calculate the relation of dynamics of employment for a given number of years for the above-mentioned groups of activity to the dynamics of employment in the national economy (with the latter set as 1 in the case of countries selected to form the basis of our simulations). In the case of the countries of Central and Eastern Europe, all the countries of the European Union can be chosen to constitute such a basis. This makes the evaluation an objective one, as it allows us to avoid accidental deviations that could arise in the case of comparisons with individual countries. The following formula can be applied to carry out such calculations:

$$rdi = Izi/Izg \quad (1)$$

where:
rdi – dynamic relation in the i-th group of activity
Izi – dynamics of employment in the i-th group
Izg – dynamics of employment in the whole economy

b) These proportions, which have been observed in the countries forming the basis of our simulation, can in turn be transformed to forecast the rate of employment growth in a given country for a number of years, according to the following formula:

$$Zi = Izg \times rdi \quad (2)$$

where:
Zi – forecasted number of those employed in the analysed country in the i-th group, other symbols, as in the formula (1), here refer to forecasted quantities.

As a result we obtain a simulation of the level of employment in the smallest analytical groups or sectors of activity.

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[36] "Industrial Transition of Employment – converging trends in the EU", "Panorama of EU Industry 95/96", "Brussels-Luxembourg" 1995, p. 81.

3) From there, we can simulate employment in specific occupational groups.
In the case of Poland, the analysis is based on a sample of 105 occupational groups. The analysis in question makes use of the following procedure:

a) We can assume that the occupational structure in individual sectors or in the smallest analytical groups in the target year will be the same as in the initial year, which signifies transposition of a constant structure of occupations in a given sector to a target level without modification, according to the following formula:

$$GZj = Zg \times Uzj \quad (3)$$

Where:
GZj – forecasted number of employees in the j-th group of occupations.
Zg – forecasted number of employees in a given sector of activity.
Uzj – share of the j-th group of occupations in the total employment in an analysed sector.

b) Now we can attempt to take into account the tendencies of changes in the coefficients of saturation of individual occupations. This signifies taking into account other shares in total employment in a given sector (the smallest analytical group), thus assuming a shifting structure of demand for occupations. It can be effected through the transposition of tendencies of change in a given occupational group, by considering dynamics in a several-year period preceding the forecasted period.
We can use a corrective coefficient for individual groups of occupations, one that is obtained by dividing the dynamics of employment in a given occupational group by the dynamics of employment in a given sector (or in the smallest group of analysis). It expresses the degree of variation (deviation) of a rate of changes in a given group of occupations from the dynamics of employment in a given sector (or in the smallest group of analysis).
The following formula has been applied for this goal:

$$GZjk = GZj \times (IGZj/Izi) \quad (4)$$

where:
Gzjk = forecasted, corrected number of employed in the j-th group of occupations
IGZj – dynamics of employment in the j-th group of occupations
Izi – dynamics of employment in the i-th sector of activity.

Such an approach promises a more likely result, and therefore is more credible than an approach that assumes a constant structure of occupations within individual groups. It benefits us by forecasting the growth in demand for an individual group of occupations, due to total employment growth and changes in the structure of the economy on the one hand, and how much it will grow due to the increased saturation by the given occupational group.

Finally, we can estimate the shifting structure of demand for individual occupations by using an expert method.

4) Even in the case described in paragraphs 3a and 3b, it is necessary to make expert corrections when government takes certain actions within individual sectors or groups with the intent of restructuring these groups, assuming that these governmental programs allow for the evaluation of the mid-term or long-term quantitative scale of effected reduction in employment.

In order to smooth out marginal variations, additional corrections can be made allowing for the reduction of the scale of these variations, when the boundary of variation on the plus or minus side has been exceeded.

5) The order of suggested operations is as follows:

a) Calculate the inter-sectoral relation in the dynamics of employment, according to the formula presented in paragraph 2a,

b) Calculate the level of employment in the analysed country, by applying the relations derived from one country or from a group of countries forming the basis of the simulation, as in paragraph 2b,

c) Calculate the demand for the main groups of occupations, assuming a constant structure – according to paragraph 3a,

d) Calculate the demand for the main groups of occupations, assuming a shifting structure – according to the point 3b,

e) Apply expert corrections, as described in paragraph 4.

As a result we obtain the simulated demand for individual groups of occupations, according to the chosen simulation of employment growth in sectors or in the smallest group subject to analysis.

6) The result obtained by applying this method doesn't precisely answer the question of the demand for individual occupations that could be expected in the final year of the analysed period. However, it does tell us what the demand would be, if the country experienced tendencies similar to those that occurred in the countries forming the basis for our simulation.

7) Finally, we should stress that the suggested methodology was proved to be valid in the case of Poland. This was done using specific calculations of employment in individual groups of occupations in the period 1997–2010, where the trends in the changes in employment in the EU in the period 1984–1993 was chosen to form the basis for the simulation. The data derived from "Panorama of EU industries 1995/1996" was used to perform the said calculations.[37]

8) The results obtained by using the above-mentioned methodology may be compared with information about the number of school graduates specializing in individual occupations, or with the number of workers leaving the labour force in a given profession due to natural causes (deaths or retirement) in the analysed period. Such an arrangement tells us in which occupations the number of graduates is sufficient to meet potential demand, and in which occupations it is insufficient to satisfy this demand. Therefore, it informs us in which occupations we should expect surpluses, and in which we may expect shortages in the final year of the projected period. This is a fundamental factor, one that has many applications and is of great significance in evaluating both the situation on the labour market and training programs.

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[37] "Panorama of EU Industry 95/96" Brussels-Luxembourg, 1995

3. Multiple-variant, medium-term forecast

Scope of the forecast

The postulated forecast concerns:
- The general macroeconomic scenario of the development of the Polish economy until the year 2005, including the labour market forecast (simulation with multiple variants).
- Demand for (hired) labour, consistent with the above scenario, according to 58 divisions and sections of the ECA.
- Within each of the ECA categories distinguished – the demand for hired labour (defined as contracted employment, excluding the uniformed services) according to the subdivision into 369 professional groups and 5 groups of education types (with an additional grouping into 120 groups of professions).
- An estimate of a regional forecast of demand for labour in Poland's 16 regions (with the classification of professions as above).

Specific features of the study

The following features are of particular significance to the study:
- The simulation and multiple-variant character, allowing for the analysis of demand for labour depending on the assumed economic development path.
- The methodology of the study, making it possible to flexibly use various macroeconomic models, which may be applied in order to generate the projections of the economic development path.
- The study is based both on data covering the present state of the Polish economy and on international comparisons, particularly with EU member states.
- The possibility of intervention and modification of the existing employment structures, in accordance with the envisaged direction of structural change in the economy and the labour market.
- The repetitive character of the study.
- Continuation of the study should not require any significant investment in terms of computer hardware or software. The necessary equipment includes a standard PC and Excel 7.0, and – depending upon the macroeconomic model used – a standard simulation software program (such as GAMS). The elements of software required for the further conduct of the study should be elaborated within the framework of the proposed project (the templates in Excel).

General remarks concerning the nature of the study

The forecast will concern the demand for hired labour until 2005 (defined as employment on the basis of a contract, excluding the uniformed services) with division into 369 professional groups and 5 educational groups. The forecast will not apply to the uniformed services, as the number in this field is a result of specific policies in the domains of public safety and national defence. It must be stressed that the forecast of demand for hired labour is substantially different from forecasts concerning actual employment according to professions and education. Demand for labour in its forecasted volume and structure may for many reasons differ from actual changes in employment according to professions and education levels. Thus at the present stage of research we will not be forecasting the supply of work.

The differences between the forecast of demand for hired labour according to professions and education levels and the true changes in employment may, in particular, be in evidence when the labour market does not supply a sufficient number of people with appropriate higher education. Such people may out of necessity be substituted with people with secondary education. Another factor may be that enterprises, confronted with supply from people with higher education, decide that the wage demands of these people are so high that it is beneficial for the enterprise to employ people with secondary education.

A number of critical remarks should be addressed at the classification of professions, and especially its excessive level of detail in some domains. This classification, moreover, does not satisfactorily take into account new professions that are likely to appear in the near future in connection with the development of the information-based society.

This study will allow the clear determination of the extent to which the changes in the structure of professions and in the structure of education within each of the 58 branches impact the general changes in the demand structure on the national scale, and on the scale of individual provinces, in relation to the existing structure. It is important to take into account that the forecast is also a function of the initial state of employment in individual professions, including the structure of employment by education. This structure, in view of the disequilibria in various segments of the labour market, often differs from our requirements regarding the skills and qualifications necessary for performing a given profession. Such situations are noticeable in certain professions, and in spite of intuitive reservations they cannot be corrected without a detailed analysis of the labour market in a given market segment (For example, five-star hotels belonging to global chains may employ professional linguists fluent in foreign languages as doormen).

General outline of methodology

The methodology postulated is based – in view of the complexity of the problem – on the algorithm presented below. This algorithm makes use of some varyingly complicated models of applied economics, either custom made, or adapted for the purposes of this study.

The scheme shows both the models used (white fields) and the products obtained in the consecutive stages of research (grey fields), as well as the more important sets of additional assumptions, introduced on the basis of simple models, international comparisons, or expert knowledge. In case of individual products (i. e. forecasts of various levels of detail and different scope) the possibility of obtaining them in different variants is shown (product versions overlaid in the background).

The study is composed of a number of modules, from which we obtain increasingly detailed results.

The fundamental modules of the study are as follows:
- ■ **The aggregate projection of economic development**, calculated with the help of the computable general equilibrium (CGE) model of the Polish economy. This projection is aggregated to the level of five sectors of the economy and it shows the basic trends and macro-proportions of the economic development in the years 1999–2005. The forecast is elaborated in several variants.
- ■ **Sub-module:** a projection determined on the basis of a different type of model (such as, for instance, a demand-driven model, a model belonging to the class of models based on I/O tables, or, more broadly, integrated models).

■ **The aggregate projection of the labour market** is determined by treating the development forecasts with more detailed assumptions concerning the labour market (these assumptions apply in particular to demography, elasticity of the labour market, wages and trends in agricultural employment). Such assumptions are necessary for forecasting the situation on the labour market (unemployment). Thus, for example, unemployment will depend on the rate of decrease of employment in agriculture. Then, in turn, the assumption on the elasticity of the labour market makes it possible to introduce further assumptions into the CGE model determining the degree to which wages in the economy will vary from the level that would enable equilibration of the market (limitation of unemployment to a technical level).

■ **Projections of demand for hired labour according to 58 branches** are obtained through application of a number of model-based instruments. In case of *demand for employment* the starting point is constituted by detailed changes in the structure of the economy, resulting from changes in the SAM matrix (the real increase of demand for production of particular branches depends both on the general rate of growth and on changes in the share of a given branch in the value added). Then changes in the role of particular branches in the economy are the result both of changes in the final consumption structure and the structure of the I/O matrix. Demand for hired labour declared in individual branches is, therefore, a function of the increase of demand for production.

■ On the other hand, the scale of demand for hired labour is also influenced by trends in the field of labour productivity in respective branches (an assumption of constant labour intensity coefficients would lead to false results, and the generation of an excessive projection of the increase in demand for hired labour). Similarly, adoption of the trends in labour productivity observed in Poland in recent years as a basis for projection would have led to errors: in some sections of industry an exceptionally high rate of growth of labour productivity was observed, exceeding 20 % per annum, linked with the process of restructuring and reduction of excess employment. The instrument that can be used is constituted by international comparisons, and, in particular, long-term rates of growth of labour productivity observed in the years 1960–1995 for particular industries in countries in the OECD (data from the OECD database ISD). One can assume that these rates define the technical capacities of increasing labour productivity in Poland over a longer time period, all the more so that the present labour productivity in Polish industry corresponds to that of western European countries in the early 1960s. As always, though, the method of international comparisons is subject to criticism (lack of the possibility of verifying the assumptions). In the case of some branches (for instance coal mining or the steel industry), additional assumptions have to be made concerning the restructuring programs.

■ Detailed assumptions also have to be made for **employment in the non-market sphere** (including administration, health care and education). In some cases it is possible to generate the true changes of demand for service (such as in the area of education), while in other cases employment changes can only constitute assumptions resulting from international comparisons and government declarations. In the case of health care, we are dealing with only a partial, and incomplete, application of market principles, although it is necessary to link to a certain degree the demand for employment with market development. In each case it is possible to establish different variants of the assumptions regarding employment policy in the public sector (employment can, but does not necessarily have to, fully adapt to demand or to needs).

■ **Detailed projection of demand according to branches, 369 professions and 6 education groups** is obtained through application of the appropriate transition matrices (based on detailed information from the years 1996 and 1998), which disaggregate the joint demand for hired labour in 58 branches according to professions and education. In order to obtain this projection we need to make assumptions concerning trends in the area of demand for education (e. g. the increasing demand for people with higher education) and in the "demography of professions" (the decline and expansion of professions). The method proposed is again based on international comparisons (see the preceding steps of the algorithm). In this manner a projection of demand for employment in two periods (1998 and 2005) is obtained, and through subtraction of the former from the latter – the projection of **changes in employment (demand for) according to 58 branches, 369 professions, and 6 education groups**.

■ Projection of **demand for hired labour (employment) according to branches, 369 professions, and 6 education groups** is obtained through estimation – on the basis of information on the age of employees in 1998 – of the retirement-related outflow in particular professions and education groups until the year 2005, and then adding the demand resulting from the replacement of retiring people by new employees to the projection of employment changes.

■ **Projection of the regional distribution** of demand for hired labour is again obtained on the basis of appropriate transition matrices, linking economic activity in particular regions with the changes in demand for production of branches located in these regions. The regional disaggregation is possible through the use of regional transition matrices (involving transformation from the 49 old regions to the new 16). One should bear in mind, however, that in view of the incomplete representativeness of regional data (deeply disaggregated) concerning employment structure (according to 369 professions and 6 education groups) and production (for 58 branches included in the I/O and SAM tables), in the approximate regional disaggregation a simplified methodology must be used, based on the more aggregated regional production and employment structures, and on the use of the unified matrices of transition to the lower level of disaggregation for all regions. In elaboration of the forecast, use can be made of the matrices of assignment of production at the level of aggregation of 21 branches (the ECA sections, with further breakdown of the manufacturing – five groups, and of the transport and communication – three groups), assuming an identical structure of professions in the respective industries in all the provinces. This certainly constitutes a far-reaching simplification, which cannot be avoided at the present stage, due to a lack of representative data.

The scheme of linkages between the particular modules of the study (models and products) is shown in the diagram. The most important characteristics of the basic modelling instruments are presented in the consecutive annexes.

Note: In case of all calculations, if not stated otherwise, preservation of relations observed in 1998 is assumed (e. g. regarding the number of working people of retirement age, and the early retired, as well as the structure of employment within a category of activity classification according to professions, etc.).

■ 3.1 The structure of the macroeconomic model (CGE)

The study will refer, in particular, to the computable general equilibrium model (CGE) of the Polish economy (neo-Keynesian and consistency check models will also be used). Such models are commonly used in the analysis of long-term economic growth of market economies. The essence of the CGE models is the assumption that over long time periods the economy develops due to the constant adjustment of demand and supply (increase in supply results from the increase of production capacities, an effect of the accumulated increment to factors of production). The adjustments take place due to changes in price structures, informing consumers of production costs of particular goods and services, and forcing producers to allocate production factors in accordance with consumers' decisions.

In the CGE model for Poland the following assumptions were made. Economic agents act rationally, with producers maximising profit, and consumers maximising utility. Wages do not equilibrate the labour market, thus unemployment persists (partly for technical reasons, and partly due to the imperfections of the labour market). It is assumed that the resultant unemployment level decreases as labour market reforms progress. Capital is mobile in the medium term, but not in the short term. Mobility of capital in the medium term is a result of the functions allocating investments, which account for the differences in return on capital in various sectors of the economy. Investments add to the resource of capital with a one-step delay, and so the volume of capital is given in each time period (this depends only on past investments).

For a given level of revenues and an allocation of factors of production, demand for goods and services is broken down into the demand for imports and for domestic production (depending upon the price relations between domestic production and imports). Then, demand for domestic production is confronted on particular markets with supply levels. When markets are not in equilibrium, price changes take place, followed by changes in production profitability. This, in turn, induces changes in the demand structure (through reaction of consumers to price changes), and in the structure of allocation of production factors among various branches of production (through reaction of producers to changes in profitability of production). Demand for factors of production, articulated by the producers, is confronted on the labour and capital markets with the respective supplies, which leads to the setting of prices. Demand for factors of production and their prices determine the level and the structure of primary incomes, which are from then on, after consideration of transfers taking place in the economy, used to define the ultimate allocation of incomes (between households, the government, and companies). Incomes generate consumption demand (private and general) and investment demand, while foreign demand generates the required exports. Taken together this gives the new demand for goods and services (see the beginning of this paragraph). This model is solved until the vector of prices is obtained ensuring equilibrium on all the markets.

The dynamics of the model is determined by savings, defining the level of investments: for a given level of current account deficit, investments and production depend upon the level of domestic savings. Since it is assumed that the currency market is elastic, the model calculates the real exchange rate consistent with the assumed current account deficit.

The model includes five branches of the economy and four institutional sectors (households, government, financial sector, and non-financial enterprise sector). The foreign sphere is divided into three areas (UE, CEFTA, and other countries). It must be emphasised that the software used (the GAMS system) allows the introduction of modifications into the model in a simple manner. Typical examples of such modifications are:

■ Change in the functional form or the parameters of equations.
■ Change in the assumed coefficient values.
■ Adjustment of the constant term in the behavioural equations.
■ Change in the category serving to equilibrate the market (for example, on the labour market it is wages that equilibrates the market for a given unemployment rate; alternatively, equilibrium may be brought about by using the unemployment rate for an assumed or forecasted wage increase; the second method should be applied for purposes of the calculations used in the study).

The detailed pattern of links between the fundamental variables is shown on the diagram.

■ 3.2 Analysis of the employment demand structure (outline)

The starting point for construction of the forecast of demand for people employed according to their professions is the forecast of demand for employment in 58 branches of the national economy, obtained on the basis of the macroeconomic model associated with the I/O table and the SAM matrix:

$$N(T) = N_1(T) + N_2(T) + ... + N_{58}(T),$$

where $N_i(T)$ is the number of people employed in branch "i" and year "T" $(T = 2005)$.

We will now briefly describe the procedure of constructing a forecast of the number of people working in classification category "i" in year "T" according to the elementary profession groups (369), distinguished according to the Classification of Professions and Services.

Generally speaking, the forecast of demand for employees according to professions consists in extrapolation of the structure of employment in a given branch or other category of classification of the national economy according to:
(a) sex (difference in retirement age),
(b) age (working people of retirement age, working people in the age up to five years before retirement, other working people),
(c) education level (university, high school, college and professional secondary, basic professional, primary, and incomplete primary),
(d) profession (369 professions),
accounting both for restructuring programs of branches of the economy (coal mining, iron and steel industry, health care system reform) and for trends in the change in demand for hired labour (increase of demand for skilled employees).

In view of the lack of direct information concerning the structure of employment in the sectors of the national economy according to the situation outlined above, the study will have to use available information on the structure of employment, determined on the basis of the representative study, denoted Z-09, carried out by the Central Statistical Office (GUS) in March 1996 and October 1998.

The data obtained from GUS should be corrected (regarding divisions in the economy) in order to measure not the number of people employed but the number of those working. Consequently, for each of the 58 branches and for both sexes in the base year we will dispose of the following information on the number of working people:

■ $N(t) = NK(t) + NM(t)$, where N, NK and NM are, respectively, the total number of people working, the number of working women, and the number of working men. These symbols hide the vectors of data whose elements provide information on, for instance, the number of women working in the category of Health Care and Social Protection, having university education, aged between 50 and 55 years (five years before retirement age), working as a dentist (similar information would exist for men).

■ If we omit for simplicity of notation the indices for sex and classification of the national economy, the structure of the information available for a given age group (I) can be shown in the form of a table, in which NI_j^i is the number of people working in profession j, having education category i.

Profession	Education level			Totals
	1	...	5	
1 ... 369	NI_j^i			NI_1 ... NI_{369}
Totals	NI^1	...	NI^5	NI

■ The initial demand forecast for hired labour according to professions is constructed by extrapolating the structures of the working population, presented in the table (for each division of the economy), according to the following procedure:

a. For 2005 we deal with two age groups (people working before retirement age and after retirement age); the number of people working in 2005 having reached or exceeded retirement age is obtained by multiplying the forecast of the total number of people working by the share of those of retirement age in the base year. We add to this number a definite share of those working who are before retirement age, but who will take earlier retirement. The remaining working population is obtained by subtracting the number of working "retirees" from total demand for hired labour.

b. The number of people working, according to education and profession, in the group of "retirees" is obtained by multiplying the forecast for the total number of "retirees" by the share structure of this working population, according to education and profession, who in the base year were in the age group of up to five years before retirement (separate for men and women).

c. The number of people working according to education and profession in the remaining age group is obtained by multiplying the forecast for the total number of people working not having reached the retirement age by the share structure of this working population, according to education and profession, who in the base year had been in the age group of at least ten years before retirement (separate for men and women).

d. The forecast of the number of working people according to professions is obtained by aggregating the forecasts for the divisions of the national economy.

■ The initial forecast is corrected using the trend of increased qualifications of working people (earlier retirements concern people with a lower level of education, while the newly employed can be expected to be of a higher level of education).

■ Taking into account the changes in global demand for people employed according to professions and education levels until the year 2005, defining the projected demand for net employment according to profession and education, as well as the additional new jobs created due to the fact that in 2000–2005 some workers will retire (employment meant to replace retiring employees), we obtain the projected demand for gross employment according to professions and education levels.

4. The method of shortage and surplus occupations

A common problem for the majority of European countries is that with the growth of expenditure on education, the level of unemployment young educated people has increased considerably. With the exception of Germany and Switzerland the unemployment rate among young people has been much higher than the overall unemployment rate. In European Union countries, the general unemployment rate was 10.9 %, and the youth unemployment rate was as high as 22 % (table 1). Why is this? One of the main reasons is the lack of coordination between education and labour market demand for different skills and occupations. We shall examine this problem using the case of the Polish economy, where new methods of linking vocational education with labour market demand recently have been developed and implemented on a pilot basis.

Table 1. Overall and Youth Unemployment Rates in Selected European Countries (1996) and in Poland (1998)

Country	(1)	(2)	Ratio
Austria	4.1	6.0	1.5
Belgium	9.8	22.9	2.3
Denmark	6.0	10.6	1.8
Finland	15.7	38.2	2.4
France	12.3	28.9	2.3
Greece	9.6	31.0	3.2
Spain	22.2	41.9	1.9
The Netherlands	6.6	11.5	1.7
Ireland	12.3	18.1	1.5
Germany	9.0	9.6	1.1
Portugal	7.3	16.7	2.3
Switzerland	3.8	4.9	1.3
Sweden	10.0	21.1	2.1
U. K.	8.2	15.5	1.9
Italy	12.0	33.5	2.8
European Union	10.9	22.0	2.0
Poland – 1998	10.4	22.9	2.2

(1) Unemployment rate – percentage of the economically active population;
(2) Age 15–24.
Sources: European Commission, Proposal for Guidelines for Member States Employment, Policies Brussels 1998, p. 11–21, GUS, Rocznik Statystyczny Pracy, Yearbook of Labour Statistics 1999.

■ 4.1 Four new methods of linking vocational education and labour market needs in Poland

There were two important reasons for seeking new methods of linking vocational education and training (VET) with the labour market. **First**, long-term forecasting of training needs would not be possible without a comprehensive diagnosis of the labour market situation, i. e. analysis of shortage and surplus skills in the current period, prior to the forecast. **Long-term forecasting of training needs should not ignore the existing, in the base period, shortages or surpluses in occupations**. If in certain occupation groups there are surpluses, the forecasting should be adjusted accordingly. **Second**, in spite of special programs for increasing youth employment and reducing the general level of unemployment in Poland, the youth unemployment rate has constantly remained twice as high as average (see table 2). Until recently one of the main reasons was the lack of proper coordination between VET and the changing labour market demand for skills and qualifications.

Table 2. Unemployment rate of Youth in Poland (1992–1998)

Year	Unemployment rate (total)[1]	Unemployment rate of youth[2]	Ratios
1992	13.7	31.3	2.3
1993	14.9	35.4	2.4
1996	13.2	29.5	2.2
1998	10.4	22.9	2.2

1) Percentage of the economically active population.
2) Age 15–24.
Source: GUS, Statistical Bulletin, 1991–99.

The analysis revealed that many vocational schools and training (retraining) centres are producing graduates, for whom there is no demand on the rapidly changing labour market. It has been estimated that as much as 50 % of youth unemployment in Poland is due to a lack of coordination of VET with labour market demand. One of the reasons for the lack of co-ordination has been the deficiency of proper information on labour market needs for specific occupations. The available labour market data is very rich but **too aggregated and to a large degree useless for the adjustment of training structures by occupations and contents**. The existing labour market information system in Poland is shown in a table (annex 1).

For the reasons mentioned above four new methods for linking vocational education and training (VET) with labour market demand have been developed and implemented in selected regions and training organisations:
1. Monitoring of shortage and surplus occupations (MSSO).
2. Tripartite and bilateral training agreements (TTA and BTA).
3. Bilateral agreements between schools and enterprises (BA).
4. Monitoring of employment and careers by graduates of schools and training centres (MEC).

These methods have been used for short and medium-term co-ordination, and constitute components of a broader system of linking VET with the labour market. The basic element of the co-ordination system is illustrated in Figure 1. These methods have been gradually implemented in selected regions and have led to important changes in VET and labour market policies. In this paper only one method (MSSO) will be examined. This method is particularly important in reducing unemployment among young people in Poland and is relevant in determining a methodology for regular long-term forecasting of training needs.

Figure 1

SYSTEM OF LINKING LABOUR MARKET AND VOCATIONAL TRAINING IN POLAND
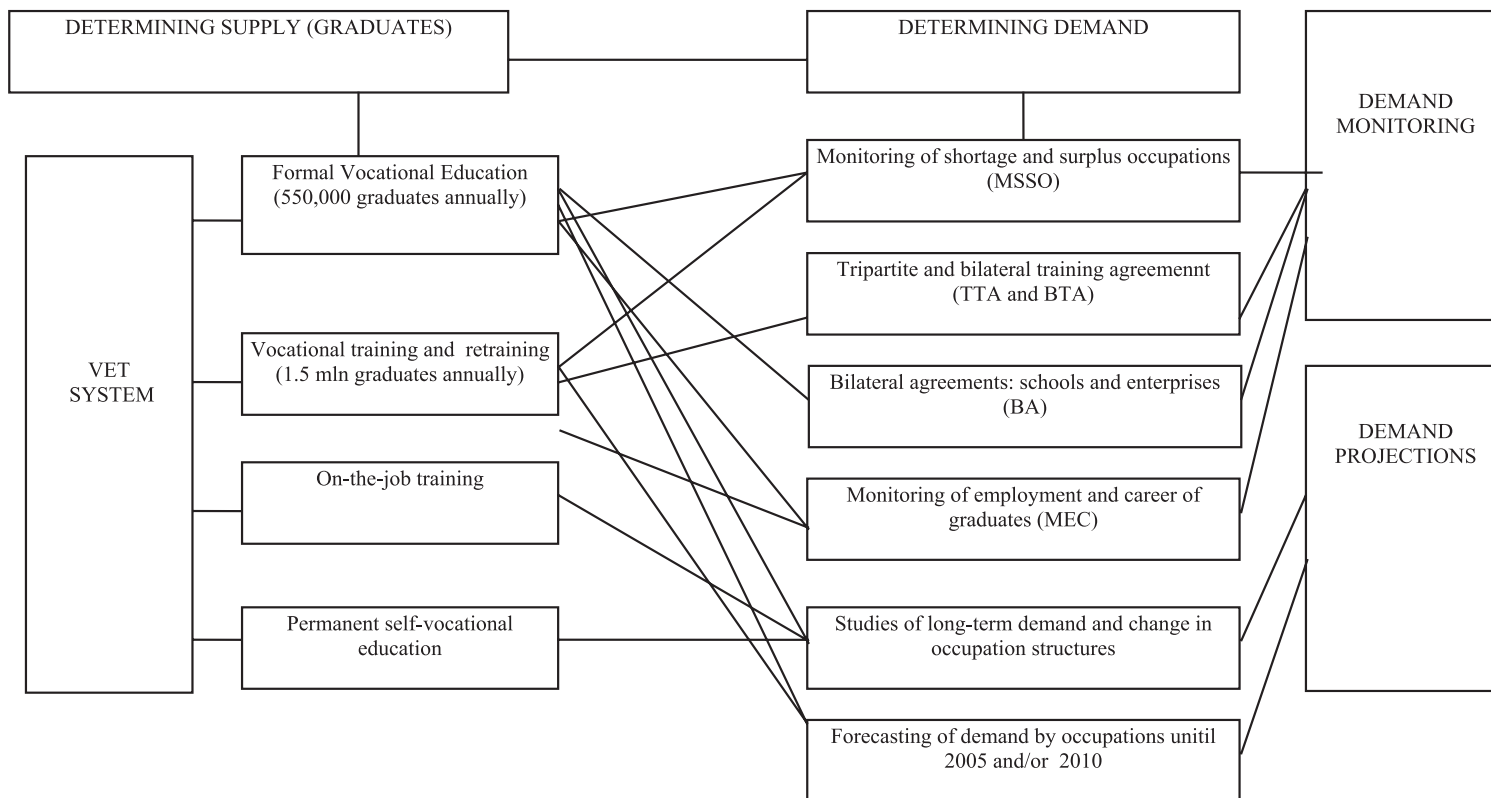
> **Shortage occupations:** number of job-offers is higher than number of job-seekers
>
> **Balanced occupations:** number of job-offers is about equal to number of job-seekers
>
> **Surplus occupations:** number of job-offers is lower than number of than job-seekers

■ 4.2 The Method of Monitoring Shortage and Surplus Occupations (MSSO)

The main aim of MSSO is to identify the occupations which are in shortage or in surplus on the **local and/or regional labour markets**. This information is vital for vocational schools, training organisations and publicly financed labour market training (Labour Fund).

Among the nine sources of information (See Figure 2), two are particularly important:
(1) monitoring of job-seekers and job-offers by the Public Employment Services (PES) and collecting information on the careers of graduates by the VET schools and the PES.
(2) annual surveys on expected job-creation and elimination in local/regional enterprises by PES in co-operation with these enterprises.

Thus, the monitoring of shortage and surplus occupation by PES is based on three variables per occupation (annex 1 shows the data-collection methods used in Poland).
■ job-seekers,
■ job-offers,
■ graduates entering the labour market.

The survey of enterprises also covers three variables per occupation:
■ expected hiring,
■ expected lay-offs,
■ hiring of VET graduates.

The monitoring of shortage and surplus occupations has been introduced on a pilot basis in four local and two regional labour markets. The results shown in Table 3 and Figure 3 were rather surprising. In shortage occupations there were 3,067 job-offers (according to the PES system) and only 146 graduates entering the labour market, i. e. 5 graduates per 100 job-offers. Adding the registered unemployed we have a total of 17 job-seekers per 100 job-offers. On the other hand in surplus occupations there were 193 graduates per 100 job-offers and a total of 594 job-seekers per 100 job-offers (see Table 3 and Figure 3).

Figure 2

MONITORING OF SHORTAGE AND SURPLUS OCCUPATIONS (MSSO)

| MSSO |
| Sources of information |

Monitoring job-seekers, job-offers
and graduates by occupation
(PES and schools)

Monitoring by schools of employment
and careers of graduates

Monitoring (or survey) of demand
from enterprises by occupations

Monitoring of employment and careers
of graduates of training courses

Analysis of press announcements

Monitoring of employment of labour market training by
public employment services (PES)

Information of counseling centres

Analysis of job-seekers and job-offers
in private employment offices

Studies of evolution of occupations by research institutes
and centres

The analysis provides two conclusions: **firstly**, vocational schools are not producing enough graduates for shortage occupations and instead are creating too many in surplus occupations; **secondly**, under conditions of high unemployment there is still a shortage in certain occupations. At the same time, public and private vocational schools are producing potentially unemployable graduates. In other words, the VET, using public financial resources, is not acting fully in line with the public interest.

Table 3. The Results of Pilot Application of Monitoring of Shortage and Surplus Occupations in three Local Labour Market (Gliwice, Knurów and Pyskowice) 1996

Items	Shortage occupations	Surplus occupations
1. Registered unemployment (PES)	380	8743
2. Job-offers (PES)	3067	2175
3. Number of job-offers per 100 unemployed persons	807	25
4. Graduates of vocational training school*	146	4198
5. Number of graduates per 100 job-offers	5	193
6. Number of registered unemployed and graduates per 100 job-offers	17	594

■ Entering the labour market.

Figure 3

RESULTS OF MONITORING
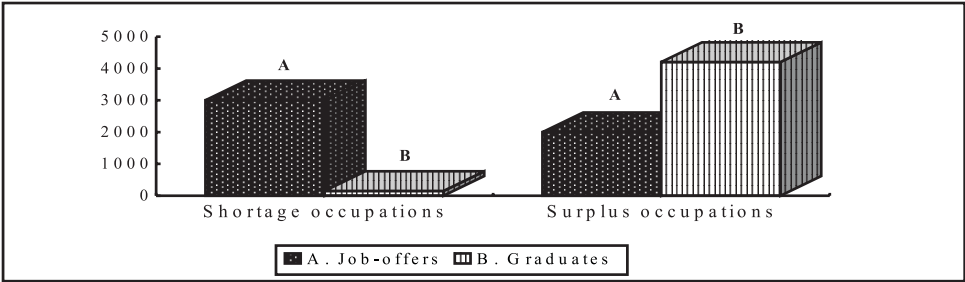
So far, we have presented static disparities between demand and supply in different occupations.

■ 4.3 Two labour markets: shortage and surplus occupations

Monitoring shortage and surplus occupations also has dynamic aspects. Our analysis covers a period of four years (1994–97). The results of this analysis are illustrated by table 4 and Figure 4. Two observations were made.

First, we observed a gradual decline in surplus occupations and a dramatic increase in the number of shortage occupations (from 18 % in 1994 to 37 % in 1997).

Table 4. Evolution labour markets in the Gliwice region (1994–1997)

Items	Total				Shortage occupations				Surplus occupations			
	1994	1995	1996	1997	1994	1995	1996	1997	1994	1995	1996	1997
Number of job offers per 100 unemployed persons	35	49	59	64	485	502	789	597	17	21	25	23
Number of unemployed persons per 100 job offers	289	203	170	157	21	20	13	17	580	487	406	435

Source: Monitoring Rynku Pracy (Monitoring of Labour Market), Gliwice 1998, p. 26.

Figure 4

EVOLUTION OF STRUCTURE OF OCCUPATIONS
IN REGION OF GLIWICE (1994–1997)
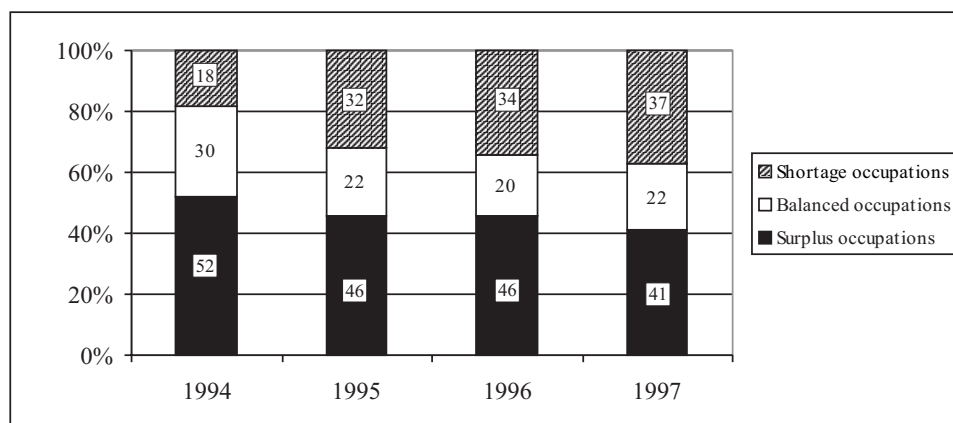
Source: Monitoring Rynku Pracy (Monitoring of Labour Market), Gliwice 1998, p. 23.

Second, it appears there has been **dual** labour market in Poland until now: shortage occupation and surplus occupation labour markets. It is surprising that the same occupations were in short supply in 1994 and in 1997.

In order to reduce the gap between two labour markets, shortage and surplus occupation markets, the VET occupational structure should gradually be changed, i. e. towards an increasing number of students in shortage occupations and a reduced number in surplus occupations may contribute to a substantial reduction in youth unemployment.

The VET system can gradually adjust to the labour market, **if schools (and other vocational training centres) regularly receive information on shortage and surplus occupations**. This requires the introduction of monitoring in local/regional labour markets. The Minister of Labour and Social Policy has already recommended the introduction of MSSO in all PES offices.

Methods of collecting information of three basic variables used in MSSO

A. PES INFORMATION					
NSOC Code	Occupation	Job-seekers PES (a)	Job-offers PES (b)	Shortage/ Surplus (a – b)	Graduates entering labour market
....	1................... 2................... 3................... 4...................				
B. ENTERPRISES INFORMATION					
NSOC Code	Occupation	Expected hiring (a)	Expected lay-offs (b)	Shortage/ Surplus (b – a)	Graduates entering labour market
....	1.................... 2.................... 3.................... 4....................				

■ RESULTS

This part of the report includes, as contracted, the empirical exemplification of methods of labour demand forecasting by occupations. The estimates concern the three methods that were used for the needs of the project in order to determine the directions of educational and training changes in the third stage. These are:

■ **the identification of entrepreneurs' expectations with regard to hiring and dismissing of employees by occupation within one year;**

■ **the estimate of the increase and decrease in demand in the national economy for 110 occupational groups until 2010;**

■ **the macroeconomic demand forecast for the national economy for 369 occupational groups until 2005, including classification by educational levels.**

The fourth method of forecasting was not used due to non-availability of data.

1. Labour demand survey by qualification through enterprises – information for 1998

■ 1.1 Labour demand survey in the enterprise sector

The demand for labour means the number and structure of jobs offered by the economy under particular socio-economic conditions. From the point of view of global equilibrium on the labour market, the most important element is the total number of jobs. Jobs are created by entities of the national economy. This consists mainly of enterprises, i. e. units maintaining economic accountability, and so-called "budgetary sphere" units.

The majority of people employed in the national economy work in economic entities. Moreover, these entities are responsible for decisions concerning the size of enterprises, measured by the number of employees, as well as the required qualification structure of their staff. Taking the above points into consideration, the CSO decided that a survey of the demand for labour should first and foremost cover entities maintaining economic activity.

Budgetary sphere units have decidedly less influence on general changes in the demand for labour. Moreover, these changes are to some extent "predictable", as the size of employment in these units is fixed annually in the budget bill. The restrictions set by law are rarely exceeded.

Thus, the survey on the demand for labour was directed at the enterprise sector. The questionnaire survey was carried out at the end of 1998 and allowed enterprises to answer questions concerning both changes in the number of employees and the reasons for these changes.

The questionnaire included questions concerning two periods. One block of questions of a retrospective character tackled the demand for labour during 11 months of 1998, including the number of vacancies at the end of the period, while the other block of questions of a progressive character included questions regarding changes in the number of employees anticipated for 1999.

The survey of demand for labour covered large and medium-sized units in the enterprise sector. Large units are enterprises with over 50 employees in manufacturing, mining or quarrying companies, or over 20 employees in other types of enterprises, i. e. forestry and sea fishing, electricity, gas and water supply, construction, trade and repair, transport, storage and communication, real estate and business activities, other municipal, social and individual services and hotels and restaurants. Medium-sized units are enterprises with between six and 20 or 50 units respectively.

The questionnaire was answered by 83,600 enterprises, of which 56,900, i. e. 68.1 % constituted medium-sized enterprises. Of the surveyed enterprises, 5,000, i. e. 5.9 %, constituted public sector enterprises, whereas 78,600 (94.1 %) were private sector enterprises. State owned enterprises were predominant in the public sector, whereas in the private sector the majority constituted enterprises of domestic private ownership. In all enterprises covered by the survey, a total of 5,239,800 people were employed at the end of November 1998; 34.0 % (1,781,100) constituted employees in the public sector, while 66.0 % (3,458,700) were in the private sector. Thus, on average, public sector enterprises were much larger (by employees) than private sector enterprises. This is important from the point of view of analysis of the demand of labour (the average number of people employed in public sector enterprises was 358, while in private enterprises it was 44 persons).

■ 1.2 Changes in demand in 1998

At the end of 1998 we examined large and medium-sized companies in the enterprise sector regarding events affecting the demand for labour that had taken place within the past year. We asked how many workers were hired or dismissed, what their occupations were, what reasons were given for dismissals, whether there were any problems with recruitment of staff, and whether these companies were offering any jobs at the end of November. Our information indicated a significant fluctuation of staff in enterprises as well as a sometimes surprisingly differentiated demand for labour.

During 11 months of 1998 i. e. the period covered by the survey, net changes in the surveyed enterprises were not significant, as the observed growth amounted to about 67,000 which means on average one hired employee in every enterprise in which the changes occurred. The total number of the increase included the hiring of 1,318,00 employees and dismissal of 1,251,00 employees. Thus, fluctuation of employment was high. It is worth underlining that the highest net growth occurred in medium-sized enterprises (70,400), while in large enterprises a big drop in the number of employees was observed (by 3,500).

The reasons for changes in the number of employees were varied, however there were few that worked only one-way, i. e. resulted solely in hiring or in dismissals. On the one hand structural changes in a company could lead to an increased number of employees, while on the other hand increased automation of production lines usually leads to a reduction in the number of unskilled workers. In the case of retirement we observe not only termination of contracts, but also hiring for free positions. These figures are not the same, as contract terminations cover the number of people who ceased work in the period January – November due to retirement, while hiring in the same period also covers jobs vacated in the previous year. Moreover, positions vacated in the current period are not filled immediately.

Table 5: Net changes in the number of employees in the period January – November 1998 by selected reasons were as follows:

	Total	Enterprises	
		large	medium
Total	**+66.9**	**−3.5**	**+70.4**
in which:			
Growth of domestic demand for goods and services	+109.7	+79.3	+30.4
Growth of foreign demand for goods and services	+51.8	+40.5	+11.3
Decrease of domestic demand for goods and services	−57.0	−39.3	−17.7
Decrease of foreign demand for goods and services	−23.6	−18.4	−5.2
Bad financial condition of enterprise	−49.9	−37.0	−12.9
Expansion of enterprise	+315.6	+227.5	+88.1
Rationalisation of employment	−34.1	−36.6	+2.5
Other structural changes	−1.2	−2.6	+1.4
Technological changes	+3.7	+2.3	+1.4
Privatisation	−11.5	−13.3	+1.8
Other organisational changes	+5.8	−1.8	+7.6
Terminations due to retirement and disability pensions	−48.5	−45.2	−3.3
Seasonal changes in production and service	+55.5	+43.7	+11.8

Among the reasons above that are worth mentioning are those which resulted in significant two-directional changes. Among them are rationalisation of employment, which led to the hiring of 113,500 people and dismissal of 147,600 people, and organisational changes which caused 187,900 new employees to be hired and 182,100 dismissed. Nevertheless some changes resulted in one-way changes. An example of this is the expansion of enterprises, which led to 315,600 new employees being hired, or an increase in domestic demand for goods and services – which resulted in the hiring of 109,700 employees.

When comparing entities according to the number of employees, it is noticeable that the majority of new jobs appeared in large enterprises, in both the public and private sectors.

Table 6. Structure of hiring by ownership sector and size of enterprises in the period January – November 1998

	Total	Enterprises	
		large	*medium*
Total	100.0	75.9	24.1
Public sector	100.0	98.5	1.5
Private sector	100.0	71.0	29.0

Hiring in the period January – November 1998 was as follows – 18 % was in the public sector and 82 % in the private sector. Thus, publicly owned enterprises employed 237,400 people, and private enterprises – 1,080,200 people.

Public sector enterprises hired relatively less employees than they had previously – they employed 18.0 % of new employees, compared to 34.0 % of the total number of employees.

Table 7. New jobs in the period January – November 1998 (in thousands)

Specification	Grand total	Public sector			Private sector		
		total	out of which		total	out of which	
			state ownership	municipal ownership		domestic ownership	Foreign ownership
	In thousand						
TOTAL	1317.6	237.4	197.2	20.5	1080.2	852.9	140.0
out of which:							
MINING AND QUARRYING	11.6	8.1	6.3	0.0	3.5	1.6	0.3
MANUFACTURING	536.0	62.7	50.6	0.5	473.3	348.6	71.7
ELECTRICITY, GAS AND WATER SUPPLY	19.2	16.2	8.1	7.9	3.0	1.9	0.0
CONSTRUCTION	213.0	14.8	11.7	1.8	198.2	175.8	3.9
TRADE AND REPAIR	242.1	7.0	5.4	0.2	235.1	190.5	40.7
HOTELS AND RESTAURANTS	33.2	3.2	1.9	0.1	30.0	18.8	10.6
TRANSPORT, STORAGE AND COMMUNICATION	128.5	99.3	95.9	2.5	29.2	20.9	4.6
REAL ESTATE AND BUSINESS ACTIVITIES	98.3	10.7	7.6	2.1	87.6	77.1	7.1
OTHER COMMUNITY, SOCIAL AND PERSONAL ACTIVITIES	26.8	8.9	3.3	5.3	17.9	15.6	1.1

The proportion of changes in the number of employees in particular ownership sectors are determined by the degree of privatisation in particular branches of the economy. Thus, the relatively largest number of jobs created in public sector enterprises took place in electricity, gas and water supply – 84.5 % of the total number of new jobs in this section, transport and communication – 77.3 %, mining and quarrying – 69.9 %, while the relatively lowest number of new jobs created was in wholesale and retail trade and repairs of vehicles – 2.9 % of the total, construction – 7.0 %, hotels and restaurants – 9.6 % and real estate activities – 10.8 %.

In the 11-month period in 1998 less people were dismissed than hired in the surveyed enterprises, with dismissals totalling 1,250,700. More employees were dismissed from private sector enterprises (78.4 % of total dismissals) than from the public sector (21.6 %).

In the public sector the majority of dismissals took place in manufacturing companies – 30.2 % of the total number of terminations in this sector. Dismissals in transport and communication constituted 21.2 % of the total number of dismissals in public sector companies, in mining and quarrying – 16.2 %, and in power enterprises – 12.9 %.

Analysing the number of dismissals in the private sector, wee see that three kinds of activities were dominant: manufacturing enterprises were responsible for 47.0 % of the total number of dismissals in the private sector, trade enterprises for 20.7 % and construction enterprises for 18.5 %.

Comparing enterprises according to the number of employees, we see that the largest number of dismissals took place in large enterprises in both the public and private sectors.

Table 8. Structure of dismissals by sector and sizes of enterprises in the period January–November 1998

	Total	Enterprises	
		large	*Medium*
Total	100.0	80.3	19.7
Public sector	100.0	99.1	0.9
Private sector	100.0	75.1	24.9

Naturally, the absolute scale of dismissals differs very much, depending on the kinds of activities, which are presented in the following table.

Table 9. Dismissals in the period January–November 1998 (in thousands)

Specification	Grand Total	Public sector			Private sector		
		total	out of which		total	out of which	
			state ownership	municipal ownership		domestic ownership	foreign ownership
				In thousand			
TOTAL	1,250.7	270.0	220.4	23.3	980.7	742.9	103.2
out of which:							
MINING AND QUARRYING	46.9	43.8	40.8	0.0	3.1	1.3	0.3
MANUFACTURING	542.4	81.5	64.5	0.8	460.9	308.1	55.7
ELECTRICITY, GAS AND WATER SUPPLY	36.8	34.7	24.2	10.3	2.1	1.5	0.0
CONSTRUCTION	195.7	14.1	11.2	1.5	181.6	155.6	3.6
TRADE AND REPAIR	213.3	9.8	8.2	0.1	203.5	171.8	25.5
HOTELS AND RESTAURANTS	28.4	3.1	1.5	0.1	25.3	15.3	9.4
TRANSPORT, STORAGE AND COMMUNICATION	80.7	57.3	52.7	3.6	23.4	17.8	3.3
REAL ESTATE AND BUSINESS ACTIVITIES	73.7	9.5	6.1	2.2	64.2	57.2	4.4
OTHER COMMUNITY, SOCIAL AND PERSONAL ACTIVITIES	23.0	8.5	3.6	4.7	14.5	12.5	1.0

On the basis of both tables above (hiring and dismissals) it can be concluded that in all sections by kinds of activities more employees were hired than dismissed. The absolute net changes in the private sector amounted to +99,500 people, while in the public sector to −32,600

Information on the occupational and educational structure of employees, particularly those hired but also those dismissed, as well as people needed for work, is very significant from the point of view of the analysis of demand for labour.

The number of people hired during the period January–November 1998 that we will discuss below according to disaggregation by occupations and educational level, is over 21 % lower than the full number of number of new employees hired, totalling 1,038,100 people. This is because we were interested only in occupations which were most frequently mentioned regarding new employees hired (enterprises could indicate no more than 8 professions).

The first general observation is that employees hired within the period of eleven months of 1998 performed many occupations (350) whose shares in the total number of hires were often very low, but nevertheless significant for a given kind of activity. The largest occupational group among new employees was "salespeople and demonstrators" with 82,800 people, i. e. 8.0 % of the total number of hired people. This was followed by "other simple task workers in the processing industry" – 46,400, or 4.5 % of the total number of the new employees; seamstresses, embroiders and related – 40,800 (3.9 %), bricklayers and related – 39,500 (3.8 %), locksmiths and related – 27,700 (2.7 %) and labourers in general construction – 27,400 (2.6 %). Thus, the largest number of hired employees consisted of blue-collar occupations.

Among the occupations with the largest shares in the number of new employees, it is worth noting the amount of people involved in trade and marketing – there were a total of 100,500 professionals in this branch, or 9.7 % of the total number of employees that enterprises listed by occupation. This indicates large demand for staff in this field of the national economy.

Table 10. New employees by selected occupation in the period January–November 1998

Specification	The number of new employees					
	total	of which in section				
		manu-factu-ring	construc-tion	trade repair	Transport, Storage, communi-ation	real estate activities
	in thousands					
TOTAL	1,038.1	420.1	172.2	194.1	92.6	81.6
Out of which:						
Professionals	42.5	14.6	3.3	10.9	2.4	8.1
Out of which:						
Professionals in marketing and trade	15.1	6.4	0.4	6.5	0.4	1.3
Technicians and other associate professionals	55.5	19.1	4.2	17.2	5.3	6.7
Out of which:						
Sales agents	12.4	4.8	0.1	6.5	0.3	0.6
Bookkeepers	9.3	2.6	0.7	3.5	0.5	1.6
Office clerks	77.2	11.2	2.0	33.3	22.6	4.0
Out of which:						
Warehousemen and related	24.6	4.4	0.3	18.5	1.0	0.3
Cashiers and ticket sellers	14.5	0.1	0.0	5.9	7.8	0.1
Other office clerks	9.8	2.6	0.8	2.8	1.7	1.2
Personal service workers and salespeople	143.9	11.7	1.0	73.8	5.8	27.7
Out of which:						
Salespeople and demonstrators	82.8	9.5	0.6	70.2	0.2	0.7
Personal protection workers	20.0	0.1	0.1	0.5	0.1	18.8
Craft and related trades workers	371.2	205.4	113.5	21.7	13.9	6.1

Specification	The number of new employees					
	total	of which in section				
		manu-factu-ring	construc-tion	trade repair	Transport, Storage, communi-ation	real estate activities
		in thousands				
Out of which:						
Seamstresses, embroiders and related	40.8	38.6	0.1	1.5	0.0	0.3
Bricklayers and related	39.5	2.4	34.3	1.2	0.2	0.9
Locksmiths and related	27.7	21.0	3.1	1.2	0.6	0.6
Joiners and related	20.6	18.9	0.3	1.0	0.0	0.2
Plant and machine operators and assemblers	154.9	82.3	7.9	15.6	37.5	2.7
Out of which:						
Truck drivers	26.3	6.2	2.4	8.4	6.9	0.4
Dispatchers, plant operators and related	21.4	0.1	0.0	0.0	21.2	0.0
Machine operators of rubber and plastic						
Products	10.6	9.6	0.2	0.7	0.0	0.0
Plant and machine assemblers	6.9	3.6	0.8	0.4	1.7	0.3
Elementary occupations	181.1	73.4	39.4	19.3	4.6	25.3
out of which:						
Other elementary workers						
in the processing industry	46.4	42.5	0.4	2.7	0.2	0.3
Labourers in general construction	27.4	2.6	22.4	0.9	0.2	0.7
Office and hotel labourers and cleaners and related	25.8	3.4	0.9	2.8	1.5	10.2

An important issue is the education level of employees hired, and the occupations appearing most frequently at each level of education.

Table 11. New employees hired, by occupation and educational level in the period January–November 1998

Specification	Total	Educational level				
		tertiary	vocational secondary	general secondary	basic vocational	Primary
		in thousand				
TOTAL	1038.1	48.9	125.4	62.4	620.4	181.0
Legislators, senior officials and managers	6.4	5.7	0.6	0.1	0.0	–
Professionals	42.5	41.8	0.5	0.2	0.0	–
Technicians and other associate professionals	55.5	0.8	42.5	11.9	0.3	0.0
Office clerks	77.2	0.4	37.3	29.8	4.1	5.7
Personal service workers and salespeople	143.9	0.1	32.3	19.1	89.3	3.1
Skilled agricultural, forestry and fishery workers	5.3	–	0.0	0.0	4.0	1.3
Craft and related trades workers	371.2	0.0	5.8	0.4	358.7	6.4
Plant and machine operators and assemblers	154.9	0.0	5.6	0.5	145.0	3.7
Elementary occupations	181.1	0.0	0.8	0.4	19.1	160.8

In the group of 1,038,100 people hired in the period January to November 1998 the largest number of employees had basic vocational education (620,400), which constituted 59.8 % of the total number, followed by primary – 181,000 (17.4 %), vocational secondary – 125,400 (12.1 %), general secondary – 62,400 (6.0 %) and tertiary – 48,900 (4,7 %). This means that no more than every fourth/fifth employee hired had at least secondary education and only every 21ˢᵗ had tertiary education.

Table 12. Structure of new employees hired, by educational level in the period January–November 1998

Specification	Total	Educational level				
		tertiary	vocational secondary	general secondary	basic vocational	Primary
TOTAL	100.0	4.7	12.1	6.0	59.8	17.4
Of which:						
MINING AND QUARRYING	100.0	3.9	18.7	0.4	68.1	8.9
MANUFACTURING	100.0	3.9	6.8	2.7	69.7	16.9
ELECTRICITY, GAS AND WATER SUPPLY	100.0	8.0	11.5	2.7	56.6	21.2
CONSTRUCTION	100.0	2.4	3.8	0.9	70.8	22.1
TRADE AND REPAIR	100.0	6.6	24.3	15.8	43.8	9.5
HOTELS AND RESTAURANTS	100.0	0.9	13.8	8.8	60.3	16.2
TRANSPORT, STORAGE AND COM-MUNICATION	100.0	3.3	23.0	8.1	53.6	12.0
REAL ESTATE ACTIVITIES	100.0	10.9	15.0	8.4	38.1	27.6
OTHER COMMUNITY, SOCIAL AND PERSONAL ACTIVITIES	100.0	7.4	9.1	7.5	34.4	41.6

Analysis of employment in enterprises by types of activity and educational level indicated that the relatively highest number of employees with tertiary education were hired in enterprises providing real estate services (10.9 %), people with vocational secondary education were most frequently hired in trade and repair (24.3 %), general secondary education – in trade and repair (15.8 %), basic vocational education – in construction (70.8 %), primary education – in other community, social and personal activities (41.6 %).

The current situation on the Polish labour market (high unemployment) leads to the conclusion that enterprises should not have problems with finding employees. In reality this was not entirely true. For over 115,000 employees of various occupations and educational levels demand was stated as a factor in occupations in which vacancies were most difficult to fill. The greatest difficulties were in enterprises maintaining manufacturing activities (45,300 employees), construction (28,200) and in trade and repair (20,100). Manufacturing enterprises had difficulty in finding craft and related trades workers, including seamstresses, embroiders and related workers, machine operators and assemblers, mainly operators of machines for rubber and plastic production. Construction enterprises also required crafts and related trades workers, mainly bricklayers and related jobs, carpenters, and joiners and related workers. In trade and repair enterprises the greatest problems were in finding personal service workers and salespeople, mainly salespeople and demonstrators.

Table 13. Employees by occupation where filling vacancies was difficult in the period January–November 1998

Specification	The number of employees					
	total	out of which in section				
		manu-factu-ring	construc-tion	Trade Repair	transport, storage, and communi-cation	real estate Activities
	In thousands					
TOTAL of which:	115.4	45.3	28.2	20.1	4.6	6.1
Professionals	11.9	4.3	1.3	3.3	0.6	2.0
Technicians and other associate professionals	7.5	2.5	1.1	2.4	0.5	0.7
Office clerks	4.0	0.5	0.1	2.3	0.5	0.2
Personal service workers and salespeople	17.9	0.7	0.1	6.7	0.5	1.7
Craft and related trades workers	57.8	29.8	23.1	3.2	0.5	0.6
Machine operators and assemblers	10.3	5.2	1.6	1.3	1.8	0.1
Elementary occupations	4.5	1.9	0.8	0.6	0.2	0.7

When we analysed the structure of these employees by educational level, the effect was surprising, although a similar situation was observed in the previous year. Thus, the most serious difficulties were in finding people with basic vocational education – they constituted 67.6 % of the group of employees who were the most difficult to find. This is even more surprising if we consider the fact that the majority of economically active Poles have basic vocational education. The phenomenon mentioned was probably caused by disharmony in occupations, professional qualification and the skills of labour supply and demand in a given territory.

Table 14. Employees by occupation and educational level which were most difficult to find

Specification	Total	Educational level				
		tertiary	vocational secondary	general secondary	basic vocational	primary
		in thousand				
TOTAL	115.4	13.0	14.6	5.0	78.1	4.8
Legislators, senior officials and managers	1.1	0.9	0.2	–	–	–
Professionals	11.9	11.8	0.1	0.0	0.0	–
Technicians and other associate professionals	7.5	0.2	6.0	1.3	0.0	–
Office clerks	4.0	0.0	1.8	1.9	0.1	0.1
Personal service work-ers and salespersons	17.9	0.0	4.7	1.7	11.5	–
Skilled agricultural, forestry and fishery workers	0.4	–	0.0	–	0.2	0.2
Craft and related trades workers	57.8	0.0	1.3	0.1	56.2	0.2
Plant and machine operators and assemblers	10.3	–	0.5	0.0	9.7	0.1
Elementary occupations	4.5	–	0.0	–	0.3	4.2

One could assume that the most difficult employees to find are those with the highest qualifications. Nevertheless, this only caused real problems in a few types of activity. About 13,000 employees with tertiary education were sought, and the greatest requirements came from manufacturing enterprises (4,600 persons) and trade enterprises (3,700). The fewest problems were evident in finding employees with primary education, which leads to the conclusion that the supply of these workers probably exceeds demand.

Among employees with tertiary education, the most difficult to find were professionals in marketing and trade, and construction engineers.

Among employees with low qualifications, the most difficult to find were people with occupations such as bricklayers, seamstresses, embroiders and welders.

In addition to difficulties in finding employees in particular occupations, enterprises also experienced shortages of staff with particular skills. Such shortages were experienced by over a quarter of the surveyed enterprises, or 21,800. Again, it was surprising that 53.4 % of enterprises experiencing demand for staff were seeking skilled workers. The situation was worst in private sector manufacturing and construction enterprises.

Almost every seventh enterprise among those with staff shortages were seeking employees fluent in foreign languages, and marketing professionals. This suggests the direction education should take, and although this is a generally known fact, it is worth underlining the absorbability of the market in this field.

Table 15. Shortages of staff by skill in the period January–November 1998

Specification	Number of enterprises claiming shortages of staff	Personal computer literacy	Foreign langu-ages	Mana-gers	Marke-ting profes-sionals	Finan-ciers	Law-yers	Skilled wor-kers	Elemen-tary workers
	(in 1000s)	in % of enterprises claiming							
TOTAL	21.8	9.7	14.7	4.2	14.9	5.8	2.1	53.4	7.7
public sector	1.4	9.5	15.3	3.9	18.3	7.6	3.4	38.6	5.9
the private sector out of which:	20.4	9.7	14.7	4.2	14.6	5.7	2.0	54.5	7.8
MANUFACTURING	8.7	7.2	15.3	3.6	16.5	5.2	1.7	62.1	7.9
CONSTRUCTION	4.5	3.2	5.5	1.4	3.6	2.6	1.3	81.4	7.9
TRADE AND REPAIR	5.0	17.5	17.4	7.6	24.2	8.8	2.5	28.9	6.3
TRANSPORT, STORAGE AND COMMUNICATION	0.8	11.3	25.8	3.9	11.9	7.0	2.9	32.3	3.8
REAL ESTATE AND BUSINESS ACTIVITIES	1.4	18.8	20.8	5.7	16.2	10.9	5.1	18.7	8.3

The majority of economic entities experienced staff fluctuation, particularly over a period as long as 11 months. One side of this phenomena consists of new employment while the other consists of dismissal of employees.

Enterprises included in the survey of demand for labour in 1998 defined many reasons for the outflow of staff, and listed the occupational groups in which there were the highest number of contract terminations. This information concerns 871,000 people who left work during the 11 months of the survey, i. e. it does not cover all dismissed employees – as with new employment created, we were mainly interested in occupations which experienced the largest number of people leaving or dismissed from work. The main reason given for contract termination among the 10 specified was organisational changes in the enterprises.

Table 16. The structure of outflow of staff by selected reason was as follows:

■ high number of retirements and disability pensions	−5.2 %
■ great competition on the labour market	−8.1 %
■ difficult financial situation of enterprise	−3.7 %
■ low wages and salaries in enterprise	−5.1 %
difficult working conditions	−3.1 %
■ decrease in demand for enterprise's products and services	−5.9 %
■ organisational changes in enterprise	−14.8 %
■ privatisation of enterprise	−1.2 %
■ planned restructuring of employment	−6.0 %

In regard to occupations, the highest outflows were observed in the following occupations:
- salespersons and demonstrators – 70,700 people, mainly due to organisational changes in enterprises and strong competition on the local labour market,
- other elementary workers in the processing industry – 38,300 people, mainly due to organisational changes in enterprises and the decrease in demand for products and services,
- seamstresses, embroiders and related – 37,700 people, mainly due to strong competition on the local labour market and organisational changes in enterprises,
- bricklayers and related – 33,300 people, mainly due to strong competition on the local labour market, low wages and salaries and organisational changes in enterprises,
- locksmiths and related – 30,600 people, mainly due to organisational changes in enterprises and retirement and disability pension leaves,
- general construction labourers – 25,600 people, mainly due to strong competition on the local labour market and planned restructuring of employment.

Note that enterprises which gave low wages and salaries as a reason for employee outflow most often lost salespersons and demonstrators, seamstresses, embroiders and related and bricklayers and related. Enterprises whose employees most often left as a result of strong competition on the local labour market, mainly lost salespersons and demonstrators, waiters and barmaids, seamstresses, embroiders and related, and bricklayers and related, in other words almost the same occupations as in the case of low wages and salaries. Difficult working conditions were most often the reason for losing elementary workers in the processing industry, labourers in general construction and labourers in road, aquatic and related construction.

In light of the above it is worth examining the issue of the educational level of people dismissed from work, and what occupations were most often associated with a given level of education.

Table 17. Terminations by occupation and education in the period January–November 1998

Specification	Total	Educational level				
		tertiary	vocational secondary	general secondary	basic vocation	primary
		in thousands				
TOTAL	871.0	29.8	81.2	45.2	553.9	160.9
Legislators, senior officials and managers	4.8	4.5	0.3	0.0	0.0	–
Professionals	25.2	24.6	0.5	0.1	0.0	–
Technicians and other associate professionals	39.0	0.4	28.8	9.5	0.3	0.0
Office clerks	52.3	0.2	21.4	22.3	3.0	5.4
Personal service workers and salespersons	114.0	0.0	23.0	12.5	76.5	2.0
Skilled agricultural, forestry and fishery workers	5.4	–	0.0	0.0	4.0	1.3
Craft and related trades workers	345.5	0.0	4.1	0.3	332.4	8.6
Plant and machine operators and assemblers	131.3	0.0	2.5	0.3	124.0	4.4
Elementary occupations	153.4	–	0.5	1.7	13.6	139.1

The majority of employees dismissed from work had basic vocational education – 63.6 %, quite a large group had primary education (18.5 %), followed by vocational secondary – 9.3 %, general secondary – 5.2 % and tertiary – 3.4 %.

Among employees with tertiary education, the largest number of dismissals occurred in manufacturing enterprises (30.5 %). Among people with vocational secondary education 42.3 % of dismissals occurred in trade and repair enterprises, among people with general secondary education 49.8 % of dismissals also occurred in trade and repair enterprises, and among people with basic vocational and primary education the majority of dismissals took place in manufacturing enterprises, 49.6 % and 38.0 % respectively.

Employment fluctuation in enterprises may result in satisfaction of demand, or may lead to vacancies in an enterprise is if does not satisfy demand. Thus, among enterprises included in the survey of demand for labour at the end of November 1998, 9,600 units reported 37,800 vacancies. In public sector enterprises there were 4,500 vacancies, mainly in state-owned enterprises (3,500), whereas in private sector enterprises there were 33,300 vacancies, mainly in domestic companies (26,600); foreign companies reported 4,700 vacancies.

Table 18. The structure of vacancies by sector and size of enterprises was as follows:

	Total	Enterprises	
		Large	*medium*
Total	1000.0	65.4	34.6
Public sector	100.0	98.4	1.6
Private sector	100.0	60.9	39.1

The presented data indicates that on 30[th] November 1998 the highest number of vacancies was in large enterprises, both in the public and in the private sector.

The highest number of jobs was offered by manufacturing enterprises (17,700), especially in clothes manufacture and furriery (4,900 jobs mainly in private enterprises). 6,800 jobs were offered by trade and repair enterprises, 5,700 by construction enterprises, and 3,000 by real estate companies.

In addition to the number of vacancies in various types of enterprises, the structure of qualifications and occupations of sought employees is very important as well. Enterprises defined their expectations concerning 37,400 prospective employees. According to these expectations 59.8 % of future employees should have basic vocational education, 34.9 % should have at least secondary education, including 15.3 % with tertiary education, while the remaining employees (5.3 %) should have primary education.

Analysing vacancies by occupations we see that the largest offer concerned seamstresses and embroiders, salespersons and demonstrators, welders and bricklayers. This confirmed our earlier information about shortages reported by enterprises in these occupations.

■ 1.3 Forecast for the year 1999

One of the goals of the survey was identification of the anticipated demand for employees in 1999. Needs anticipated by managers, both quantitative (the number of jobs) and qualitative (qualification and occupation structure), in relation to dismissals and hiring of employees, enables the identification of directions of changes on the labour market till the end of 1999.

If the forecast figures prove to be right, then at the end of 1999 the net number of people employed in large and medium-sized enterprises will decrease by over 32,000. This is the result of anticipated hiring of about 340,000 employees and dismissal of about 372,000. According to enterprises, hiring of employees will mainly be due to the seasonal character of production and services, extension (development) of enterprises and an increase in domestic demand for products and services. Terminations are more likely to result from the seasonal character of production and services, organisational changes, rationalization of employment and retirement and disability pensions.

Some of the reasons listed by enterprises may result in hiring as well as dismissal. This is true in the case of the seasonal character of production and services, rationalization of employment, structural changes, technological changes, organisational changes and retirement and disability pension leaves. Jobs left by employees are taken by other people.

Table 19. Anticipated changes in the number of employees in 1999

| Specification | Anticipated | | | | Net changes | |
| | hires | | terminations | | | |
	total	of which private sector	total	of which private sector	total	of which private sector
	in thousands					
TOTAL	339.6	271.3	371.7	219.8	−32.1	51.5
of which:						
MINING AND QUARRYING	8.1	0.6	48.2	1.2	−40.1	−0.6
MANUFACTURING	132.5	105.5	174.8	116.0	−42.3	−10.5
ELECTRICITY, GAS AND WATER SUPPLY	6.2	0.4	9.5	0.5	−3.3	−0.1
CONSTRUCTION	71.0	64.7	51.0	44.4	20.0	20.3
TRADE AND REPAIR	49.0	48.0	29.6	26.8	19.4	21.2
HOTELS AND RESTAURANTS	13.1	12.3	10.6	9.5	2.5	2.8
TRANSPORT, STORAGE AND COMMU-NICATION	20.2	7.3	23.0	4.5	−2.8	2.8
REAL ESTATE AND BUSINESS ACTIVITIES	30.2	26.8	17.0	12.8	13.2	14.0
OTHER COMMUNITY, SOCIAL AND PER-SONAL ACTIVITIES	6.5	4.5	5.4	3.6	1.1	0.9

Positive net changes in the number of employees are mainly anticipated in construction, trade and repair and real estate activities; negative net changes mainly in manufacturing and mining and quarrying.

According to forecasts by enterprises, the balance of changes in the number of employees in the public sector will be negative and will amount to about –84,000, whereas in the private sector it will be positive and amount to over +51,000.

According to forecasts large enterprises will reach negative net change amounting to –65,000, including –83,000 in public sector enterprises, while private sector enterprises will have changes of about +18,000. Medium-sized enterprises will reach a positive net change amounting to over +33,000 in both sectors: public (+200) and private (+33,000).

Regarding qualification and occupational structure of employees according to needs anticipated for 1999, the largest group among new employees will be workers with basic vocational education –59.0 %, followed by primary –18.9 %, vocational secondary –10.9 % and general secondary and tertiary – both 5.6 %. This means that of the employees that enterprises are planning to hire in 1999, only slightly over 22 % will have at least secondary education.

Table 20. Structure of anticipated hires by occupation and educational level in 1999

Specification	Total	Educational level				
		tertiary	vocational secondary	general secondary	basic vocational	Primary
		in %				
TOTAL	100.0	5.6	10.9	5.6	59.0	18.9
Legislators, senior officials and managers	0.5	0.4	0.0	0.0	–	–
Professionals	5.1	5.1	0.0	0.0	–	–
Technicians and other associate professionals	4.5	0.1	3.7	0.7	0.0	–
Office clerks	5.9	0.0	2.7	2.4	0.2	0.6
Personal service workers and salespersons	14.7	0.0	3.2	2.4	8.8	0.3
Skilled agricultural, forestry and fishery workers	0.5	–	0.0	0.0	0.4	0.1
Craft and related trades workers	36.8	–	0.8	0.0	35.6	0.4
Plant and machine operators and assemblers	13.2	–	0.4	0.1	12.4	0.4
Elementary occupations	18.7	–	0.1	0.0	1.6	17.0

In 1999 enterprises anticipated supplementation of staff in occupations where vacancies had been most difficult to fill the previous year. This means that among people with tertiary education, the most sought after will be specialists in marketing and trade, and construction engineers, while among people with secondary education – salespersons and demonstrators. For low qualified employees the largest number of jobs will be in such occupations as seamstresses, embroiders and related, bricklayers and related, carpenters, joiners and related and welders and related. Employees without qualifications will be most likely to find jobs as other simple task labourers in the processing industry, office and hotel support and cleaners. Generally, it appears that in 1999 enterprises intended to continue the completion of their plans concerning the desired structure of employment.

The qualification and occupational structure of new employment is also influenced by anticipated dismissals. For 1999 enterprises forecast the lowest outflow of staff among people with tertiary education (2.0 % of the total number of dismissals), followed by those with general secondary education (4.5 %), vocational secondary (8.9 %), primary (22.2 %) and basic vocational (62.4 %).

Table 21. Structure of anticipated terminations by occupation and education in 1999

Specification	Total	Educational level				
		Tertiary	vocational secondary	general secondary	basic vocational	primary
		in %				
TOTAL	100.0	2.0	8.9	4.5	62.4	22.2
Legislators, senior officials and managers	0.3	0.3	0.0	0.0	–	–
Professionals	1.7	1.7	0.0	0.0	–	–
Technicians and other associate professionals	4.1	0.0	3.3	0.7	0.0	–
Office clerks	6.8	0.0	3.2	2.7	0.2	0.7
Personal service workers and salespersons	8.7	0.0	1.4	0.9	6.1	0.3
Skilled agricultural, forestry and fishery workers	0.5	–	0.0	–	0.4	0.1
Craft and related trades workers	41.2	–	0.6	0.0	39.1	1.4
Plant and machine operators and assemblers	15.8	–	0.3	0.0	14.7	0.7
Elementary occupations	20.9	–	0.1	0.0	1.8	18.9

Among occupational groups for which dismissals were forecast, the most numerous is the group of industrial workers, mainly miners and related and locksmiths and related. The lowest number of dismissals was forecast for executive officials and managers.

2. Results of applying analogous method (simulation) to estimate demand for the main occupational groups in Poland in 2010

This paper presents the projected demand for the main occupational groups in Poland in 2010. The simulation method – presented in a separate document entitled "Application of Analogous Method in estimating long-term demand for individual occupations" – was applied to obtain these results.

It is important to bear in mind the following issues:
The estimate in question was based on the level of employment forecast for 2010 by applying the simulation. The simulation was based on employment trends observed in the whole of the European Union. Therefore, our estimate shows what the level and structure of employment would be in Poland, if the trends observed in the EU over the past decade were to be repeated in this country.

The estimate of demand for labour has been presented for two scenarios. The first scenario is based on the assumption that the structural changes observed to date would be continued in an environment of more moderate economic growth. The second scenario implies that structural changes will become more profound and the economy will develop at a faster rate.

Estimates of the demand for labour under each of the two scenarios take into account not only the saturation of the labour market with individual occupations within a given occupational category observed in 1996, but also changes that may occur by 2010 as a result of the currently observed trends. There is an assumption of varying coefficients of saturation by individual occupations.

Detailed results of our estimates are presented in the annex.
Below are the most important results and conclusions.

Table 22. Estimate of demand for labour and main occupations

Item	1996	Scenario I	Scenario II
Total employment in Poland in thousands.	15,842	16,760	17,440
Index 1996=100	100	105.8	110.1
Of which occupations:			
Modern	1,745	2,744	2,965
Traditional	13,729	13,425	13,770
Non-defined categories	368	590	705

The demand for modern occupations linked to modern technologies (computer specialists, telecommunications specialists, automated production equipment specialists. etc), as well as for occupations servicing the modern market economy (management advisers, marketing specialists, advertising and business specialists) would under the first scenario increase by 57 % in 2010 compared to 1996, and by 70 % under the second scenario. The share in total employment would grow from 11.3 % in 1996 to 17.0 % in 2010 under the first scenario and to 17.7 % under the second scenario. Therefore one in six employees would work in such occupations, compared to one in nine in 1996.

At the same time the demand for traditional occupations in 2010 would fall slightly, by 2 %, under first scenario and would grow more slowly (0.3 % growth over 1996) under the second scenario. The total result is composed of the different trends in individual occupational groups, namely:
- ■ significant growth in shop salespersons and demonstrators (522), in excess of 20 %.,
- ■ heavy decline (20–30 %) in traditional industries such as mining and heavy industry. All these differences must be taken into account when developing training curricula for traditional occupations.

■ 2.1 Occupations with the highest rate of growth by 2010.

From our analysis we can conclude that the highest increase in demand for individual occupations, in the period from 1996 to 2010 in descending order, will take place in the following 20 groups (see Table 19).

Analysis of these estimates indicates that long-term attractiveness of individual occupations does not always correlate with short-term attractiveness (a few years). This is shown by the fact that certain occupations which will enjoy growing demand for labour towards 2010 are currently burdened with an unemployment problem. This is visible in the case of nurses, certain groups of technicians (e. g. environmental protection) and certain groups of qualified

workers. Therefore care must be taken in operating educational facilities providing training in such professions, in order to avoid limitation of new employees before the situation is intensified when the demand for the given occupation resurfaces.

Table 23. Estimated increase in demand for individual occupations until 2010

Place	Symbol	Subgroup of occupations	Index in 2010 1996=100		Average yearly rate of growth 1997–2010 (in %)	
			Scenario I	Scenario II	Scenario I	Scenario II
	342	Business services agents and trade brokers	306	318	8.3	8.6
	312	Computer associate professionals	261	299	7.1	8.1
	313	Optical and electronic equipment operators	244	249	6.6	6.7
	211	Physicists, chemists and related professionals	230	231	6.1	6.4
	914	Building caretakers, windows and related cleaners	205	213	5.3	5.6
	817	Automated assembly-line and industrial robots operators	196	222	4.9	5.9
	213	Computing professionals	192	219	4.8	5.8
	411	Secretaries and keyboard operating clerks	170	194	3.9	4.9
	244	Social science and related professionals	167	173	3.7	4.0
	731	Precision workers in plastic and related materials	166	172	3.7	3.9
	516	Protective services workers	162	185	3.5	4.5
	412	Numerical clerks	157	157	3.3	3.3
	241	Accountants	155	178	3.2	4.2
	235	Other teaching professionals	155	161	3.2	3.5
	347	Artistic, entertainment and sports associated professionals	154	160	3.1	3.4
	214	Architects, engineers and related professionals	153	153	3.1	3.1
	916	Garbage collectors and related labourers	152	174	3.0	4.0
	419	Other office clerks	152	158	3.0	3.3
	513	Personal care and related workers	152	158	3.0	3.3
	823	Rubber and plastic products machine operators	151	173	3.0	4.0

In terms of rate of growth over 1996, the most dynamic occupational group was business service agents and trade brokers (projected growth of 206 %), followed by computer associate professionals (growth of 161 %), optical and electronic equipment operators (144 %), physicists, chemists and related professionals (130 %), building caretakers, window cleaners (105 %), automated assembly-line and industrial robots operators (96 %) computer professionals (92 %), secretaries and keyboard operating clerks (70 %), social science and related professionals, including economists (67 %), and precision workers in plastic and related materials (66 %) in tenth place. Protective service workers (62 %) are 11th, and twelfth were numerical clerks with 57 % projected growth.

We can assume that some of the figures presented above are slightly overestimated, as they are based on trends between 1994 and 1998, when demand for individual occupations was less pronounced than in the projected period. This is particularly evident in the case of business service agents and trade brokers, since this category was only just being developed in the period 1994–1998. In the 20 most dynamic occupations, about 1,785,000 jobs will be created by 2010, and when we take into account groups not shown in the table, the number grows to 2.5–2.6 million. This figure does not take into account the number of jobs to be liquidated in the same period. According to the studies conducted to date, the largest number of new jobs will be generated in the following occupational groups:

■ general managers (group 131),
■ occupations belonging to groups (412,241,214,421,411), who are accountants,
■ health professionals, particularly home-care nursing (due to the increased average age if society),
■ occupations related to road transport, drivers and service-people.

Table 24. Estimated decline in demand for individual occupations until 2010

Place	Symbol	Subgroup of occupations	Index in 2010 1996=100		Average yearly rate of growth 1997–2010 (in %)	
			Scenario I	Scenario II	Scenario I	Scenario II
	744	Pelt, leather and shoemaking trades workers	50	50	−4.8	−4.8
	711	Miners, shot firers, stone-cutters and carvers	51	51	−4.7	−4.7
	613	Market-oriented crop and agricultural producers	60	60	−3.6	−3.6
	611	Market gardeners and crop growers	61	61	−3.5	−3.5
	314	Air and ship aircraft controllers and technicians	66	68	−2.9	−2.7
	621	Subsistence agricultural and fishery workers	76	76	−1.9	−1.9
	812	Metal processing plant operators	77	77	−1.8	−1.8
	743	Textile, garment and related trades workers	82	85	−1.4	−1.2
	722	Blacksmiths, tod makers and related trades professionals	83	88	−1.3	−0.9
	811	Mining and mineral processing plant operators	85	85	−1.2	−1.2
	825	Printing, binding – and-paper -products, machine operators	85	88	−1.2	−0.9
	933	Transport labourers and freight handlers	85	85	−1.2	−1.2
	932	Manufacturing labourers	86	89	−1.1	−0.8
	921		88	88	−0.9	−0.9
	233	Primary- and pre-primary education teaching professionals	89	92	−0.8	−0.6
	615	Fishery workers, hunters and trappers	89	89	−0.8	−0.8
	734	Printing and related trades workers	90	93	−0.7	−0.5
	931	Mining and construction labourers	90	90	−0.7	−0.7
	826	Textile, fur-and-leather- products machine operators	92	95	−0.6	−0.4
	742	Wood-treaters, cabinet-makers and related trades workers	95	99	−0.4	−0.1

The heaviest decline in demand for individual occupations compared to 1996 is forecast for the following occupations:

■ Agriculture (613,611,621),
■ Mining and extractive industry (711,931),
■ Light industry (743) and leather industry (744),
■ Blacksmiths, tod makers and related-trade (722)

The most controversial situation is in agriculture. With the forecasted growth of agricultural production and the assumed increased productivity of labour, the demand for agriculture-related occupations will decrease significantly (by 40 %). If all occupations directly connected with agriculture are taken together, the demand for labour will decrease from its present level of 4 million people to 2.5 million in 2010.

However, the actual decline will be strongly influenced by the possibilities of transferring labour from rural areas to city areas, which will influence and be influenced by labour demand in cities. Thus, the possibilities for leaving agriculture will decline. These possibilities will be highly limited until 2005, when the growth in the population of working age will be the highest, due to urban unemployment. Therefore the real possibilities of reducing employment will be lower than the respective decline in demand for labour in agriculture. These possibilities should be estimated at around 500,000–750,000 people, compared to the 1.2 million decline in demand, which will be most evident after 2005).

Therefore, in the 20 occupations listed earlier one should expect a decrease of 1,780,000 in the number of jobs, which is 2/3 of the increase in new jobs.

Forecasted decline in the demand for qualified workers is not always matched by the actual situation on the labour market. Certain groups of occupations, such as qualified workers with low projected demand, currently enjoy a large share in new job offers. For example, in mid-1999 72 % of employment offers were directed at workers with vocational education, while the share of such workers in the number of graduates of post-primary schools was about 17 %.

However, under open market conditions it is likely that further production growth, without a more proactive stance from the authorities towards the employment stimulation, will be of a capital intensive character, which will see equipment being replaced with more efficient machinery, but will not lead to an increase in employment. An unavoidable effect of this trend, which has to be taken into consideration when preparing educational programs, will be a sizeable decline in the demand for qualified workers in the majority of industries. This will be particularly evident in traditional industries and less so in hi-tech industries, which will continue to generate jobs.

Under such circumstances the best solution is not to extend training of qualified workers in narrow specialisations (as has been done to date) but to develop a wider system of continuous professional education outside of the educational system.

■ 2.2 Increasing significance of new occupations on the labour market

The longer the horizon of analysis, the larger the share of employees in categories that are not defined in present classifications of occupations and specialisations. We estimate that before 2010 between 200,000 and 250,000 new jobs will be created in occupations that are not identified in the current classifications.

This problem will increase in significance. For example, it is estimated that every second 10-year old primary-school student at the end of the 1990s will work in a profession that does not exist at present.

Therefore there is an urgent need for improved recognition of professions that could develop in the future. The greatest increase in such occupations should occur in information technologies, environmental protection, leisure activities, healthcare system, social welfare, and bio-technologies.

General conclusions

This paper should serve as a basis for the formation of strategic conclusions:
The most urgent problem to be solved in order to improve the situation on the labour market is a transition from the policy of "negative adjustment" (protection of declining industries) towards a more proactive policy of positive adjustment, i. e. supporting industries with potential for development. The first solution, protection of declining industries, still dominates. However, the true alternative for unemployment lies in the development of new sectors.

How the effects of such delays in the modernisation of employment structures will be counteracted will depend on how fast the demand grows for modern occupations. This requires a profound reorientation of directions and education programs towards intensification of training in modern occupations.

Particular acceleration is required in occupations functionally related to a modern market economy and the information society. These include the training of specialists in IT for all branches of the economy, staff servicing modern, automated industrial equipment, and in social services in home-care and social work.

Another possibility is to take advantage of the business cycle worldwide by finding employment outside of the home country. We can identify five areas and occupations for which there is external demand for labour. These include Information Technology, teachers, doctors and medical staff, environmental protection and biotechnology specialists. In these categories there is a projected future shortage of qualified personnel in many European countries.

The biggest drop in demand will occur in occupations such as agriculture and traditional sectors of mining, heavy industry and railroad transport. There is an urgent need for re-training programs for people currently working in these sectors.

There is also an urgent need to identify new professions than can be created towards 2010 and beyond.

It will be necessary to intensify research on demand for individual occupations, as the significance of this research will increase as a result of the "mega trend" in the creation of new occupations in the information society. This trend means that the development of the information society will lead to the replacement of old occupations, requiring physical labour and tools ill-equipped in IT, with new ones increasingly requiring information and knowledge, and the more widespread application of IT tools.

3. Medium-term forecast of demand for hired labour in Poland

■ 3.1 Demand for hired labour: Results of the forecast

3.1.1 General remarks

The presented forecast covers demand for hired labour until 2005 (defined as employment based on a contract, excluding the uniformed services) divided into 369 occupational groups and 5 educational groups. The forecast does not cover the uniformed services, as the number of people employed here is a result of domestic public security and foreign security policy followed by the state. A forecast for hired labour is very different in essence from forecasts related to actual employment according to occupations and education. The size and structure of demand for hired labour as presented by us can differ thanks to many factors, such as actual changes in the employment level according to occupations and education levels. Thus we do not forecast the supply of labour. In order to define the boundaries of the forecast for demand we only used a general evaluation of labour supply according to education in the forecasted period.

Differences between a forecast of demand for hired labour according to occupations and level of education, and actual changes in employment, can appear when there is a lack of people on the labour market with higher education and the required skills. These people will, if necessary, be replaced by people with secondary education. Another such case is when companies confronted with a supply of people with higher education, demanding high salaries, decide to employ people with secondary education but demanding a lower salary. Of course other cases may occur too, such as when there is a deficit of people with secondary education and a surplus of people with higher education, and this would ultimately influence the actual employment structure too.

The results of the forecast allow us to judge the extent to which changes in occupation structure and education structure within each of the 58 branches affect general changes in the demand structure in the economy as a whole, in comparison to the current structure. In table 23 below we present the numerical results, including the so-called demographic effect, i. e. the number of people retiring, in relation to net values (thus including the number of retired employees in 2005). The estimated mortality rate (the estimate here did not include a division into occupational groups), changes only in a low degree (approximately by 20.000 persons only) general demand for labour in the period of 2000–2005.

3.1.2 Macroeconomic scenario

We assume the following main determinants of growth in the period 2000–2005:
Sustainable high dynamics of domestic absorption, and especially high investment dynamics supported by an inflow of foreign investment and the increasing modernisation of enterprises, due to increased competition.

Relatively good, and improving, image of Poland abroad, encouraging an inflow of foreign direct investments (FDI).

Perspectives of EU membership. Poland official target is to become a member in 2003. However, we believe that because of problems with adapting to EU standards, and the approximation of the Polish legal system, the realistic date for entry is 2004.

Moderately beneficial conditions abroad, especially the stable development of Western Europe (acceleration of growth in 2000–2002), and very slow development in former members of the Soviet Union countries.

Increase in domestic savings, especially as a result of the reform of public finances, privatisation and restructuring of enterprises, and effective implementation of sectoral programs.

Improvements in macroeconomic stability and stable and clear macroeconomic policy, which is appreciated abroad. The relatively stable macroeconomic and legal environment will encourage investors to plan long-term. Simultaneously, the strong currency, along with a careful and consistent macroeconomic policy should allow Poland to avoid a financial crisis similar to those that occurred in the Czech Republic and Hungary.

Continuation of structural reforms, and in particular competition of major privatisation in 1999–2002, restructuring of ageing industries and public sector structural reforms.

According to the projection, GDP growth in 2000–2003 will reach 5–6 %, consumption growth will be just below 5 % and investment growth will be approximately 10 % annually. Growth will slow down, as a result of attempts to sustain an external balance.

The results of the macroeconomic projection are presented below:

Table 25. Macroeconomic forecast 1999–2005

	1998	1999	2000	2001	2002	2003	2004	2005	Average 1999–05
National Accounts (constant 1998 prices)									
GDP	551	572	607	642	677	713	754	802	
Growth rate in %		*3.7*	*6.2*	*5.8*	*5.4*	*5.3*	*5.8*	*6.3*	*5.8*
of which:									
Investment	139.7	150.7	169.2	186.2	203.6	222.5	246.9	280.3	
Growth rate in %		*7.9*	*12.3*	*10.0*	*9.4*	*9.3*	*11.0*	*13.5*	*10.9*
Personal consumption	343	358	376	395	414	433	453	474	
Growth rate in %		*4.2*	*5.1*	*5.1*	*4.8*	*4.4*	*4.6*	*4.8*	*4.8*
Government consumption	92	93	95	96	97	99	101	103	
Growth rate in %		*1.5*	*1.5*	*1.5*	*1.5*	*1.5*	*2.0*	*2.5*	*1.7*
Total consumption	435	451	471	491	512	531	553	577	
Growth rate in %		*3.6*	*4.4*	*4.4*	*4.2*	*3.8*	*4.1*	*4.3*	*4.2*
Change in stocks	6	6	6	6	7	7	7	7	
Growth rate in %		*0.1*	*4.9*	*5.9*	*4.8*	*2.9*	*2.8*	*4.9*	*4.3*
Net exports	−29	−35	−39	−42	−45	−48	−53	−64	
Exports	136	132	143	156	170	186	203	223	
Growth rate in %		*−2.5*	*8.0*	*9.5*	*9.0*	*8.9*	*9.1*	*10.1*	*9.1*
Imports	165	168	182	198	215	234	256	287	
Growth rate in %		*1.5*	*8.3*	*9.1*	*8.7*	*8.4*	*9.5*	*12.0*	*9.3*
Balance of payments									
In billions of USD									
Trade deficit	*−13.7*	*−15.1*	*−16.9*	*−18.9*	*−20.4*	*−21.8*	*−24.0*	*−27.8*	
EU transfers	*0.3*	*0.6*	*1.0*	*1.2*	*1.4*	*1.5*	*4.4*	*6.1*	
Other current positions	*6.4*	*2.8*	*3.2*	*3.8*	*4.0*	*4.3*	*4.6*	*4.8*	
Current account	*−6.9*	*−11.7*	*−12.6*	*−14.0*	*−14.9*	*−16.0*	*−15.0*	*−16.9*	
Current account before EU transfers	*−7.3*	*−12.3*	*−13.6*	*−15.1*	*−16.3*	*−17.5*	*−19.4*	*−23.0*	
As % of GDP									
Trade deficit	*−8.7*	*−9.2*	*−9.3*	*−9.4*	*−9.4*	*−9.3*	*−9.5*	*−10.0*	
EU transfers	*0.2*	*0.4*	*0.5*	*0.6*	*0.6*	*0.6*	*1.7*	*2.2*	
Other current positions	*4.1*	*1.7*	*1.8*	*1.9*	*1.9*	*1.8*	*1.8*	*1.7*	
Current account	*−4.4*	*−7.1*	*−7.0*	*−6.9*	*−6.9*	*−6.8*	*−5.9*	*−6.1*	
Current account before EU transfers	*−4.6*	*−7.5*	*−7.6*	*−7.5*	*−7.5*	*−7.5*	*−7.6*	*−8.3*	
Labour market									
Labour supply	17606	18069	18043	18119	18196	18273	18350	18428	X
Labour demand	15775	15720	15535	15597	15784	16045	16334	16630	X
Of which: demand for hired labour	9864	9770	9575	9670	9912	10160	10444	10736	x
Unemployment	1831	2349	2508	2522	2411	2228	2016	1797	x
Unemployment rate	*10.4 %*	*13.0 %*	*13.9 %*	*13.9 %*	*13.3 %*	*12.2 %*	*11.0 %*	*9.8 %*	*12.2 %*

3.1.3 Results of the forecast of demand for hired labour

The results of the study show that changes in the structure of the economy – expressed by forecast changes in the level and structure of employment according to branches, and preserving unchanged structures within every branch, as a kind of index of constant structure, have a significant influence on the general domestic structure of demand for hired labour according to occupations, and – to a lower degree – according to the level of education. Below we illustrate the changes in the employment structure according to education level, without changes in the structure within branches, and after including the changes in the education structure in branches, obtained in the basic forecast. As shown, the change in the employment structure due to economic growth and changes in the production structure will in the next five years lead to increase in the demand for workers with higher and secondary education, mostly at the cost of demand for workers with tertiary education. Additional assumptions made in simulation based on international comparisons (assumed comparison of the employment structure according to education with the French structure) further broaden this process.

Table 26. Employment structure by education level

Years	Education levels				
	Higher	Secondary general	Secondary technical & vocational	Tertiary	Primary
1999 data	16.7	7.0	30.3	31.5	14.6
Forecast 2005 (before assumptions about changes in the demand for education by branches)	17.4	7.3	30.7	30.6	14.1
Forecast 2005 (final forecast including all assumptions)	18.0	7.5	30.7	30.3	13.5

At the same time one should notice that even seemingly small projected changes in employment structure according to level of education in 2005 in comparison to 1999 result in important differences in structure of demand for labour in this period according to level of education in comparison to structure in 1999 and in 2005.

We illustrate this point with the graph presented below, which shows the structure of the increase of demand and employment on a domestic scale according to levels of education in the projection.

Employment structure by education level

Legend:
- Primary
- Tertiary (vocational)
- Secondary general
- Secondary technical and vocational
- Higher

	Structure of increase 1999-2005	1999	2005
Primary	6.6	14.5	13.5
Tertiary (vocational)	17.7	31.5	30.3
Secondary general	33.3	30.3	30.7
Secondary technical and vocational	12.1	7.0	7.5
Higher	30.3	16.7	18.0
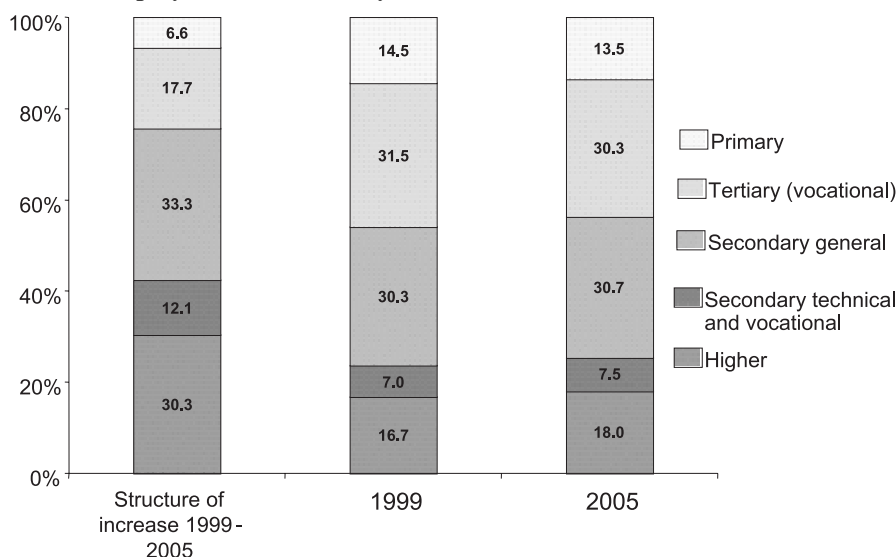
When analysing data regarding employment according to the level of education in Poland and in the European Union, we had at our disposal data as follows: for EU countries, covering the education structure of the employed according to three levels of education (based on the Economic Activity Survey), and for Poland, covering the education structure of the employed according to five groups of education level. Thus these data are not fully comparable (especially in the case of EU countries in which the share of agriculture and small enterprises is relatively high in comparison to the EU average).

The most important differences are presented on the graph.

Employment structure by education level – EU and Poland

	Poland 1999 (hired labour)	UK	Ireand	Netherlands	France	Germany	Italy	Spain	Portugal
Primary and tertiary	46	45	43	16	36	21	56	65	75
Secondary general, technical and vocational	37	31	31	58	45	55	8	14	12
Higher	17	24	26	26	19	24	35	20	14

Legend: Higher | Secondary general, technical and vocational | Primary and tertiary

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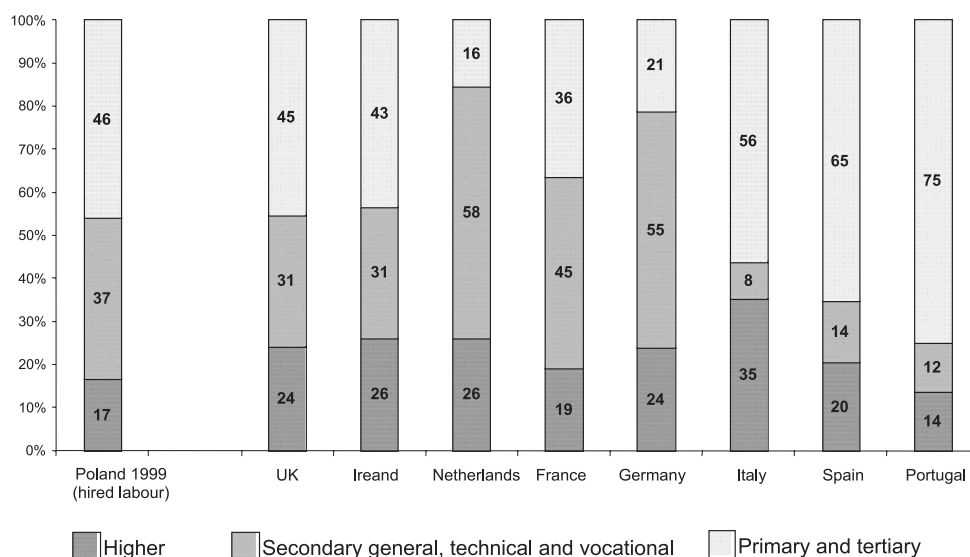
In Poland's case, to obtain data comparable to EU data, one should combine primary and tertiary education, and add higher education and post-secondary education (in Poland combined with secondary technical and tertiary education). The third group, secondary education, would then include secondary general, technical and tertiary education (without post-secondary). Unfortunately, primary data for our projection, based on the CSO survey, does not include separate information on the employed with post-secondary education completed.

Using other information as a basis, it can be estimated that approximately 10 % of the employed from the post-secondary and secondary education group have completed post-secondary education. So the percentage of those employed with higher education, according to international classification can be estimated at 19 % for 1999, what puts Poland on the same level as France, but still lower than Great Britain, Ireland, the Netherlands and Germany. At the same time, the share of the employed with primary and tertiary education in Poland is much higher, while with secondary education it is much lower, than in the Netherlands, France and Germany. Based on the general assumption that the employment structure according to the level of education in Poland should be approximately the same as that in "developed and economically stable" countries of the EU, we have assumed (with expert support) that there will be an increase in the share of those employed with a higher level of education, a decrease in the share of workers with primary and tertiary education and a relatively strong increase in the share of workers with secondary general, secondary technical and tertiary education in almost all of the projected branches. (These changes are not dependent on changes in the share of the employed with different education levels derived in domestic scale from changes in branch structure).

This allowed us to forecast the demand for workers, divided into five groups of education levels, with the use of relatively arbitrary solutions in dividing the groups of the lowest level of education into primary education and tertiary education, as well as groups related to secondary education into primary general (relative increase) and post-secondary, secondary technical and secondary tertiary education.

The detailed results of the forecast are presented in Table 27. Explanation of codes for professions are given in the Annex.

Table 27. Results of the forecast

Profes-sions	Level of employment 1999 (thousands)	Demo-graphic effect Persons retiring	Effect of the economic growth and structural changes							Total effect (demographics, growth, structural change)					Level of employment 2005 (thousands)
			Increase in employment		Demand for hired labour total*		Demand by education levels			Demand for hired labour total*		Demand by education level			
			thousands	% of 1999 level	thousands	% of 1999 level	Higher	Secon-dary	Primary	thousands	% of 1999 level	Higher	Secondary	Primary	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
000	9 702 247	188 563	1 033 874	10.7 %	1 222 437	12.6 %	303 152	531 889	387 396	1 222 437	12.6 %	370 786	555 400	296 251	10 736 121
111	7	0	3	45.2 %	3	45.2 %	3	0	0	3	45.2 %	3	0	0	11
112	0	0	0	0.0 %	0	0.0 %	0	0	0	0	0.0 %	0	0	0	0
113	6 508	433	350	5.4 %	783	12.0 %	609	173	1	783	12.0 %	761	25	−3	6 857
114	875	51	14	1.6 %	65	7.4 %	45	32	−12	65	7.4 %	52	36	−23	889
121	151 706	7 481	22 057	14.5 %	29 538	19.5 %	22 467	6 831	240	29 538	19.5 %	26 225	3 502	−189	173 764
122	184 574	8 162	23 311	12.6 %	31 474	17.1 %	16 069	14 274	1 131	31 474	17.1 %	21 665	9 978	−170	207 885
123	118 509	5 319	13 546	11.4 %	18 865	15.9 %	8 159	10 153	553	18 865	15.9 %	12 074	6 910	−119	132 055
131	37 995	1 601	6 980	18.4 %	8 582	22.6 %	4 722	3 520	340	8 582	22.6 %	5 977	2 634	−30	44 975
211	10 627	604	2 364	22.2 %	2 968	27.9 %	2 969	−1	0	2 968	27.9 %	2 975	−7	0	12 992
212	3 455	123	404	11.7 %	528	15.3 %	277	249	1	528	15.3 %	365	163	0	3 859
213	40 390	375	24 378	60.4 %	24 753	61.3 %	18 726	6 004	23	24 753	61.3 %	20 040	4 705	8	64 768
214	140 475	5 838	22 413	16.0 %	28 251	20.1 %	27 975	274	2	28 251	20.1 %	28 239	17	−5	162 889
221	25 718	1 405	3 186	12.4 %	4 590	17.8 %	4 615	−25	0	4 590	17.8 %	4 637	−47	0	28 903
22201	74 887	5 699	9 395	12.5 %	15 094	20.2 %	15 093	1	0	15 094	20.2 %	15 094	0	0	84 283
22202	12 288	715	1 495	12.2 %	2 210	18.0 %	2 207	1	1	2 210	18.0 %	2 211	0	−1	13 783
22203	2 083	166	169	8.1 %	334	16.1 %	334	0	0	334	16.1 %	334	0	0	2 251
22204	10 518	752	921	8.8 %	1 674	15.9 %	1 666	8	0	1 674	15.9 %	1 681	−8	0	11 440
22290	12 001	528	1 532	12.8 %	2 061	17.2 %	1 878	180	2	2 061	17.2 %	1 997	68	−5	13 533
231	69 514	5 597	20 559	29.6 %	26 156	37.6 %	26 132	24	0	26 156	37.6 %	26 138	18	0	90 073
232	358 175	8 888	13 622	3.8 %	22 510	6.3 %	19 655	2 854	2	22 510	6.3 %	24 274	−1 757	−6	371 798
233	155 712	1 824	10 194	6.5 %	12 018	7.7 %	6 381	5 634	3	12 018	7.7 %	10 494	1 524	−1	165 905
234	17 678	603	1 091	6.2 %	1 694	9.6 %	1 421	271	1	1 694	9.6 %	1 708	−13	−1	18 768

Table 27. Results of the forecast (cont.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
235	71 211	2 658	6 993	9.8 %	9 651	13.6 %	7 533	2 111	7	9 651	13.6 %	9 051	599	1	78 204
241	319 361	8 075	62 296	19.5 %	70 371	22.0 %	42 673	27 543	154	70 371	22.0 %	52 235	18 191	−55	381 657
242	32 013	1 717	4 168	13.0 %	5 885	18.4 %	5 878	7	0	5 885	18.4 %	5 880	5	0	36 181
24301	5 919	310	1 881	31.8 %	2 191	37.0 %	1 902	264	25	2 191	37.0 %	1 981	194	16	7 800
24302	17 454	1 102	4 328	24.8 %	5 430	31.1 %	2 302	3 076	52	5 430	31.1 %	2 877	2 523	30	21 782
24401	37 901	2 661	6 703	17.7 %	9 364	24.7 %	7 079	2 265	19	9 364	24.7 %	8 041	1 316	7	44 603
244>>	15 574	434	2 076	13.3 %	2 510	16.1 %	2 319	195	−4	2 510	16.1 %	2 426	89	−6	17 650
245	36 791	1 173	12 139	33.0 %	13 312	36.2 %	9 028	4 084	200	13 312	36.2 %	10 100	3 105	107	48 929
246	751	16	135	18.0 %	152	20.2 %	96	56	0	152	20.2 %	112	40	0	887
247	644	4	41	6.4 %	45	7.0 %	45	0	0	45	7.0 %	48	−2	0	686
31107	12 462	50	−3 418	−27.4 %	−3 368	−27.0 %	−222	−3 115	−31	−3 368	−27.0 %	−132	−3 197	−39	9 045
31108	3 914	19	−835	−21.3 %	−816	−20.8 %	−97	−644	−75	−816	−20.8 %	−55	−661	−100	3 079
311>>	328 564	6 608	38 752	11.8 %	45 360	13.8 %	2 247	41 007	2 105	45 360	13.8 %	4 802	40 416	143	367 316
312	29 523	198	15 620	52.9 %	15 818	53.6 %	2 135	12 807	877	15 818	53.6 %	2 761	12 406	652	45 143
313	14 855	331	2 445	16.5 %	2 775	18.7 %	138	2 150	488	2 775	18.7 %	192	2 202	381	17 300
314	6 644	198	417	6.3 %	615	9.3 %	188	348	79	615	9.3 %	318	277	19	7 061
315	67 706	1 482	2 646	3.9 %	4 127	6.1 %	886	3 205	36	4 127	6.1 %	1 632	3 404	−908	70 351
321	37 373	1 370	−1 527	−4.1 %	−157	−0.4 %	899	−1 182	125	−157	−0.4 %	1 295	−1 547	96	35 846
322	76 974	2 756	8 757	11.4 %	11 513	15.0 %	291	10 800	423	11 513	15.0 %	536	10 732	245	85 731
323	244 983	6 684	29 453	12.0 %	36 136	14.8 %	444	35 427	266	36 136	14.8 %	864	35 163	109	274 436
331	24 375	387	1 979	8.1 %	2 367	9.7 %	655	1 555	157	2 367	9.7 %	1 300	1 029	38	26 354
341	94 341	1 261	13 764	14.6 %	15 025	15.9 %	3 015	10 603	1 408	15 025	15.9 %	4 622	9 956	447	108 105
342	26 001	359	4 191	16.1 %	4 550	17.5 %	966	3 453	131	4 550	17.5 %	1 466	3 044	40	30 192
343	365 115	10 954	53 209	14.6 %	64 163	17.6 %	9 222	53 878	1 063	64 163	17.6 %	13 322	50 441	400	418 323
344	91 660	1 996	8 433	9.2 %	10 429	11.4 %	1 964	8 396	68	10 429	11.4 %	4 155	6 236	38	100 093
345	561	29	118	21.0 %	146	26.1 %	62	71	13	146	26.1 %	73	65	9	679
346	24 177	515	2 469	10.2 %	2 984	12.3 %	478	2 396	111	2 984	12.3 %	976	1 962	46	26 646
347	8 048	187	2 179	27.1 %	2 366	29.4 %	442	1 688	236	2 366	29.4 %	619	1 590	157	10 226

Table 27. Results of the forecast (cont.)

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
348	57	0	3	6.0 %	3	6.0 %	3	0	0	3	6.0 %	4	0	0	60
411	81 264	1 067	13 424	16.5 %	14 490	17.8 %	1 983	11 223	1 284	14 490	17.8 %	3 014	10 862	614	94 688
412	238 522	4 246	42 137	17.7 %	46 384	19.4 %	5 485	39 875	1 023	46 384	19.4 %	8 258	37 882	243	280 659
41301	209 246	3 015	15 034	7.2 %	18 049	8.6 %	336	9 086	8 627	18 049	8.6 %	754	13 322	3 973	224 280
41302	13 555	142	272	2.0 %	414	3.1 %	98	305	11	414	3.1 %	211	357	− 154	13 827
41303	46 517	814	4 214	9.1 %	5 027	10.8 %	251	3 272	1 505	5 027	10.8 %	537	3 957	533	50 731
414	52 627	1 228	4 148	7.9 %	5 375	10.2 %	388	3 529	1 459	5 375	10.2 %	623	4 114	638	56 774
419	209 157	4 567	26 266	12.6 %	30 833	14.7 %	3 219	24 979	2 634	30 833	14.7 %	5 757	23 944	1 131	235 423
421	162 052	2 335	28 730	17.7 %	31 065	19.2 %	1 834	26 029	3 202	31 065	19.2 %	2 740	26 946	1 379	190 782
422	55 730	1 544	9 521	17.1 %	11 065	19.9 %	441	7 516	3 109	11 065	19.9 %	653	8 443	1 969	65 251
511	16 893	38	2 537	15.0 %	2 575	15.2 %	53	1 202	1 320	2 575	15.2 %	102	1 509	964	19 430
512	130 798	3 387	33 428	25.6 %	36 814	28.1 %	394	13 532	22 888	36 814	28.1 %	619	15 749	20 447	164 226
513	72 186	2 491	8 771	12.2 %	11 262	15.6 %	50	3 540	7 673	11 262	15.6 %	147	5 243	5 872	80 956
514	10 449	41	1 381	13.2 %	1 422	13.6 %	18	233	1 171	1 422	13.6 %	25	311	1 087	11 830
515	85	− 4	4	5.1 %	1	0.7 %	0	1	0	1	0.7 %	0	1	− 1	89
516	121 634	2 205	34 490	28.4 %	36 694	30.2 %	995	12 982	22 717	36 694	30.2 %	1 668	15 102	19 924	156 123
521	93	0	1	1.5 %	1	1.5 %	0	1	1	1	1.5 %	0	1	1	94
522	456 187	3 206	142 788	31.3 %	145 994	32.0 %	2 623	65 982	77 389	145 994	32.0 %	4 088	76 171	65 735	598 975
611	10 100	207	− 231	− 2.3 %	− 24	− 0.2 %	16	30	− 71	− 24	− 0.2 %	30	124	− 179	9 869
612	15 643	118	− 3 104	− 19.8 %	− 2 986	− 19.1 %	− 19	− 493	− 2 474	− 2 986	− 19.1 %	− 4	− 329	− 2 652	12 539
613	2 037	0	− 457	− 22.4 %	− 457	− 22.4 %	0	− 6	− 451	− 457	− 22.4 %	0	− 2	− 455	1 580
614	8 532	118	− 1 973	− 23.1 %	− 1 855	− 21.7 %	4	− 268	− 1 592	− 1 855	− 21.7 %	6	− 202	− 1 660	6 559
615	4 634	25	− 980	− 21.1 %	− 955	− 20.6 %	− 35	− 189	− 731	− 955	− 20.6 %	− 12	− 149	− 794	3 654
621	0	0	0	0.0 %	0	0.0 %	0	0	0	0	0.0 %	0	0	0	0
71 101	91 288	42	− 46 719	− 51.2 %	− 46 677	− 51.1 %	− 52	− 4 931	− 41 694	− 46 677	− 51.1 %	− 34	− 4 601	− 42 042	44 569
71 102	3 633	15	− 147	− 4.0 %	− 132	− 3.6 %	0	− 8	− 123	− 132	− 3.6 %	0	20	− 152	3 486
712	239 026	1 041	55 448	23.2 %	56 489	23.6 %	66	4 901	51 522	56 489	23.6 %	133	6 830	49 526	294 474

Table 27. Results of the forecast (cont.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
713	135 244	943	22 059	16.3 %	23 002	17.0 %	19	2 594	20 389	23 002	17.0 %	77	4 072	18 853	157 304
714	58 653	157	10 255	17.5 %	10 412	17.8 %	23	900	9 489	10 412	17.8 %	38	1 339	9 035	68 907
721	145 493	358	11 394	7.8 %	11 752	8.1 %	15	1 489	10 248	11 752	8.1 %	54	2 750	8 948	156 887
722	353 767	1 710	2 372	0.7 %	4 081	1.2 %	−4	402	3 683	4 081	1.2 %	64	4 377	−360	356 139
723	191 085	735	2 550	1.3 %	3 285	1.7 %	32	1 303	1 950	3 285	1.7 %	174	3 537	−426	193 635
724	253 932	1 713	12 943	5.1 %	14 656	5.8 %	124	4 205	10 327	14 656	5.8 %	348	8 004	6 304	266 875
731	4 015	31	144	3.6 %	175	4.4 %	1	63	110	175	4.4 %	4	134	37	4 159
732	40 787	165	1 449	3.6 %	1 614	4.0 %	0	333	1 280	1 614	4.0 %	4	821	789	42 236
733	2 686	0	207	7.7 %	207	7.7 %	0	61	146	207	7.7 %	0	110	97	2 894
734	19 755	254	4 939	25.0 %	5 192	26.3 %	37	1 880	3 275	5 192	26.3 %	67	2 252	2 873	24 693
741	170 112	589	3 026	1.8 %	3 616	2.1 %	16	445	3 155	3 616	2.1 %	76	1 781	1 759	173 138
742	136 440	409	7 074	5.2 %	7 483	5.5 %	22	974	6 487	7 483	5.5 %	74	2 177	5 232	143 514
743	272 001	2 685	−9 658	−3.6 %	−6 973	−2.6 %	11	−1 108	−5 876	−6 973	−2.6 %	71	2 014	−9 057	262 343
744	38 868	289	−2 797	−7.2 %	−2 509	−6.5 %	−4	−379	−2 126	−2 509	−6.5 %	6	22	−2 537	36 070
811	33 523	94	−6 307	−18.8 %	−6 213	−18.5 %	−15	−994	−5 204	−6 213	−18.5 %	−4	−730	−5 478	27 215
812	32 611	85	−4 843	−14.9 %	−4 758	−14.6 %	−8	−787	−3 963	−4 758	−14.6 %	−1	−481	−4 277	27 768
813	14 549	78	490	3.4 %	568	3.9 %	1	106	462	568	3.9 %	5	282	281	15 039
814	27 419	149	230	0.8 %	380	1.4 %	0	94	286	380	1.4 %	9	390	−18	27 650
815	32 821	199	−241	−0.7 %	−42	−0.1 %	−1	22	−62	−42	−0.1 %	23	493	−558	32 580
81601	13 904	246	−980	−7.0 %	−734	−5.3 %	−7	−381	−346	−734	−5.3 %	26	−176	−584	12 925
81602	47 137	875	1 587	3.4 %	2 462	5.2 %	13	95	2 354	2 462	5.2 %	55	579	1 829	48 724
81603	36 148	553	−1 025	−2.8 %	−472	−1.3 %	1	−145	−328	−472	−1.3 %	27	410	−909	35 123
817	3 096	12	1 008	32.6 %	1 020	32.9 %	0	236	784	1 020	32.9 %	0	294	725	4 104
821	46 391	391	1 166	2.5 %	1 557	3.4 %	61	413	1 083	1 557	3.4 %	104	1 058	396	47 557
822	25 679	210	439	1.7 %	650	2.5 %	18	180	451	650	2.5 %	38	539	72	26 118
823	52 454	279	4 324	8.2 %	4 603	8.8 %	13	899	3 690	4 603	8.8 %	46	1 617	2 941	56 778
824	4 157	38	172	4.1 %	210	5.1 %	0	51	160	210	5.1 %	0	99	111	4 329
825	39 800	340	5 475	13.8 %	5 815	14.6 %	32	1 940	3 843	5 815	14.6 %	68	2 707	3 039	45 275

Table 27. Results of the forecast (cont.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
826	44 631	249	−5 087	−11.4 %	−4 838	−10.8 %	−8	−763	−4 067	−4 838	−10.8 %	6	−288	−4 556	39 544
827	69 259	729	801	1.2 %	1 530	2.2 %	4	197	1 329	1 530	2.2 %	66	1 137	328	70 061
828	87 695	636	5 229	6.0 %	5 865	6.7 %	41	1 698	4 126	5 865	6.7 %	129	2 967	2 769	92 924
829	6 491	59	508	7.8 %	567	8.7 %	3	137	428	567	8.7 %	7	231	330	7 000
831	61 376	203	−7 687	−12.5 %	−7 484	−12.2 %	−25	−1 091	−6 368	−7 484	−12.2 %	3	−174	−7 313	53 688
832	421 247	2 296	28 699	6.8 %	30 995	7.4 %	91	4 744	26 160	30 995	7.4 %	266	8 681	22 048	449 947
833	112 870	535	7 843	6.9 %	8 378	7.4 %	−3	578	7 803	8 378	7.4 %	10	1 438	6 930	120 713
834	3 814	42	290	7.6 %	332	8.7 %	5	95	233	332	8.7 %	16	159	157	4 104
911	3 314	26	218	6.6 %	244	7.4 %	12	114	118	244	7.4 %	14	156	73	3 532
912	180	0	25	14.0 %	25	14.0 %	0	12	13	25	14.0 %	0	12	13	206
913	414 212	13 568	60 436	14.6 %	74 005	17.9 %	110	7 946	65 949	74 005	17.9 %	234	12 921	60 850	474 649
914	31 077	634	10 859	34.9 %	11 493	37.0 %	26	1 197	10 271	11 493	37.0 %	46	1 569	9 878	41 936
915	165 231	10 199	19 219	11.6 %	29 417	17.8 %	274	5 180	23 963	29 417	17.8 %	514	7 598	21 305	184 450
916	42 446	877	6 721	15.8 %	7 598	17.9 %	7	479	7 111	7 598	17.9 %	25	828	6 745	49 167
921	13 680	160	−896	−6.5 %	−736	−5.4 %	9	−109	−636	−736	−5.4 %	18	32	−785	12 785
93101	11 592	103	−4 284	−37.0 %	−4 181	−36.1 %	2	−469	−3 715	−4 181	−36.1 %	6	−412	−3 775	7 308
931>>	91 592	458	20 961	22.9 %	21 419	23.4 %	43	1 639	19 737	21 419	23.4 %	86	2 328	19 004	112 553
932	163 398	2 342	4 715	2.9 %	7 057	4.3 %	51	1 369	5 636	7 057	4.3 %	126	3 601	3 329	168 113
933	45 078	277	−8 530	−18.9 %	−8 253	−18.3 %	−13	−1 180	−7 060	−8 253	−18.3 %	0	−783	−7 470	36 548

*Excluding the mortality effect.

3.1.4 Remarks related to projected demand according to voivodships

Projection of demand according to provinces is by definition biased with a higher margin of error than country-wide projections. Representation of the results of the employment study according to 16 provinces (Polish NUTS 2 regions), education and 58 branches of economy, conducted by CSO, is by definition insufficient in the case of disaggregation according to provinces. Therefore we decided not to use this data in our forecast. Moreover, the full data sets from the CSO on the number of people employed according to provinces in 1997 relate only to section NACE (and therefore do not allow for the introduction of disaggregation of the processing industry, which is important for decentralisation), and moreover were based on a subjective classification of units according to main activity. Sufficient data on employment structure according to provinces, in a configuration that could be sufficient for the needs of the study of disaggregation into 21 NACE groups (sections with disaggregation of processing industry and transportation) were collected at the end 1994. This data, adapted to apply to the new 16 provinces, was used by us to construct the projection according to provinces.

Aggregated results of the regional projection are shown on the map. It is clear that Mazowieckie province has a dominant position on the labour marker, and in 1999 absorbed 16 % of employment and created demand for hired labour of 23 % of the total demand in the economy. The share of this province in employment in 2005 will reach 17%. At the opposite extreme is the Silesian province, with a 15 % share of employment in 1999. Due to structural changes (mostly restructuring of mining and steel industry) the share of demand for hired labour generated in this province in the total demand for hired labour is projected to be 8 %. As a result, the Silesian province's share in total employment in 2005 will decrease by 0.7 percentage points. Małopolskie and Pomorskie provinces are in a similar situation to Mazowieckie province (increase in the share of total employment in 2005, but on a smaller scale). An almost imperceptible decrease in the share of total employment will occur in Wielkopolskie province.

Demand for hired labour by region, 1999–2005

Total demand 1999-2005

- from 100 000 to 284 000
- from 76 000 to 100 000
- from 56 000 to 76 000
- from 38 000 to 56 000
- from 27 000 to 38 000

By education level

100 000

- Higher
- Secondary
- Primary

Regions of Poland

Dsl	–	Dolnośląskie	Pkp –	Podkarpackie
K-P	–	Kujawsko-Pomorske	Pdl –	Podlaskie
Lbl	–	Lubelskie	Pom –	Pomorskie
Lbs	–	Lubuskie	Sl –	silesian
Ldz	–	Łódzkie	Sw –	Świętokrzyskie
Mlp	–	Malopołskie	W-M –	Warmińsko-Mazurskie
Maz	–	Mazowieckie	Wlk –	Wielkopolskie
Op	–	Opolskie	Zpm –	Zachodniopomorskie

The map shows demand for workers (the darker the background of the province, the higher demand) in relation to demand structure in three education groups: demand for workers with higher education, demand for workers with secondary education (general, post-secondary and secondary- technical and tertiary), and for non-skilled workers (primary or tertiary education). In all provinces the demand is highest for workers with secondary education, which is a result of the structure of domestic demand (45 % of demand in domestic scale is for workers with secondary education). Silesian province has higher-than-average demand for workers with secondary education (+13 points). In this province the demand for workers with higher education also differs the most from the national average (national demand is 30 %, and province demand is 43 %). Such a difference between the structure of national demand and regional demand results from changes in the production structure in the region (deep restructuring of coal mining) and a decrease in demand for non-skilled workers (decrease of demand in this classification group). Dolnośląskie province is in a similar situation, but to a smaller extent. There is a higher share of demand for workers with higher education than the national average, and a lower than average share of demand for non-skilled workers). Lower than average demand for workers with higher education will occur in the following provinces: Mazowieckie, Małopolskie, Pomorskie, Świętokrzyskie, Wielkopolskie and Zachodniopo-

morskie (deviation from average share from 4 to 1 percentage point). The share in demand for workers with secondary education will be lower than the average share in the country in all provinces except the Silesian province. Higher than average share of demand for non-skilled workers will be evident in the following provinces: Małopolskie, Pomorskie, Podlaskie and Zachodniopomorskie.

3.1.5 Remarks concerning effects on education system and labour market

The remarks presented below are preliminary and should be verified in future studies. An additional difficulty is that we have at our disposal statistical information on the employment structure according to education levels, which is the basis for our estimates and calculations, and which will shortly be out of date, and will no longer reflect the actual educational system in Poland (as a result of the reform of the education system).

In spite of this, it is possible to develop the following findings, based on our analysis:
In our simulations, the results achieved suggest that with an increase of about 5–6 %, and assuming the current dynamics of education at a higher education level remain the same, the demand for workers with higher education should be satisfied globally, although adaptation of the education structure will remain a problem. A faster increase will lead to surplus demand, which will probably change into wage pressure.

It appears that the greatest imbalance between the current situation in education and needs will occur in secondary education: there will be surplus demand for workers with secondary general education, and surplus supply of employees with secondary-tertiary education.

The result of differences in the speed of economic growth in three scenarios is a significant change in the size of demand for hired labour (tables 7–8). Total demand for hired labour, reaching in the basic projection over 1.2 million people, increases in other simulations by about 1/3 (when the speed of growth is increased by 1 point), or decreases by 2/3 (when the speed of growth is reduced by about 2 points). These results suggest that with the current elasticity and efficiency, improving the situation on the labour market is not possible without an increase in GDP exceeding 5 %.

If the rate of growth is below 2–3 %, the economy will stop generating any additional demand for hired labour, failing even to replace those who retire. This situation results from the fact that, irrespective of dynamics in the economy, the process of increasing competitive pressure forces a high increase in labour efficiency in enterprises. This also causes low elasticity in the labour market, which allows for the creation of new jobs only when GDP increases by 3–4 %.

Changes in demand for hired labour which are dependent on the rate of growth affect people with higher education to the lowest degree (table 7–8), and influences demand for workers with primary education to the highest degree (in our simulations the differences ranged from an increase of 0.5 million to a decrease of 0.1 million). This means that improvements on the labour market (employment of the non-skilled unemployed) will to a greater degree depend on the rate of GDP growth than the situation for highly educated employees entering the labour market.

3.2 Forecasting the labour market in Poland: supply-demand equilibriums

3.2.1 Introductory remarks

The aim of this chapter is to look into the problem of equilibrium between the forecasted demand for labour in the Polish economy until 2005 on the one hand, and the capacities of the educational system to deliver a supply of adequately qualified employees on the other. For this exercise we will use several research modules:

(a) The macroeconomic forecast of the economic development of Poland until 2005.

(b) The detailed forecast of the demand for hired labour by professions and educational level.

(c) Information about the current capacity of the education system of Poland (higher and secondary education).

(d) A simple model that translates, with the use of specially constructed bridge matrices, the demand for labour by professions into the demand for graduates with various profiles of education.

(e) A supply-demand analysis, comparing the demand for graduates with various profiles of education with the projected supply (derived from the current capacities of the education system).

For the detailed description of modules (a) and (b) compare the previous chapter.

Obviously, the technique used in this exercise is quite rough and gives only a general approximation of the general prospects of the labour market. Firstly, the demand forecast is far from exact. Secondly, the education system will fluctuate and adjust to market conditions. Thirdly, students will adjust by modifying their education profile during the course of their studies. Fourthly, the employers will adjust by modifying their demand for specific categories of employees (in a search for the optimal solution, taking into account the availability of "ideal" candidates and the cost of hiring them). Finally, the unknown part of the supply will be taken from the labour market through self-employment.

Nevertheless, the exercise makes some sense, as the structure of the graduates in the whole period 2001–5 is, to a large degree, determined by the current structure of profiles of students.

3.2.2 Macroeconomic scenario

The macroeconomic scenario for the period 2000–2005 is the same as that described in subchapter 1.2 (see also Table 25).

Please note that according to the forecast Poland will remain a high-unemployment country throughout the whole period 2001–5.

3.2.3 Forecast of the demand for hired labour by professions and educational level

The presented forecast relates to the demand for hired labour up to 2005 (defined as employment on the basis of a contract, excluding the uniformed services) divided into 369 occupation groups and five education groups. The forecast does not cover the uniformed services, as the number of people employed is a result of domestic public security and foreign security policy followed by the state. We would like to stress that a forecast for hired labour is very different in essence from forecasts related to actual employment according to occupations and education. Size and structure of demand for hired labour as presented by us

can differ due to many factors, actual changes in employment level according to occupations and education levels. Thus we do not forecast the supply of labour. In order to define the boundaries of the forecast for demand we only used a general evaluation of labour supply according to education in the forecasted period.

The detailed results of the forecast are presented and discussed in Chapter 1. Below we present a summarized version of the forecast, aggregated to 14 big groups of professions. Grouping was made on the basis of experts' choice (the reasons for resignation from formal clustering are presented in the annex).

Table 28. Demand for hired labour until 2005 (persons)

	TOTAL		By educational level		
	persons	as % of 2000 employment	Higher	Secondary	Primary
Managers	89 309	18 %	82 171	7 409	− 270
Specialists in exact and natural sciences	61 090	28 %	59 358	1 730	1
Specialists in health service	69 021	16 %	67 462	1 315	245
Teachers	74 396	11 %	73 882	501	13
Business specialists	89 946	20 %	77 839	11 894	213
Office personnel	184 735	15 %	124 790	55 305	4 641
Professionals, artists, priests	41 257	27 %	38 546	2 544	167
Salesmen and specialists in customer service	276 895	27 %	116 486	88 889	71 519
Specialists in agriculture	− 6 278	− 15 %	− 534	− 1 295	− 4 449
Civil servants	13 559	12 %	10 645	2 838	76
Medium level technical staff	64 355	13 %	56 192	8 139	24
Construction workers	89 902	21 %	11 221	30 197	48 485
Operators of machinery	40 392	3 %	18 300	15 417	6 674
Industrial workers, craftsmen, other workers	133 856	5 %	41 971	30 904	60 982
Total	**1 222 437**	**13 %**	**778 329**	**255 788**	**188 320**

Please note that the highest dynamics of the demand were observed in the groups of various specialists in exact and natural sciences (including computer scientists), professionals, and specialists in customer service. Negative demand (drop of employment exceeding retirement) is expected in the group of specialists in agriculture, and close to zero growth in the groups of industrial workers.

Two graphs show the breakdown of the demand for labour by professions into two components: net increase in jobs and replacement of retiring persons. One should note that due to the demographic structure of employment, the whole period 2001–5 will be marked by a relatively small importance of the second factor.

Sources of the demand for labour by professions (persons)
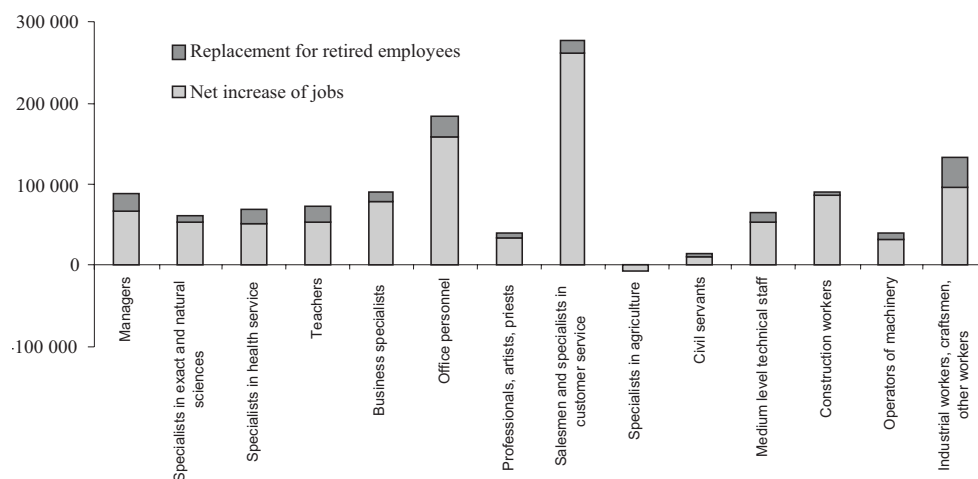
Sources of the demand for labour by professions (% of employment)
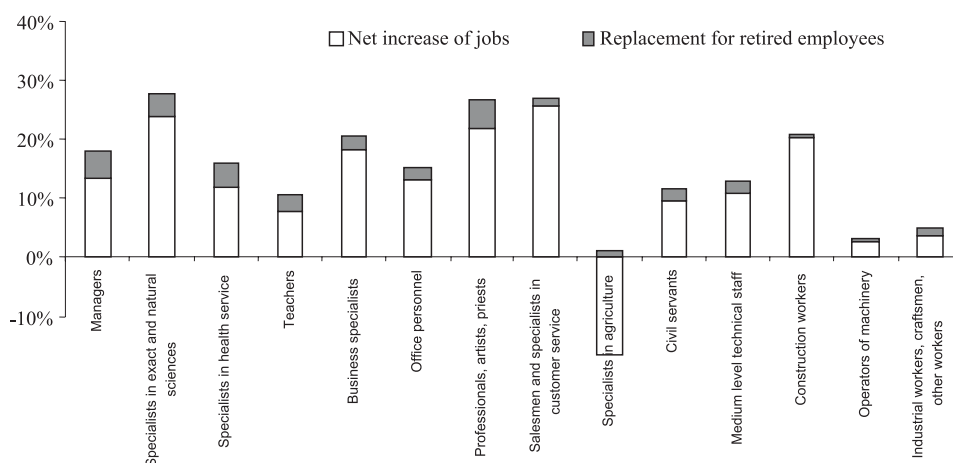
3.2.4 Current capacity of the education system of Poland

The current capacity of the education system in Poland determines, to a large degree, the structure of supply of qualified employees over the period 2001–5. The number of students currently involved in the system, and the forecasted supply of graduates for the whole period, are presented in table 29.

Table 29. Capacities of the educational system 2000–2005

Type of educational profile			Number of students in 1999/2000 (thousands)			Number of graduates entering labour market until 2005		
Primary	Secondary	Higher	Primary	Secondary	Higher	Primary	Secondary	Higher
General	General		4 750	227		238		
	Teaching	Teaching		17	158		5	150
	Arts	Arts		24	15		7	14
		Humanities			107			102
		Theology			22			21
		Social			194			184
	Business	Business		385	396		115	376
		Law			59			56
		Natural science			38			36
		Math//computer			33			32
	Health service	Health service		37	36		11	34
	Technical	Engineering		1 083	222		325	211
		Architecture			10			10
	Agricultural	Agricultural		126	39		38	37
		Home economics			9			9
	Transport and commun.	Transport and commun.		9	12		3	12
		Mass media			7			7
	Services							
		Services		289	14		87	13
		Military and police			11			10
		Other			49			46
TOTAL			**4 750**	**2 198**	**1 432**	**238**	**591**	**1 360**

Please note that the forecasts of the number of graduates entering the labour market are based on several strong assumptions. For example, all the students of general secondary schools are expected to continue education, while 5 % of the pupils of primary schools are expected to enter the market after having made some primary vocational training.

3.2.5 Translating demand for labour by professions into demand for graduates

Translation of the demand for labour by professions into the demand for graduates with various profiles of education is conducted with the use of specially constructed bridge matrices. The matrices, separately constructed for the higher and the secondary education, are of the form:

	Graduates by types of education:		
	Type 1 Type 2 Type 3 ... Type n		
Profession 1			100 %
Profession 2			100 %
Profession 3		a_i	100 %
....			....
Profession 14			100 %

The matrices, constructed on the basis of expert knowledge, show the distribution of demand for a given profession into various profiles of education. Parameter aij explains what percentage of the demand for profession i is satisfied by graduates with the education type j.

Obviously the bridge matrix methodology is not very sophisticated. The main restriction of this method is that it does not allow for the substitution between various types of education. Nevertheless, its strength lies in its simplicity, and ability to estimate some very general trends in the demand for labour by profiles of education.

Obviously, the method needs further elaboration.

3.2.6 Supply-demand analysis

The current capacity of the education system in Poland determines, to a large degree, the structure of supply of qualified employees over the period 2001–5. The number of students currently involved in the system, and the forecast supply of graduates for the whole period, are presented in table 29.

The supply-demand analysis is based on comparing the demand for graduates with various profiles of education with the projected supply (derived from the current capacities of the education system). A comparison for the period 2001–5 is presented in tables 30 and 31.

Table 30. Demand-supply equilibriums: higher education

Type of education	Supply	Demand	Disequilibria	
			Excess demand	Excess supply
Teaching	150 385	50 979		99 406
Arts	13 965	3 855		10 110
Humanities	102 030	31 748		70 282
Theology	20 995	1 927		19 068
Social	183 920	65 776		118 144
Business	376 200	294 784		81 416
Law	55 860	29 509		26 351
Natural science	36 290	16 240		20 050
Math/computer	31 540	31 916	−376	
Health service	33 725	40 477	−6 752	
Engineering	210 900	153 249		57 651
Architecture	9 690	6 823		2 867
Agricultural	37 335	10 043		27 292
Home economics	8 740	4 567		4 173
Transport and commun.	11 780	7 060		4 720
Mass media	6 935	3 101		3 834
Services	13 490	8 079		5 411
Other	46 170	18 730		27 440
TOTAL	**1 349 950**	**778 862**	**−7 128**	**578 216**

Table 31. Demand-supply equilibriums: secondary education

Type of education	Supply	Demand	Disequilibria	
			Excess demand	Excess supply
Teaching	5 220	501		4 719
Arts	7 234	3 274		3 960
Business	115 397	88 720		26 677
Health service	11 101	1 315		9 786
Technical	325 011	118 415		206 596
Agricultural	37 941	4 318		33 624
Transport and commun.	2 709	1 640		1 069
Services	86 687	38 900		47 787
TOTAL	**591 300**	**257 082**	**0**	**334 218**

Table 32 combines higher and secondary education, allowing for some spill-over of the demand between the two levels. Unfortunately, only in the case of the health service is such a spill-over possible (excess demand for employees with higher education, excess supply with secondary education).

Table 32. Demand-supply equilibriums: higher & secondary combined

Type of education	Disequilibria (excess supply)			Disequilibria as % of supply		
	Higher	Secondary	Combined	Higher	Secondary	Combined
Teaching	99 406	4 719	104 125	66 %	90 %	67 %
Arts	10 110	3 960	14 070	72 %	55 %	66 %
Humanities	70 282		70 282	69 %		69 %
Theology	19 068		19 068	91 %		91 %
Social	118 144		118 144	64 %		64 %
Business	81 416	26 677	108 093	22 %	23 %	22 %
Law	26 351		26 351	47 %		47 %
Natural science	20 050		20 050	55 %		55 %
Math/computer	−376		−376	−1 %		−1 %
Health service	−6 752	9 786	3 034	−20 %	88 %	7 %
Engineering/techn.	57 651	206 596	264 248	27 %	64 %	49 %
Architecture	2 867		2 867	30 %		30 %
Agricultural	27 292	33 624	60 915	73 %	89 %	81 %
Home economics	4 173		4 173	48 %		48 %
Transport and commun.	4 720	1 069	5 790	40 %	39 %	40 %
Mass media	3 834		3 834	55 %		55 %
Services	5 411	47 787	53 198	40 %	55 %	53 %
Other	27 440		27 440	59 %		59 %
TOTAL	**571 088**	**334 218**	**905 305**	**42 %**	**57 %**	**47 %**

The general observation is that, due to the extremely difficult situation on the Polish labour market, the demand for labour will remain very small throughout the whole period 2001–5. As a result, the current capacities of the education system seem to be sufficient to deliver, with some excess supply, the demanded flow of graduates. The supply exceeds demand in all the educational profiles except for mathematicians and computer scientists, and health service workers with higher education. The biggest excess supply, combined for both levels – in proportion to the total supply – is likely to be observed among graduates specialized in agriculture, teaching, humanities and social sciences. Small excess supply (or, in fact, excess demand given the opportunities for self employment, and other forms of leaving the labour market) can be expected among graduates in business management, and law. Excess demand can be expected among graduates in maths and computer science, and the health service. Theology is, obviously, a special case, as the graduates normally do not enter the labour market.

In absolute numbers, the biggest groups of graduates that are likely to be in excess supply are graduates with higher education in teaching, humanities and social sciences (excess supply of almost 300 thousand, or 50 % of the total excess supply), and with secondary technical education (over 200 thousand). The patterns of excess supply are shown on two following graphs.

Excess supply of labour by education (% of supply)
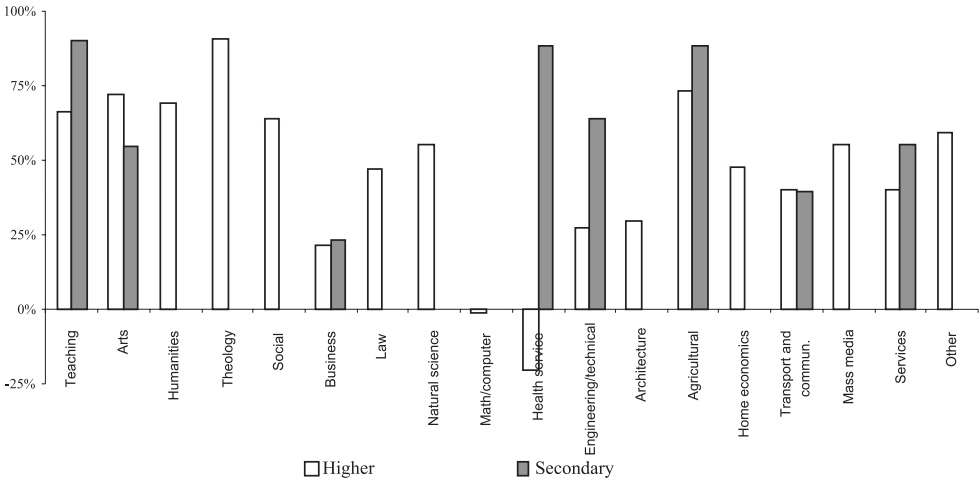
Excess supply of labour by education (persons)
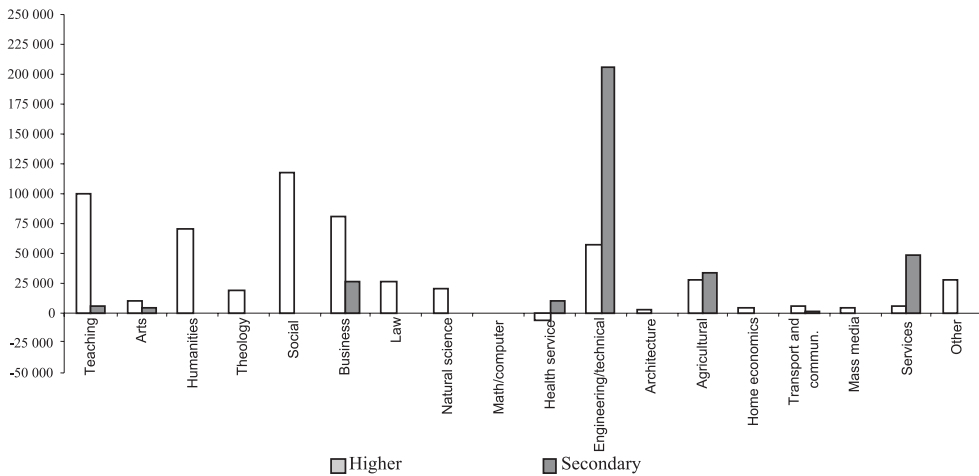
■ DILEMMAS AND RECOMMENDATION

1. Dilemmas of forecasting vis à vis the development trends of education within the labour market

The forecasting of the development trends in education means (on a smaller or larger scale) that forecasts of labour demands in several occupations are taken into consideration by the educational offer. The existing vocational school system (state schools) provides employees who are trained in professions included in the Classification of Professions in Vocational Education (CPVE for short). Due to the fact that this classification undergoes changes – new types of occupations are implemented or the classification is changed as a whole –more than one classification is usually in force. At the moment, there are four, dating from 1982, 1986 and 1993. Professions that are learned according to the existing classifications may differ. Graduates of secondary schools of economics from the beginning of the nineties are completely different from the graduates of the late nineties. Their education is based on significantly different, old curricula. In addition, individuals from the same group of professions may differ in their work experience, knowledge and skills, which affects their employability. Statistical data available disregards the above-mentioned differences.

Rapid changes in the school environment caused by economic and technological forces shape the development of the vocational education. This is aimed at the preparation of graduates for the labour market rather that at their preparation for work in a specific profession. The result is a rapid development of general secondary education and vocational education in the so-called broad-field-professions which give work opportunities in related occupations. The predominance of broad fields of study in the vocational education sector, together with general education, is attempting to shift training from schools to the out-of-school system. This raises organizational and educational issues, which are expressed by the following questions. What kind of relationships should exist between the opportunities of preparation for a career in schools and the out-of-school system? Should occupations where training is offered by the out-of-school system be included in the classification? Should that training be determined by

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labour market needs or should the two criteria be taken into account together? In addition, there are many more problems and questions. Neither educational legislation nor the documents of the education reform that have been passed hitherto offer any answers to these questions.

■ 1.1 The forecasting of the development trends of education – main problems and challenges

The adaptation of vocational education to labour market needs is one of the chief aims of the education system reform (Reforma ..., 1998). This aim is very complex because the social and economic changes since 1989 have had a very specific impact on the vocational education system. The rapid transformation of the economy has revealed every shortcoming of the whole sector of vocational education and training, while the new market showed significant discrepancies between employers' expectations and graduates' real qualifications acquired in vocational schools. This discrepancy has resulted in a substantial increase in unemployment rates among graduates – the scope and level of the phenomenon has given reasons for concern, and encouraged the analysis of vocational education problems from the organizational, teaching and research perspective (S. M. Kwiatkowski, 2000).

Changes to the Polish education system which started in the nineties have tended to follow the direction of European Union countries (Biała Księga ..., 1997, Raport dla UNESCO ..., 1998). It has consisted of the following issues:

■ the implementation of knowledge in technical, social and economic fields into general education;
■ an increased role of general education in vocational training;
■ a greater importance of general fields of knowledge in vocational education and training.

The most important dilemmas forecast for the development trends of education make a long list:
■ In the next six years, there will co-exist two systems of education in which various types of vocational schools will operate. They will also offer diverse vocational qualifications. Graduates of upper secondary schools will not enter the labour market before 2005. In this case the forecast is addressed to the "expiring" system. However, it can be useful for the future development trends of the out-of-school system as well (courses, professional development, specialisations). Note that the majority of school-leavers with a certain level of education usually do not return to the school system after graduation. Research results back this claim (Białecki, 1996, Edukacja ..., 1996, Raport o rozwoju ..., 1998). Those who leave school after acquiring a certain level of knowledge may develop new qualifications or improve the ones they already have.
■ Until the mid nineties, initial vocational education led either to the title of qualified worker or technician. In recent years, a new approach has been adopted – certificates received upon the completion of school and vocational titles that can be obtained are separate things. This means in practice that if one finishes a technical school, he or she does not necessarily obtain the vocational title of technician. The scope of this development is, however, unknown. This is probably insignificant a statistical point of view, but it causes problems as to how to qualify an individual within a group of professions. How do you qualify a graduate from a technical school, but who does not have formally acknowledged vocational qualifications, and is in fact not a technician? Does the lack of recognized qualifications mean that a person is treated as a graduate of a general secondary school without any qualifications? The behaviour of employment agencies shows that this happens. This specific problem will be faced again after the implementation of the education reform.

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■ If the relationships between the education and the labour market are to be suitably developed, it is necessary to answer the following question: will the hitherto existing model of how to bring professions into the school system continue to be in force? More specifically, on what kind of basis will professions be included in the classification by the decision of the minister of education? Emphasis should be given to the fact that a uniform system of professional qualifications recognized both by educational establishments and the labour market will not solve the problem. The process of introducing specific professions to the school system is long and not very efficient (Drogosz-Zabłocka, Perspektywy ..., 2000).

■ Will education in post-secondary schools be regarded as being of a secondary or upper secondary level? According to the documents in which the education system is described (European Glossary ..., 2000), post-secondary schools are classified as institutions of a post-secondary level, whereas the education system act places them among secondary schools.

■ Does training in the out-of-school system need to focus on professions included in the classification or should a different point of reference be adopted?

■ On what basis, concerning the access to vocational qualifications, will vocational training be organised in the out-of-school system? The Decree of 1993, passed by the Minister of National Education and the Minister of Labour and Social Policy, determines rules and conditions for the development of professional qualifications and the improvement of the education level of adults. The document as an instrument for how to solve the problem is inadequate. It is necessary to put forward new legislative proposals, i. e. separate laws on the education of adults and continuing education[38].

■ The studies aiming for uniformity adopt four levels of vocational qualifications (Juchnowicz ..., 2000, p. 63); however, a study on the development of standards takes five qualification levels into account (Budowa standardów ..., p. 11). The authors of the second study refer to professional qualification standards recognized by the European Union and used for comparative purposes. Further work focused on the forecasting of development trends in education requires uniformity in this regard.

■ Vocational education in non-state schools brings additional difficulties. These schools train for occupations that are neither in the classification used by schools nor in the classification adopted by the economy as a whole. The terminology is often different from the names of professions used in the two classifications. It is worth pointing out that, except for post-secondary vocational schools, the problem is of minor importance for this type of basic and secondary school, which are attended by barely 0.02 % of the total number of students in vocational schools. Even if the forecast ignores this issue, it should not affect the final outcome at all. It is far more difficult to tackle the problem of definition of professions and specializations taught in non-public post-secondary schools. In the 1999/2000 school year, the number of students here reached 10 % of the total population in post-secondary education. Therefore, such a large number should not be neglected. The only source of information about the types of professions which are taught in non-public post-secondary schools can be found in the directories for candidate-students. They pave the way for comparisons with the Classification of Professions in Vocational Education and the Classification of Professions and Specializations – CPVE and CPS for short (Lelińska & Sołtysińska, 1999). Attention should be drawn to the fact that, in general, the education offered by non-public post-secondary schools reflects labour market requirements. This is feasible because time-consuming procedures of incorporating a specific profession into the education system do not apply here. Neither do professions need to be

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[38] The projects of two laws have already been submitted to Parliament. One of them was drawn up by government bodies, the other by non-governmental organizations.

included in the classification, nor are the core curricula for specific occupations necessary. Schools respond directly to the needs of the market. However, they still risk educating in very narrow fields which may no longer be demanded by the labour market.

The reform of upper secondary schools, which is under way, raises several problems and dilemmas. Solutions to these problems should be thoroughly considered during the forecast of the development trends of education within the framework of a new school system.

■ 1.2 The forecasting of development trends in education – proposals for further steps

The cluster method adopted by experts from the Research Centre for Education and Labour Market in the Netherlands was developed for detailed analyses of the education system and the opportunities to meet labour market requirements (Heijke, Matheeuwsen, Willems, 1998). The cluster method cannot be used in an extensive way in Poland due to the following barriers:

- the absence of research into professions which are performed on the labour market and for which training is offered by the school system. At present, the classification of professions is the only point of reference. A simplified interpretation of this issue indicates that professions respond to the market needs only if they are included in both the previously mentioned classifications (CPVE and CPS);
- the absence of research into the compatibility of professions for which training is offered by schools and the out-of-school system; the position of these professions in regard to the classification in force is equally important;
- insufficient data on development trends in education and qualifications offered by higher education; this includes professional titles and specializations;
- these issues are barely raised; literature on these topics is still very scarce.

The forecasting of development trends in education concerning the school system is based on the following sources of information:

- the classification of professions taught in schools, i. e. the Classification of Professions in Vocational Education (CPVE) from 18th December 1997; this document is valid and currently updated by the Ministry of National Education;
- the Classification of Professions and Specializations (CPS) developed by the Ministry of Labour and Social Policy in 1995 and amended in 1998;
- a multivariate, midterm forecast of the demand for hired labour in Poland including 369 groups of professions from the year 2000;
- projected uniform Classification of Professions and Specializations from 2000 (2nd stage of work – draft).

The progress made so far towards uniformity shows that from among 179 occupational categories listed in CPVE, approximately 50 % of the professions taught in schools conform entirely with the classification. The remainder needs some corrections, for example to the names of specific professions that have to be changed (Juchnowicz, 2000). Professions taught in the school system usually respond to the second and third levels of qualifications. This means the following structure:

- secondary-level education corresponding with the third level of qualifications (for technical schools – the profession of a mechanics technician; for schools of economics – the profession of an economics technician);

- secondary level education corresponding with the second level of qualifications (for secondary and post-secondary vocational schools – the profession of a waiter);
- basic level education corresponding with the second level of qualifications (basic vocational schools – the profession of an electro-mechanics technician).

The adopted approach can be useful for further research on the forecasting of labour demand. In general terms, the following indicators are relevant to the forecasting of development trends in training from the education perspective:
- the level of education and the level of qualifications,
- the uniformity of qualifications and labour market demands,
- age.

1.3 Indicators with regard to the education and qualification levels

The levels of education and qualifications are elements of primary importance in forecasting development trends in training from an education perspective. We suggest distinguishing two specific indicators: an indicator of the education level and the qualification level acquired within the school system, and an indicator of the education level and the qualification level acquired in the out-of-school system. Our argument is that qualifications acquired in the school system should be designated by a special code. The task of the code would be to show the level of qualifications and the corresponding group of professions. This would allow information to be collected regarding professional qualifications acquired in the out-of-school system. This is, however, a preliminary proposal which requires further examination.

The indicators of the education level and the qualification level were used for the multivariate, medium-term forecasting of the demand of hired labour in Poland including 369 groups of professions. It is evident that in all kinds of scenarios the demand of hired labour in specific professions depends, among other factors, on the level of education. The labour demand for the profession of a shop assistant (code 5220 by the principal scenario of the forecast, p. 80) shows the following differences: individuals with basic education outnumber those with post-secondary education by the total of 1,372. The demand for labour in the same profession regarding individuals with secondary and basic levels of vocational education indicates a difference of as many as 35,703 to the advantage of those with basic vocational education. To conclude, this means that training for the profession of shop assistants should be provided mainly in basic and post-secondary vocational schools.

The forecasting of labour demand requires steps towards uniformity of qualification and education levels. The National Education Ministry's document about the upper secondary school reform (Reforma ..., p. 30) lists five levels of professional qualifications. The first and second qualification levels are acquired in vocational schools, the third in post-secondary schools, while levels four and five correspond to higher education. It is then worth examining the higher professional education level (bachelor degree studies) in further analyses. This is a reasonable approach because another specific qualification level is taken into account.

There is no comprehensive information about vocational qualifications acquired in the out-of-school system. Data provided by the Central Statistical Office exclusively shows the types of courses without going into details about specific qualifications. Statistics indicate numbers of students who prepare for the examinations in order to obtain the title of a qualified worker or a master worker in a specific profession. In the 1998/99 school year, out of 13,665 students who attended various types of courses – 80 % studied to pass examinations and obtain

the title of a qualified worker. The data presents levels of qualifications (second and third), but it does not specify a group of professions to which those qualifications correspond.

Lelińska and Sołtysińska (1999) present job opportunities upon completion of education within the out-of-school system in those professions on the labour market that are included in the CPVE list. The authors of the study analyse programmes of courses run by the craft sector and nongovernmental organizations which are significant for the education market (Polish Federation of Engineering Association, professional development bodies, professional associations – e. g. the Association of Accountants). The study also examines professions and occupations which are taught and acquired in this area, bearing in mind professions from the CPVE list. It needs to be stressed that professions and specialisations covered by the out-of-school system are not designated by code numbers. Official registers of out-of-school institutions do not use code symbols for their courses and other training activities. The study describes education in out-of-school organisations consisting of 199 professions/specialisations structured in correlation to over 300 professions actually performed on the labour market (Lelińska & Sołtysińska, 1999).

Higher education should be regarded as a separate dilemma, as there is no reference to the classification of professions. The development trends of education and types of specialisations are determined by the Major Council of Higher Education. Some information about the fields and profiles of study can be found in the directories for applicants, as with non-state post-secondary schools and out-of-school institutions. This source of knowledge is incomplete, however, because it only reflects names of professional titles and does not refer to the content of the education itself. Thus it is necessary to look into the minimum curriculum requirements and the core curriculum, which cannot be done without detailed research. Professional titles and degrees may serve, however, as useful indicators of how to group professions at the higher education level. Mention must be made here of the following qualifications: master's degree, including Master of Science, a degree allowing the holder to practice medicine, bachelor's degree and the title of professional engineer. The last two are awarded to graduates of higher professional courses in the fields of humanities (literature, philosophy, arts), science, social studies, economics, physical education, tourism, recreation and physical and medical rehabilitation, excluding medical studies and dentistry (Definicje pojęć ..., 1999, p. 51). Graduates of master degree courses and their equivalents (for example medical studies), as well as graduates of bachelor degree courses and those leading to the professional title of engineer, would be another interesting area to research. There is the question of whether there is labour demand for graduates of bachelor's degree programmes (the fourth level of qualifications) and what is the scale of that demand compared with graduates of master's degree courses (the fifth level of qualifications).

■ 1.4 The indicator of comparability with regard to qualifications and labour market demands

Uniformity of qualifications and market requirements is an important indicator in forecasting development trends in education. As in the case above, the place where professional qualifications are acquired – whether it is schools or out-of-school institutions – is equally significant.

Table 33. Education levels and corresponding types of schools before and after the education reform

Hitherto existing system	**Education system under implementation (upper secondary schools since 2002)**
Education levels and corresponding types of schools	
1. Primary	
8-year primary school	6-year primary school
2. Lower secondary	
8-year primary school	3-year gymnasium
3. Upper secondary	
Basic vocational school General secondary school Vocational lyceum Technical lyceum Secondary technical school	Vocational school Field-study lyceum Complementary lyceum
4. Post-secondary *	
Post-secondary school	Post-secondary school
5. Tertiary	
Academy (economics academy, medical academy, agricultural academy, academy of physical education) Teacher college Art school (academy of music, academy of fine arts, academy of theatre) University Higher maritime school Higher pedagogical school Higher military school Higher professional school (since 1997)	

*   Post-secondary schools are included among secondary schools in the Polish education system. This is where graduates of upper secondary schools acquire professional qualifications. They may not have passed the final school leaving examination (*matura*), but they are holders of a certificate obtained when they finished school.

Source: European Glossary on Education. Educational Institutions. Vol. 2, EURYDICE 2000, p. 193 (Pre-school education is not included in the table).

Two specific indicators can be distinguished here, too: an indicator of the comparability of school qualifications and labour market demands, and an indicator of the comparability of out-of-school qualifications and labour market demands. Regarding the first indicator, the school system provides a certain education level expected by the labour market. At the same time, schools ensure professional preparation. In light of the education reforms, this education will be offered by professional schools, post-secondary level establishments and higher education institutions. The second indicator shows the expected professional qualifications represented by the section of the population that has already acquired a certain level of education. These indicators can only be defined through research, which should answer to the question of whether a specific profession, learnt either in school or out of school, has an equivalent on the labour market.

■ 1.5 The indicator of age

The indicators that we specified at the beginning of this study, regarding education and qualification levels, must be complemented by an indicator of age. Reference is made here to an age group which has been on the labour market for no longer than five years. Even if these young people have the same level of education as older workers, the content of their professional preparation is significantly different. This is due to qualitative changes in the study programmes and curricula which affected all levels of education in the 1990s. In addition, younger working groups perform some professions that are not represented by older workers. This applies to graduates of higher education institutions and post-graduate studies.

The adoption of this type of indicator requires continuous work on the development of classifications and the updating of professions included in the list. The same progress applies to professional tasks too. The implementation of professional qualification standards would probably be a good solution. The procedure of implementing specific professions in the education system would then be much less complicated.

■ 1.6 Forecasting development trends in education, based on accessible data

From an education perspective, a detailed examination of professional tasks is absolutely necessary if the structuring of professions in groups is to be done properly. Task-oriented analysis should precede any structure-oriented approach.

As the suggested analysis is not available, in light of the accessible data, professions can be structured in groups exclusively on the basis of indicators, which can be examined separately or simultaneously. They consist of:

- the age of the working population, i. e. the population in employment up to five years after graduation (this is explained in the previous section of the text);
- the level of education; if possible, it would be useful to introduce the higher professional school level;
- the level of qualifications.

The authors of the forecast of labour demand took five levels of education into account. It would be more valuable to determine labour demand in relation to six levels of education. Higher education needs to be understood here as a two-level group, consisting of: higher professional studies (bachelor degree and the professional title of engineer) and "regular" higher education (master degree plus the corresponding degree of master of science and the title which licenses to practice medicine).

Table 34 presents possible changes affecting large groups of professions, although visible quantitative changes are barely noticeable.

Table 34. Possible changes in school-based professions

	Large groups	Number of professions according to the forecast*	School-based professions
1.	Members of parliament, high rank officials and managers	9 (8)	
2.	Experts	69 (24)	Professional tasks become integrated regarding the professional group of mechanical and electrical fields which are in interaction. The role of specialists with interdisciplinary qualifications increases.
3.	Technicians and other mid-level white-collar workers	76 (19)	Professional tasks become integrated. Other comments from the above file apply, too.
4.	Clerks employed in offices	20 (9)	The operating of office equipment is nearly uniform.
5.	Service sector workers and shop assistants	22 (8)	
6.	Farmers, gardeners, foresters and fishermen	15 (6)	
7.	Industry workers and craftsmen	63 (17)	Professional tasks become integrated.
8.	Machine operators and fitters	72 (22)	The operating of machines and other equipment is nearly uniform. Automation leads to integrated professional tasks.
9.	Workers hired for simple jobs	23 (11)	
	Total	369 (124)	It can be assumed that the number of professions will continue to decrease and new professions will integrate previous tasks.

* Groups of professions are put in brackets.

■ 1.7 The comparability of professions based on the analysis of educational tasks

Considering that the forecast of labour demand corresponds with the forecast of the demand in regard to professions, it can be assumed that professional qualification standards are basic reference points for theoretical thinking. At the same time, professional qualification standards (in practice just a few of them) constitute an important criterion for those educational tasks that contribute to the entire process of vocational training. The following assumptions have been adopted here:

■ the notion of educational tasks is broader than professional qualification standards;

■ educational tasks in regard to professions for which instruction is provided (through various profiles) consist of the following elements:
– specific qualification standards and general education standards (if any), or the core curriculum of general education and the core curriculum of vocational education, with regard to the school system;
– minimum curriculum requirements regarding the higher education system;
– specific qualification standards (if any), or the core curriculum of vocational education, regarding the out-of-school system.

The content of educational tasks is determined by general education standards and professional qualification standards (if any); otherwise, the core curriculum or the minimum curriculum requirements for higher education are taken into account.

The structure of a qualification standard consists of three elements corresponding to a set of tasks $(Z_1 ... Z_n)$ attributed to a specific profession (Budowa standardów ..., 2000, p. 10). They are as follows:

competence $(U_1 ... U_n)$,

knowledge $(W_1 ... W_n)$,

psychophysical features $(P_1 ... P_n)$.

The core curriculum and the minimum curriculum requirements include competence and knowledge which are absolutely necessary to perform a profession. The structuring of professions into groups should be done on the basis of similar competence and skills as those attributed to specific professions. It is assumed that psychophysical features represented by individuals performing a specific profession cannot decide about similarities between professions. This is determined by the content of tasks.

2. Recommendations for the database and the system of regular analysis of the demand for hired labour in Poland

Regular analysis and forecasting of demand for hired labour in Poland requires permanent and smooth cooperation between the statistical services, and analytical centres (governmental or scientific centres).

Enhancement of the database information for forecasting the demand for labour requires the following activities:
- Statistical services should systematically update their research of the employment structure according to 57 branches of the economy.
- The statistical classifications of professions should be adapted to match European classifications and the changing pattern of the education system in Poland.
- The sampling methodology should secure a balanced sample for the 16 provinces.
- The database should be easily accessible using standard statistical software.

Enhancement of the accuracy and timeliness of the forecasts requires the following activities:
- Analytical centres should regularly update their macroeconomic forecasts, with the use of alternative modelling tools.
- Assumptions about trends in the structure of demand for labour should be researched and updated annually by a team of experts.

Monitoring of the demand for labour requires the following activities:
- Ex-post verification of the accuracy of forecasts and assumptions, based on analysis of labour market data.
- Checking the availability of the data, and particularly analysis of the potential use of the additional information for enhancement of accuracy and level of detail.

Dissemination of the results requires the following activities:
- Publication of an annual report, with a broad indication of employment prospects in various professions.
- Maintaining a website with up-to-date information, and free access for all the organisations and individuals interested in the topic.

■ CONCLUSION

This report presented a forecast of labour demand by qualification and occupation in three time horizons:

- ■ short-term,
- ■ long-term,
- ■ medium-term.

The short-term forecast covered 1999. However, it was carried out at the beginning of 1999 and was based on data for 1998. The main elements of the forecast are as follows. The labour demand in large and medium-sized enterprises was to decrease in 1999 by over 32,000 people, as a result of more contract-terminations (372,000) than new employment. Increases in demand for labour were expected only in construction, trade, repair and real estate, while a decline was mainly anticipated for the manufacturing, mining and quarrying industries. A large decline in labour demand was anticipated in the public sector (by 84,000 people) but growth in the private sector (by 51,000 people). Among hired labour by educational level, the forecast assumed the following: share of people with basic vocational education (59 %), primary (18.9 %) and vocational secondary (10.9 %). According to the forecast, the most sought after workers by employers were specialists in marketing and trade, construction engineers, salespersons and demonstrators, seamstresses, embroiders, bricklayers and carpenters.

The long-term forecast until 2010, based on the analogous method, was prepared with the assumption that structural changes observed to date would continue (scenario I) and that structural changes will take place at a more rapid rate (scenario II). According to this forecast, the demand for modern occupations will increase by 57 % or 70 % (depending on the scenario) in 2010, compared with 1996. However, the demand for traditional occupations will decrease (by 2 % or 0.3 %). Among the most dynamic occupations according to the forecast are business services agents and trade brokers; computer associate professionals; optical and electronic equipment operators; physicists, chemists and related professionals; building caretakers, windows and related cleaners; automated assembly-line and industrial robots operators; computing professionals; secretaries and keyboard operating clerks; social science and related professionals; precision workers in plastic and related materials. The heaviest decline will hit occupations such as agriculture, mining, light industry, leather industry (pelt, leather and shoemakers); miners, shot firers, stone-cutters and carvers; market-oriented crop and agricultural producers; market gardeners and crop growers). In addition, one should expect the creation of new occupations, especially in the field of information technology, environmental protection, leisure-time activities and bio-technology.

The medium-term forecast (until 2005) is the most developed of those presented, as it covers 369 occupational groups and 5 educational levels. Furthermore, it is disaggregated with respect to educational level into individual provinces. According to the forecast, by 2005 there will be an increase in demand for employees with higher and secondary education and a decrease in demand for employees with primary education. The most rapidly growing demand will be for employees in such occupational groups as computing professionals; college, university and higher education teaching professionals; computer associate professionals; writers and creative or performing artists; artistic, entertainment and sports associate professionals; protective services and demonstrators; printing and related trades workers; building caretakers and related workers; automated assembly-line and industrial robot operators, as well as in the groups 24301 and 24302, while the heaviest decline in demand should be expected in the following groups: market-oriented crop and

animal producers; forestry and related workers; fishery workers, hunters and trappers; mining and mineral-processing plant operators; metal-processing plant operators, as well as in the groups 71101, 31107 and 31108.

The medium-term forecast suggests that demand for employees with higher education will be fully met in a short period of time as a result of the high dynamics of development in private-sector higher education. There may be a surplus of demand for workers with general secondary education and a surplus of supply in the group of secondary-tertiary education.

A lack of research on professions within the context of educational requirements (professions which are taught in schools and institutions of the out-of-school system; comparative content analyses; the responsiveness to labour market needs) does not allow the use of the cluster method on a larger scale in Poland. The authors of this study suggest the structuring of professions in groups, firstly – on the basis of similar tasks and secondly – on the basis of levels with regard to education and professional qualifications. This is recommended for the next stage of work towards the clustering of professions. At the present stage of developments, the authors propose the use of two categories of indicators, allowing the structuring of similar professions in groups: the education and qualification level indicator, together with the equivalence indicator regarding qualifications and labour market demands.

Annex List of professions
(based on the International Standard Classification of Occupations: ISC088)

0000 'TOTAL
1000 'legislators, senior officials & managers'
1100 'legislators & senior officials'
1110 'legislators'
1120 'senior government officials'
1130 'traditional chiefs & heads of villages'
1140 'senior officials special-interest organisations'
1141 'senior officials political-party organisations'
1142 'senior officials economic-interest organisations'
1143 'senior officials special-interest organisations'
1200 'corporate managers'
1210 'directors & chief executives'
1220 'department managers'
1221 'department managers agriculture, hunting, forestry & fishing'
1222 'department managers manufacturing'
1223 'department managers construction'
1224 'department managers wholesale & retail trade'
1225 'department managers restaurants & hotels'
1226 'department managers transport, storage & communications'
1227 'department managers business services'
1228 'department managers personal care, cleaning etc'
1229 'operations department managers nec'
1230 'other department managers'
1231 'finance & administration department managers'
1232 'personnel & industrial relations department managers'
1233 'sales & marketing department managers'
1234 'advertising & public relations department managers'
1235 'supply & distribution department managers'
1236 'computing services department managers'
1237 'research & development department managers'
1239 'other department managers nec'
1240 'office managers (incl. clerical supervisor)'
1300 'general managers'
1310 'general managers'
1311 'general managers agriculture, hunting forestry & fishing'
1312 'general managers manufacturing'
1313 'general managers construction'
1314 'general managers wholesale & retail trade'
1315 'general managers restaurants & hotels'
1316 'general managers transport, storage & communications'
1317 'general managers business services'
1318 'general managers personal care, cleaning etc services'
1319 'general managers nec'
2000 'professionals'
2100 'physical, mathematical & engineering science professionals'
2110 'physicists, chemists & related professionals'
2111 'physicists & astronomers'
2112 'meteorologists'
2113 'chemists'
2114 'geologists & geophysicists'
2120 'mathematicians, statisticians etc professionals'
2121 'mathematicians etc professionals'
2122 'statisticians'

2130 'computing professionals'
2131 'computer systems designers & analysts'
2132 'computer programmers'
2139 'computing professionals nec'
2140 'architects, engineers etc professionals'
2141 'architects town & traffic planners'
2142 'civil engineers'
2143 'electrical engineers'
2144 'electronics & telecommunications engineers'
2145 'mechanical engineers'
2146 'chemical engineers'
2147 'mining engineers metallurgists etc professionals'
2148 'cartographers & surveyors'
2149 'architects engineers etc professionals nec'
2200 'life science & health professionals'
2210 'life science professionals'
2211 'biologists, botanists zoologists etc professionals'
2212 'pharmacologists, pathologists etc professionals'
2213 'agronomists etc professionals'
2220 'health professionals (except nursing)'
2221 'medical doctors'
2222 'dentists'
2223 'veterinarians'
2224 'pharmacists'
2229 'health professionals except nursing nec'
2230 'nursing & midwifery professionals'
2300 'teaching professionals'
2310 'higher education teaching professionals'
2320 'secondary education teaching professionals'
2321 'secondary teachers, academic track'
2322 'secondary teachers, vocational track'
2323 'secondary teachers, other'
2330 'primary & pre-primary education teaching professionals'
2331 'primary education teaching professionals'
2332 'pre-primary education teaching professionals'
2340 'special education teaching professionals'
2350 'other teaching professionals'
2351 'education methods specialists'
2352 'school inspectors'
2359 'other teaching professionals nec'
2400 'other professionals'
2410 'business professionals'
2411 'accountants'
2412 'personnel & careers professionals'
2419 'business professionals nec'
2420 'legal professionals'
2421 'lawyers'
2422 'judges'
2429 'legal professionals nec'
2430 'archivists, librarians etc information professionals'
2431 'archivists & curators'
2432 'librarians etc information professionals'
2440 'social science etc professionals'
2441 'economists'
2442 'sociologists anthropologists etc professionals'
2443 'philosophers, historians & political scientists'
2444 'philologists translators & interpreters'

2445   'psychologists'
2446   'social work professionals'
2450   'writers & creative or performing artists'
2451   'authors journalists & other writers'
2452   'sculptors, painters etc artists'
2453   'composers musicians & singers'
2454   'choreographers & dancers'
2455   'film, stage etc actors & directors'
2460   'religious professionals'
2500   'Not in ISCO'
3000   'technicians and associated professionals'
3100   'physical & engineering science associate professionals'
3110   'physical & engineering science technicians'
3111   'chemical & physical science technicians'
3112   'civil engineering technicians'
3113   'electrical engineering technicians'
3114   'electronics & telecommunications engineering technicians'
3115   'mechanical engineering technicians'
3116   'chemical engineering technicians'
3117   'mining & metallurgical technicians'
3118   'draughtspersons'
3119   'physical & engineering science technicians nec'
3120   'computer associate professionals'
3121   'computer assistants'
3122   'computer equipment operators'
3123   'industrial robot controllers'
3130   'optical & electronic equipment operators'
3131   'photographers & elctr equipment operators'
3132   'broadcasting & telecommunications equipment operators'
3133   'medical equipment operators'
3139   'optical & electronic equipment operators nec'
3140   'ship & aircraft controllers & technicians'
3141   'ships engineers'
3142   'ships deck officers & pilots'
3143   'aircraft pilots etc associate professionals'
3144   'air traffic controllers'
3145   'air traffic safety technicians'
3150   'safety & quality inspectors'
3151   'building & fire inspectors'
3152   'safety, health & quality inspectors'
3200   'life science & health associate professionals'
3210   'life science technicians etc associate professionals'
3211   'life science technicians'
3212   'agronomy & forestry technicians'
3213   'farming & forestry advisers'
3220   'modem health associate professionals except nursing'
3221   'medical assistants'
3222   'sanitarians'
3223   'dieticians & nutritionists'
3224   'optometrists & opticians'
3225   'dental assistants'
3226   'physiotherapists etc associate professionals'
3227   'veterinary assistants'
3228   'pharmaceutical assistants'
3229   'modem health associate professionals except nursing nec'
3230   'nursing & midwifery associate professionals'
3231   'nursing associate professionals'

3232 'midwifery associate professionals'
3240 'traditional medicine practitioners & faith healers'
3241 'traditional medicine practitioners'
3242 'faith healers'
3300 'teaching associate professionals'
3310 'primary education teaching associate professionals'
3320 'pre-primary education teaching associate professionals'
3330 'special education teaching associate professionals'
3340 'other teaching associate professionals'
3400 'other associate professionals'
3410 finance & sales associate professionals'
3411 'securities & finance dealers & brokers'
3412 'insurance representatives'
3413 'estate agents'
3414 'travel consultants & organisers'
3415 'technical & commercial sales representatives'
3416 'buyers'
3417 'appraisers, valuers & auctioneers'
3419 'finance & sales associate professionals nec'
3420 'business services agents and trade brokers'
3421 'trade brokers'
3422 'clearing & forwarding agents'
3423 'employment agents & labour contractors'
3429 'business services agents & trade brokers nec'
3430 'administrative associate professionals'
3431 'administrative secretaries etc associate professionals'
3432 'legal etc business associate professionals'
3433 'bookkeepers'
3434 'statistical, mathematical etc associate professionals'
3439 'administrative associate professionals nec'
3440 'customs, tax etc government associate professionals'
3441 'customs & border inspectors'
3442 'government tax & excise officials'
3443 'government social benefits officials'
3444 'government licensing officials'
3449 'customs tax etc government associate professionals nec'
3450 'police inspectors & detectives'
3451 'police inspectors & detectives (incl. agent, detect.)'
3452 'armed forces non-commissioned officers (incl. sergeant)'
3460 'social work associate professionals'
3470 'artistic, entertainment & sports associate professionals'
3471 'decorators & commercial designers'
3472 'radio, television & other announcers'
3473 'street night-club etc musicians singers & dancers'
3474 'clowns magicians acrobats etc associate professionals'
3475 'athletes sportspersons etc associate professionals'
3480 'religious associate professionals'
4000 'clerks'
4100 'office clerks'
4110 'secretaries & keyboard-operating clerks'
4111 'stenographers & typists'
4112 'word-processor etc operators'
4113 'data entry operators'
4114 'calculating-machine operators'
4115 'secretaries'
4120 'numerical clerks'
4121 'accounting & bookkeeping clerks'

4122   'statistical & finance clerks'
4130   'material-recording & transport clerks'
4131   'stock clerks'
4132   'production clerks'
4133   'transport clerks'
4140   'library, mail etc clerks'
4141   'library & filing clerks'
4142   'mail carriers & sorting clerks'
4143   'coding proof-reading etc clerks'
4144   'scribes etc workers'
4190   'other office clerks'
4200   'customer services clerks'
4210   'cashiers, tellers etc clerks'
4211   'cashiers & ticket clerks'
4212   'tellers & other counter clerks'
4213   'bookmakers & croupiers'
4214   'pawnbrokers & money-lenders'
4215   'debt-collectors etc workers'
4220   'client information clerics'
4221   'travel agency etc clerks'
4222   'receptionists & information clerks'
4223   'telephone switchboard operators'
5000   'service workers & shop & market sales workers'
5100   'personal & protective services workers'
5110   'travel attendants etc'
5111   'travel attendants & travel stewards'
5112   'transport conductors'
5113   'travel, museum guides'
5120   'housekeeping & restaurant services workers'
5121   'housekeepers etc workers'
5122   'cooks'
5123   'waiters waitresses & bartenders'
5130   'personal care etc work'
5131   'child-care workers'
5132   'institution-based personal care workers'
5133   'home based personal care workers'
5139   'personal care etc workers nec'
5140   'other personal services workers'
5141   'hairdressers barbers beauticians etc workers'
5142   'companions & valets'
5143   'undertakers & embalmers'
5149   'other personal services workers nec'
5150   'astrologers, fortune-tellers etc workers'
5151   'astrologers etc workers'
5152   'fortune-tellers, palmists etc workers'
5160   'protective services workers'
5161   'fire-fighters'
5162   'police officers'
5163   'prison guards'
5164   'armed forces, soldiers (incl. enlisted man)'
5169   'protective services workers nec'
5200   'models, salespersons & demonstrators'
5210   'fashion & other models'
5220   'shop salespersons & demonstrators'
5230   'stall & market salespersons'
6000   'skilled agricultural & fishery workers'
6100   'market-oriented skilled agricultural & fishery workers'

6110 'market gardeners & cropgrowers'
6111 'field crop & vegetable growers'
6112 'tree & shrub crop growers'
6113 'gardeners, horticultural & nursery growers'
6114 'mixed-crop growers'
6120 'market-oriented animal producers etc workers'
6121 'dairy & livestock producers'
6122 'poultry producers'
6123 'apiarists & sericulturists'
6124 'mixed -animal producers'
6129 'market-oriented animal producers etc workers nec'
6130 'market-oriented crop & animal producers'
6131 'mixed farmers'
6132 'farm foremen/supervisor'
6133 'farmer NFS'
6134 'skilled farm workers NFS'
6140 'forestry etc workers'
6141 'forestry workers & loggers'
6142 'charcoal burners etc workers'
6150 'fishery workers, hunters & trappers'
6151 'aquatic-life cultivation workers'
6152 'inland & coastal waters fishery workers'
6153 'deep-sea fishery workers'
6154 'hunters & trappers'
6200 'subsistence agricultural & fishery workers'
6210 'subsistence agricultural & fishery workers'
7000 'craft etc trades workers'
7100 'extraction & building trades workers'
7110 'miners, shotfirers, stone cutters & carvers'
7111 'miners & quarry workers'
7112 'shotfirers & blasters'
7113 'stone splitters cutters & carvers'
7120 'building frame etc trades workers'
7121 'builders traditional materials'
7122 'bricklayers & stonemasons'
7123 'concrete placers concrete finishers etc workers'
7124 'carpenters & joiners'
7129 'building frame etc trades workers nec'
7130 'building finishers etc trades workers'
7131 'roofers'
7132 'floor layers & tile setters'
7133 'plasterers'
7134 'insulation workers'
7135 'glaziers'
7136 'plumbers & pipe fitters'
7137 'building etc electricians'
7140 'painters, building structure cleaners etc trades workers'
7141 'painters etc workers'
7142 'varnishers etc painters'
7143 'building structure cleaners'
7200 'metal, machinery etc trades workers'
7210 'metal moulders, welders, sheetmetal workers structural metal'
7211 'metal moulders & coremakers'
7212 'welders & flamecutters'
7213 'sheet-metal workers'
7214 'structural-metal preparers & erectors'
7215 'riggers & cable splicers'

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7216 'underwater workers'
7220 'blacksmiths, tool-makers etc trades workers'
7221 'blacksmiths hammer-smiths & forgingpress workers'
7222 'tool-makers etc workers'
7223 'machine-tool setters & setter-operators'
7224 'metal wheel-grinders polishers & tool sharpeners'
7230 'machinery mechanics & fitters'
7231 'motor vehicle mechanics & fitters'
7232 'aircraft engine mechanics & fitters'
7233 'agricultural- or industrial-machinery mechanics & fitters'
7234 'unskilled garage worker (incl. oiler-greaser)'
7240 'electrical & electronic equipment mechanics & fitters'
7241 'electrical mechanics & fitters'
7242 'electronics fitters'
7243 'electronics mechanics & servicers'
7244 'telegraph & telephone installers & servicers'
7245 'electrical line installers repairers & cable jointers'
7300 'precision, handicraft, printing etc trades workers'
7310 'precision workers in metal etc materials'
7311 'precision-instrument makers & repairers'
7312 'musical-instrument makers & tuners'
7313 'jewellery & precious-metal workers'
7320 'potters, glass-makers etc trades workers'
7321 'abrasive wheel formers potters etc workers'
7322 'glass-makers cutters grinders & finishers'
7323 'glass engravers & etchers'
7324 'glass ceramics etc decorative painters'
7330 'handicraft workers in wood, textile, leather etc'
7331 'handicraft workers in wood etc materials'
7332 'handicraft workers in textile leather etc materials'
7340 'printing etc trades workers'
7341 'compositors typesetters etc workers'
7342 'stereotypers & electrotypers'
7343 'printing engravers & etchers'
7344 'photographic etc workers'
7345 'bookbinders etc workers'
7346 'silk-screen, block & textile printers'
7400 'other craft etc trades workers'
7410 'food processing etc trades workers'
7411 'butchers fishmongers etc food preparers'
7412 'bakers pastry-cooks & confectionery makers'
7413 'dairy-products makers'
7414 'fruit, vegetable etc preservers'
7415 'food & beverage tasters & graders'
7416 'tobacco preparers & tobacco products makers'
7420 'wood treaters, cabinet-makers etc trades workers'
7421 'wood treaters'
7422 'cabinet-makers etc workers'
7423 'woodworking-machine setters & setter-operators'
7424 'basketry weavers brush makers etc workers'
7430 'textile, garment etc trades workers'
7431 'fibre preparers'
7432 'weavers knitters etc workers'
7433 'tailors dressmakers & hatters'
7434 'furriers etc workers'
7435 'textile leather etc pattern-makers & cutters'
7436 'sewers embroiderers etc workers'

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7437 'upholsterers etc workers'
7440 'pelt, leather & shoemaking trades workers'
7441 'pelt dressers tanners & fellmongers'
7442 'shoe-makers etc workers'
7500 '[generic skilled manual worker]'
7510 'manual foremen/supervisers NFS --non farm--'
7520 'skilled workers NFS (incl. craftsman, artisan, tradesman)'
7530 'apprentice skilled work NFS'
8000 'plant & machine operators & assemblers'
8100 'stationary-plant etc operators'
8110 'mining- & mineral-processing plant operators'
8111 'mining-plant operators'
8112 'mineral-ore- & stone-processing-plant operators'
8113 'well drillers & borers etc workers'
8120 'metal-processing-plant operators'
8121 'ore & metal furnace operators'
8122 'metal melters casters & rolling-mill operators'
8123 'metal-heat-treating-plant operators'
8124 'metal drawers & extruders'
8130 'glass, ceramics etc plant operators'
8131 'glass & ceramics kiln etc machine operators'
8139 'glass, ceramics etc plant operators nec'
8140 'wood-processing- & papermaking-plant operators'
8141 'wood-processing-plant operators'
8142 'paper-pulp plant operators'
8143 'papermaking-plant operators'
8150 'chemical-processing-plant operators'
8151 'crushing- grinding- & chemical-mixing machinery operators'
8152 'chemical-heat-treating-plant operators'
8153 'chemical-filtering- & separating-equipment operators'
8154 'chemical-still & reactor operators'
8155 'petroleum- & natural-gas-refming-plant operators'
8159 'chemical-processing-plant operators nec'
8160 'power-production etc plant operators'
8161 'power-production plant operators'
8162 'steam-engine & boiler operators'
8163 'incinerator water-treatment etc plant operators'
8170 'automated-assembly-line & industrial-robot operators'
8171 'automated-assembly- line operators'
8172 'industrial-robot operators' 8200 'machine operators & assemblers'
8210 'metal- & mineral-products machine operators'
8211 'machine-tool operators'
8212 'cement & other mineral products machine operators'
8220 'chemical-products machine operators'
8221 'pharmaceutical- & toiletry-products machine operators'
8222 'ammunition- & explosive-products machine operators'
8223 'metal finishing- plating- & coating-machine operators'
8224 'photographic-products machine operators'
8229 'chemical-products machine operators nec'
8230 'rubber- & plastic-products machine operators'
8231 'rubber-products machine operators'
8232 'plastic-products machine operators'
8240 'wood-products machine operators'
8250 'printing-, binding- & paper-products machine operators'
8251 'printing-machine operators'
8252 'bookbinding-machine operators'
8253 'paper-products machine operators'

8260 'textile-, fur- & leather-products machine operators'
8261 'fibre-preparing-, spinning- & windingmachine operators'
8262 'weaving- & knitting-machine operators'
8263 'sewing-machine operators'
8264 'bleaching- dyeing- & cleaning-machine operators'
8265 'far- & leather-preparing-machine operators'
8266 'shoemaking- etc machine operators'
8269 'textile- fur- & leather-products machine operators nec'
8270 'food etc products machine operators'
8271 'meat- & fish-processing-machine operators'
8272 'dairy-products machine operators'
8273 'grain- & spice-milling-machine operators'
8274 'baked-goods cereal & chocolate-products machine operators'
8275 'fruit- vegetable- & nut-processing-machine operators'
8276 'sugar production machine operators'
8277 'tea- coffee- & cocoa-processing-machine operators'
8278 'brewers- wine & other beverage machine operators'
8279 'tobacco production machine operators'
8280 'assemblers'
8281 'mechanical-machinery assemblers'
8282 'electrical-equipment assemblers'
8283 'electronic-equipment assemblers'
8284 'metal- rubber- & plastic-products assemblers'
8285 'wood etc products assemblers'
8286 'paperboard textile etc products assemblers'
8290 'other machine operators & assemblers'
8300 'drivers & mobile-plant operators'
8310 'locomotive-engine drivers etc workers'
8311 'locomotive-engine drivers'
8312 'railway brakers signallers & shunters'
8320 'motor-vehicle drivers'
8321 'motor-cycle drivers'
8322 'car taxi & van drivers'
8323 'bus & tram drivers'
8324 'heavy truck & lorry drivers'
8330 'agricultural & other mobile plant operators'
8331 'motorised farm & forestry plant operators'
8332 'earth-moving- etc plant operators'
8333 'crane hoist etc plant operators'
8334 'lifting-truck operators'
8340 'ships deck crews etc workers'
8400 'semi-skilled worker NES'
9000 'elementary occupations'
9100 'sales & services elementary occupations'
9110 'street vendors etc workers'
9111 'street food vendors'
9112 'street vendors non-food products'
9113 'door-to-door & telephone salespersons'
9120 'street services elementary occupations'
9130 'domestic etc helpers cleaners & launderers'
9131 'domestic helpers & cleaners'
9132 'helpers & cleaners in establishments'
9133 'hand-launderers & pressers'
9140 'building caretakers, window etc cleaners'
9141 'building caretakers'
9142 'vehicle, window etc cleaners'
9150 'messengers, porters, doorkeepers etc workers'

9151 'messengers package & luggage porters & deliverers'
9152 'doorkeepers watchpersons etc workers'
9153 'vending-machine money collectors meter readers etc workers'
9160 'garbage collectors etc labourers'
9161 'garbage collectors'
9162 'sweepers etc labourers'
9200 'agricultural, fishery etc labourers'
9210 'agricultural, fishery etc labourers'
9211 'farm-hands & labourers'
9212 'forestry labourers'
9213 'fishery hunting & trapping labourers'
9300 'labourers in mining, construction, manufacturing & transport'
9310 'mining & construction labourers'
9311 'mining & quarrying labourers'
9312 'construction & maintenance labourers: roads dams etc'
9313 'building construction labourers'
9320 'manufacturing labourers'
9321 'assembling labourers'
9322 'hand packers & other manufacturing labourers'
9330 'transport labourers & freight handlers'
9331 'hand or pedal vehicle drivers'
9332 'drivers of animal-drawn vehicles & machinery'
9333 'freight handlers'
9999 'occup. not elsewhere included'

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REGIONAL AND SECTORAL ANALYSES AS A METHOD OF FORECASTING LABOUR MARKET NEEDS
Case study: the hotel, catering and tourism sector in the Czech Republic, France and Slovenia

Olga Strietska-Ilina
André Giffard
Christine Guégnard

■ TRENDS AND PATTERNS IN THE SECTOR OF TOURISM[39] IN EUROPE

In the second half of the 20th century, tourism[40] became one of the biggest social, economic, environmental, cultural and international phenomena. All the available information on trends suggests that it will continue to be so this century. Tourism has registered non-stop growth over the last 50 years. According to WTO figures, between 1950 and 2000 the number of international tourist arrivals worldwide increased approximately 27-fold (from 25 million to 670 million), an annual growth rate of 7 %. At least the same can be assumed for domestic tourism (travelling within one country). Over the next 10 years, the WTO expects annual growth of 4–5 %, which means that the number of international tourist arrivals is forecast to double in the next 20 years[41]. The WTO and other organisations and experts are predicting that the contribution of new regions as areas of tourism interest will steadily rise. This process is being accelerated to varying extents not only by the rising interest in new tourist destinations, but also by the support which the target nations[42] are providing for tourism development. Europe will remain the primary tourist region, but second place – currently occupied by America – will switch to East Asia and the Pacific region. Arrivals of foreign tourists in Europe will rise by 3 % a year on average, and by 2020 the number of tourists will have doubled from the current 381 million to 717 million. At the same time, however, Europe's market share will shrink from the current 55 % to 47 % in 2020.

According to WTO and WTTC[43] figures, tourism is the biggest employer[44] and one of the most lucrative economic activities in the world. Tourism offers a wide variety of employment opportunities, from unskilled work (cleaners and auxiliary labour) to highly skilled jobs generating considerable value added. Tourism development also contributes to employment in areas that are less economically developed and/or suffering from structural unemployment (rural and mountainous areas, border areas, areas undergoing restructuring, etc.). Tourism therefore helps to reduce unemployment among difficult-to-employ individuals, particularly those with poor qualifications or none at all; members of ethnic minorities and foreign nationals with limited language skills; young people; school-leavers; the long-term unemployed; and women seeking work after a long break.

The employment generated by tourism is however more difficult to measure than in other sectors. It is characterised by seasonality, part-time work, a high proportion of self-employment, and family firms with low-paid or unpaid work done by family members (especially in smaller facilities, agrotourism and the like), and by illegal "under the table" labour, which can distort employment and wage statistics. These factors are also associated with a sizeable labour turnover in many occupations in the sector, which affects the quality of the services provided. Much of the work in tourism is performed on a contractual basis through various recruitment agencies.

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[39] Hotel, catering and tourism sector, further referred to as tourism
[40] For statistical purposes of the World Tourist Organisation (WTO) this is defined as "activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business or other purposes".
[41] In 2020, 1.5 billion tourists and USD 2 billion in international tourism receipts
[42] Chiefly for economically and socially motivated reasons
[43] The World Travel and Tourism Council
[44] Overall, one job vacancy in nine is generated by tourism

Tourism and its related sectors play an important role in the present transition phase to an information and post-industrial society affecting the labour market as a whole. The labour market is not a homogeneous market with clearly defined and relatively steady jobs, but is developing into a very diverse market with a new flexible structure and organisation of labour. This shift is due not only to technological developments and changes in the organisation of labour, but also to new trends in tourism such as the deep segmentation of the market, flexibility and diversification of goods and services, global availability of services, etc. This, combined with increasing world competition and pressure to cut costs, is leading to endeavours on the part of employers to replace human resources with technology (machinery and equipment, communications and information technology, automation of repetitive activities, e. g. introduction of info-boxes, etc.), and also to the standardisation of goods and services and to the subsequent employment of less skilled or differently qualified labour.

Employees and jobs in tourism are divided into primary and secondary. Primary workers (the core of the company) have steady full-time employment complete with fringe benefits and job security. They receive high remuneration and have a wide range of functions, tasks and skills. The typical workers in this group are professionals and managers, who are in short supply on the labour market and whom employers are trying to attract. Secondary workers are often hired seasonally; they are short-term and temporary employees, part-time staff, casual workers and students. These workers have less job security and little chance of career development within the firm. Often they are either only partially skilled or entirely unskilled. This type of work can be performed by workers with minimal professional knowledge, and normally there is no shortage of such workers; hence they are numerically flexible. Therefore, companies do not invest in the training and development of workers of this type.

Tourism-related services are provided by businesses of various sizes. These can differ markedly in terms of ownership, organisational structure, skills requirements, full-year or seasonal employment, and the level of wages provided. In many tourism-related sectors, especially those with low inputs (small hotels and restaurants, tour operators and travel agents, retail outlets – souvenir shops – and recreational services), small family firms or firms with no employees predominate. These rely on low prices, a personal touch, market niches, help from family members, hand-picked staff and little or no use of modern technology.

In addition to small family firms, the tourism industry is made up of large companies. These typically use specifically recruited labour and have a high level of capital investment, specialised labour, steady management, and shared ownership and management. The tourism industry is undergoing horizontal and vertical concentration, the aim of which is to make savings through the division and specialisation of labour. Most of these firms offer their staff better training, career advancement, employment conditions and pay.

The human factor plays an important role in tourism. Businesses, be they large or small, should be making the most of the knowledge, experience, motivation and social skills of their workers to provide quality services and boost their competitiveness. Despite the widely acknowledged importance of the human factor in tourism, the willingness in practice to invest in the education and training of workers in tourism businesses (especially in the hotel and restaurant area) is low compared with other sectors. Planning in the human resources area is often too short-term, particularly in the small and medium-sized businesses that predominate in tourism. The seasonal nature of the work, the large proportion of part-time workers, the high staff turnover and the limited opportunities for career advancement deter both employees and employers from investing in education and training.

■ RESEARCH METHODOLOGY

Whether in France, the Czech Republic or Slovenia, the tourism sector accounts for the employment of a substantial part of the working population. Indeed, in the analysed territories, the share of the sector in employment represents between 4.5 and 6.5 % in the 3 countries, without taking into account the multiplication effect of the sector over employment in other industries. For these three countries, the hotel and catering sector represents a major asset with high potential for future economic development. This potential for economic development in the three countries and the growing importance of the sector in Europe justified the choice of the hotel, catering and tourism sector as a case study.

The analysis however was not conducted on the national level. We have chosen to concentrate on the regional level, particularly the region of Burgundy in France, the North-West Bohemia region in the Czech Republic and the Podravje region in Slovenia. This regional focus is no coincidence: it complements the national quantitative approaches (for more see Chapter 2 of the publication), and makes it possible to develop an approach to the analysis of emerging qualifications and qualitative requirements for skills which takes into account local characteristics.

The purpose of the research was twofold. On the one hand, the partners intended to verify the methodology and to produce recommendations for future application of regional and sectoral analyses. The purpose was not to provide statistically exhaustive results (the sample was too limited), but to examine whether relatively similar questioning can be conducted, whether the approach offers opportunities for productive comparative analyses, and whether the methodology of a limited-scale but in-depth analysis can be retained for future surveys. On the other hand, the research in the same sector in the three countries added the value of cross-country results and national recommendations for future development of education and training for the sector.

In order to identify the qualification needs and the way they will develop, a survey was initiated in the last quarter of the year 2000 in each country. A questionnaire was developed to test its relevancy in each of the analysed territories. Each country applied a different questionnaire, but a certain range of core topics was agreed and preserved in all three countries. Each questionnaire included from 20 to 40 questions. In France the interviews were done by phone, in the two other countries the interviews were conducted face to face. Four core themes were addressed in the questionnaires: company and staff characteristics, prospects in terms of employment, training and HRD practices, and in terms of the evolution of qualifications and job profiles. Altogether 48 companies in Burgundy were interviewed, 83 in Podravje and 24 in the North West of the Czech Republic. In Slovenia and in France the sample mainly included micro-firms. The Czech Republic gave small and medium-sized companies a bigger share, where 6 companies of the sample had between 25 and 100 employees, and 2 companies had more than 100 employees. The companies included restaurants, taverns, fastfood, hotels, cafés, travel agencies and tourist information centres.

Table 1: Comparison of the targeting of questionnaires in the three regions

The company and staff characteristics	SL	CZ	FR
Corporate name, situation	X	X	X
Business type			X
Legal status	X	X	
Turnover	X		
Line of business (NACE)	X	X	X
Number of jobs	X	X	X
Permanent and non-permanent employees by gender, age and level of education	X	X	X
Permanent and non-permanent employees according to profession		X	X
Apprentices	X		X
Trainees	X		
Scholarship provided by the business	X		
Personnel turnover		X	
Foreign workers		X	
Prospects in terms of employment	**SL**	**CZ**	**FR**
Employment cutbacks, depending on the job type, in 2001 and 2002		X	X
Employment cutbacks based on the training level	X		
Reasons for cutting back jobs	X		X
Possible hiring of new recruits in 2001–2002 based on the job type, the training level or diploma	X	X	X
Difficulties in recruiting		X	X
Required knowledge and skills for each type of job	X	X	
Education level	**SL**	**CZ**	**FR**
Hiring of young graduates from the educational system		X	
Possible cooperation with educational institutions (initial training)		X	
Further training for employees (type of training, length, employees involved...)	X	X	X
Collaboration with ongoing training institutions, foreign experts...	X	X	
Financial contribution to the training	X	X	X
Obstacles to training	X	X	X
Evolution of qualifications	**SL**	**CZ**	**FR**
Evolution of the activities: new technologies	X	X	X
Evolution of the activities: new markets, new offers...	X	X	X
Evolution of the qualifications according to the profession	X	X	X
Obstacles to human resources development (in the business, outside of the business)	X		

The questionnaire surveys were conducted hand in hand, and were then followed by a number of focus group meetings and in-depth interviews with representatives of employers, social partner organisations, policy makers, researchers and experts in the field of tourism, and representatives of secondary and tertiary schools in related branches. The survey and focus groups' results were confronted with national and regional statistics, as well as international trends in the sector (the latter was the case of the Czech Republic). Finally, an attempt at scenario development contributed to the formulation of recommendations for the future development of the sector.

■ CONTENT RELATED FINDINGS:

Many findings proved to be similar in the regions of the three countries, only the extent of their validity differed. Here we present some trends and patterns that were found characteristic for the selected regions.

Main factors of influence

The factors of change fall into three categories.

1) GLOBALISATION, OPENING UP BORDERS, EU ENLARGEMENT

The opening up of borders was the factor evoked by Slovenia and the Czech Republic. The positive impact of globalisation, access to new markets and potential customers, the coming access to the structural policies of the European Union, and the geographical position of the region are some of the typical factors of growth in the sector. The sector has been growing in recent years in all three countries and still has substantial potential for further growth.

2) CHANGING CHARACTER OF CONSUMER DEMAND

This factor of influence is linked to the transition to a post-industrial knowledge-based society, in which greater importance is given to leisure activities that combine different types of services. In all three analysed regions the customers show greater selectivity with respect to prices and quality. Tourism involves all age groups, with an increase in pensioner tourism and youth travel, and implies a greater demand for products and services that are specific, diversified and complex in nature (e. g. spa and recreational tourism combined with sports) and a gradual departure from the 4S model as a pattern of leisure[45].

3) GROWING ROLE OF DYNAMIC FEATURES OF TECHNOLOGY DEVELOPMENT, ESPECIALLY IT

The third factor appears as crucial for meeting the demands of the first two. The surveys conducted in Slovenia and in the Czech Republic revealed different development trends, including the development of information centres for tourists and the development of links between regional businesses and institutional or political actors involved in the tourism sector. In this regard, Slovenia considers "*the mutual linkage and connections*" as an asset. Nowadays it is more often necessary to link the evolution of the hotel and catering sector with the development of the information systems of the tourism industry. Finally, the theme of the new technologies was evoked by the change in channels of communication, the ways and means of advertising, and the nature and organisation of services.

It is worth noting, however, that no drastic transformation in the traditional hotel and catering professions has been evoked in the three regions. The twofold character of the tourist business was discovered. On the one hand, the attractiveness and the special charm of the tourism sector are largely linked to its traditional nature, with old roots and the long-standing custom of the hospitality sector. This traditionalism appeared as a factor in opposition to dynamism. On the other hand, new and modern forms of organisations such as tourist information centres, in which the information system is linked to travel agencies, hotels, transportation, a pool of freelancers (e. g. guides, interpreters), regional development agencies, and regional and local

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[45] Sun, Sea, Sand, Sex

administration, represent dynamic features and a driving force behind the development of the whole sector. The latter trend brings about a demand for the construction of complex travel packages (ready-made or tailor-made) to offer clients with interlinking cultural guided sightseeing, accompanied by sports, recreation, exotic tours, local cuisine, various transport arrangements, etc. The importance of the latter, "dynamic" culture in tourism, however, should not be overestimated, as post-industrial society often iintroduces the other extreme of clientele expectations, connected to the "back-to-basics" approach. This imposes a demand for the greater role of ecoturism, agroturism, conversion and conservation techniques, etc.

The impact on skills requirements

The three surveys show that similar qualities are expected concerning the additional professional skills to be developed in the future. The most important skills include language knowledge, IT skills, new conservation techniques, modern techniques for preparing meals, and commercial skills. It is, however, crucial that these skills are often required in a complex composition, whereby it is expected that the traditional qualifications of the hospitality sector are to be combined with IT, database skills or complex understanding of regional development and ecology. The trend towards multiskilling is rather common for the sector. As such, we find that training needs differ depending on the hierarchical status in the firms. Managers traditionally have more requirements than regular employees do, and they are the ones who benefit the most from participation in training. This, however, is not a specificity of the sector, nor of the considered countries or regions: such a trend is general everywhere.

Table 2. Required skills

SL – Podravje	CZ – NW	FR – Burgundy
German language English language	Language knowledge	Language knowledge
Communication	*Human communication* Managing and working with people	
Food preparation *Food/desserts decoration*	*Manual skills specific to the sector* Broad professional base Technical skills Specific professional knowledge	Hygiene, Food security *Conservation techniques, lighter cuisine, more diversified food*
Computer skills	*Computer skills*	Computer skills
Designing travel arrangements	Strategic planning Creativity	
– *Service* – preparing covers		
Commercial skills Selling travel arrangements Marketing	Financial skills *Sales skills* Marketing	Sales skills
Expertise on wine		
Management skills	*Managerial skills*	

Note: This table sums up the required skills as mentioned by companies during the survey. The shaded sections indicate those most needed, the skills *in italics* are those mentioned by some, and the skills in normal characters are hardly ever mentioned.

The regions of Podravje and Burgundy are considering the possibility of recruiting additional employees in 2001 and 2002. In North-West Bohemia recruitment seems to be stagnating, and even giving way to a certain attrition. Still, employers declare not having difficulties finding substitutes to fill vacancies. According to the surveys, respondents did not report any serious problems in finding suitable employees to fill vacancies, except for minor cases and rather specific occupational specialisation. The situation is inverted in France, since professionals declare having difficulties in recruiting. In fact, young people do not turn away from the jobs offered in the hotel and catering sector, but businesses have difficulties retaining them.

Patterns of training provision

The sector's traditional human touch, which still largely prevails, is not reflected in the human resource policies of companies in the sector. Training is scarcely provided in spite of the importance of the human factor. The main reason to provide training is adaptation to change, especially technological change, and diversification of services, especially linked to rising expectations among clientele (more diverse, more complex, more sophisticated services), and consequently, adaptation to the rising standards.

The training provision in companies confirmed patterns in the sector at the international level where small and micro-firms, especially family type, rarely provide any training. Hotels and restaurants in general care less about their personnel development than travel agencies and information centres. The latter are better prepared to provide training in case of a skills shortage or a skills demand linked to organisational changes, the provision of new services, and the satisfaction of new demands made by clients.

Permanent employees in their majority are skilled and educated in the relevant field. However, there is still a portion of them (up to 20 % in Burgundy) who are under-skilled. The sector still suffers from lower wages as compared to the national average, and from high involvement of a low qualified and also low-motivated work force. The sector is highly affected by its seasonal nature, due to which employers do not wish to invest in training and development for their temporary staff. With high turnover of employees, unstable contractual arrangements, low wages, and the involvement of a high share of illegal labour, the commitment of companies to HRD is at the bottom of the range as compared to other sectors. Furthermore, the contextual employment situation influences the employment and training arrangements. For instance high unemployment in the North-West region of the Czech Republic introduced a situation of no recruitment problems and therefore very low interest in investment in people. In France, where employers have a legal financial obligation to pay a percentage of the payroll for training[46], the system proved to be the main and the only driving force for investment in people. One of the main barriers there, however, was the difficulty in finding a temporary employee-substitute for the one sent on training. In such cases companies prefer to pay the tax but keep their staff full-time busy, and provide no training. A more motivating mechanism of co-financing training does not seem to help this situation. Instead job-rotation, job-sharing schemes, and distance learning should be promoted at a company, sector or regional level.

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[46] This 1971 law applies to French companies and requires employers to finance training under the so-called legal financing obligation. Companies are not required to provide training to their employees; they can pay the total of their mandatory contribution to the Treasury or designated agencies certified by law. Presently, the minimal amount for this contribution is:
– 0.25 % of the gross payroll for companies under 10 employees;
– 1.5 % of the gross payroll for companies with 10 employees and more.

There are three obstacles to the development of continuous training in Slovenia and the Czech Republic: the high cost of training, the long distance between the workplace and the training agency, and the inadequacy of the training to the needs of the companies. Co-financing and motivating mechanisms (e. g. tax incentives, a voucher system) should be developed in these countries. Pre-structural funds appear as a useful tool for supporting training and development of human resources in the sector of tourism, contributing to the regional development and economic competitiveness of countries, regions and companies.

The content of the training provided is similar whatever the country. It develops skills in cuisine, service, hygiene, marketing and management. The length of the training sessions is short, one week as a rule.

■ METHODOLOGY RELATED FINDINGS

1) Different questionnaires with the same range of core topics can be used for s qualitative type of analysis at a cross-country level. Soft qualitative-type tools proved to be useful and did not present a significant barrier in the cross-country analysis of trends. A cross-country statistical comparison was not entirely crucial for the purposes of such analysis.

2) Questionnaire surveys as the sole method of investigation have limited importance and validity. Such surveys need to be combined with other data and information. This concerns not only statistics but also and especially soft information (e. g. global trends, trends in developments in other countries, types of skills demanded, job profiles, etc.).

3) Nation-wide forecasting can be used only to confront the data for the sector/region. We can conclude this summary by underlining that the methodology developed for the qualitative analysis served as a supplement to the quantitative survey and made it possible to highlight the current needs and the future challenges that face the tourism sector.

4) The prospective approach is perfectly relevant for promoting greater involvement of the different actors of the socio-economic process, and for intensifying their commitment. This involvement is all the more important, as the diagnosis and the forecasting scenarios are shared. Participative scenario-building implies a greater commitment of all actors (including social partners and policy makers) to the visions, conclusions and recommendations and therefore to their implementation in the future.

QUALIFICATION AND SKILL NEEDS IN THE SECTOR OF TOURISM: The case of North-West Bohemia – Czech Republic

Josef Zelenka

Olga Strietska – Ilina

Věra Havlíčková

Jaromír Beránek

Josef Říha

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ABBREVIATIONS

CERGE-EI	Center for Economic Research and Graduate Education-Economic Institute
CSO	Czech Statistical Office
CTA	Czech Tourist Authority
GDP	gross domestic product
GDS	global distribution system
GIS	geographic information system
IS	information system
ISCO	International Standard Classification of Occupation
IT	information technology
LFS	Labour Force Survey
MRD	Ministry for Regional Development of the Czech Republic
MEYS	Ministry of Education, Youth and Sports of the Czech Republic
NACE	General Industrial Classification of Economic Activities
ROP	regional operational plan
SOP	tourism sector operational plan
TIC	tourist information centre
WTO[47]	World Tourism Organisation

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[47] in this report, "WTO" always refers to the World Tourism Organisation, not to the World Trade Organisation

■ INTRODUCTION

1. The *LABOUR*atory project and its objectives

"*LABOUR*atory" – *Forecasting Training Needs: Comparative Analysis, Elaboration and Application of Methodology* is an international research project funded by the EU Leonardo da Vinci programme. During 1999–2001, the project took stock of the labour market data and methods used to forecast education and training needs in the project's partner countries – the Netherlands, France, Ireland, Germany from the EU and Poland, Slovenia and the Czech Republic preparing for EU accession. In the countries of the former socialist bloc, the market economy environment completely transformed the previous planning processes which had determined, by command, the skills, sectoral and geographical structure of labour force needs based on five-year economic development plans. The nations of Eastern Europe were thus faced with the task of seeking appropriate new methods for forecasting the world of work and for delivering the requisite information to professionals and the public. The need to address this task was the main impetus for setting up the *LABOUR*atory project, in which experts from Western nations used their experience to help propose the most appropriate forecasting methods for the specific conditions of their Eastern partners. By working together and exchanging views on the systems used in the individual Western nations, the partners from these countries, too, gained new ideas and inspiration on how to further develop their forecasting systems and tailor them to current needs and new opportunities.

The partners in the Czech Republic decided to propose a combined forecasting system of indicators of future labour market training needs. This is based on a quantitative mathematical model using time series of statistical data on the labour force, labour market and education system in previous years, with the model's outputs being complemented and adjusted using qualitative methods. These methods are in turn based on surveys[48] in companies; on expert discussions aimed at estimating future developments in economic sectors and regions; and on discussions with social partners, civil servants, educators and other labour market and training experts. The proposed model does not aim to provide the Czech Republic with precise figures on the future needs in specific professions. Its creators are well aware of the limitations and dangers of precise projections. All that the model produces is a set of indicators of how the professions might develop under certain conditions. It also allows the possibility of considering the future shape and form of the labour market taking into account the various possible influences upon it.

The implementation of the proposed forecasting model in its final form will generate regular information for political decision-makers, local and regional authorities and social partners working in the employment, labour market and training areas, as well as for careers advisory services and private individuals looking for new or better career prospects.

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[48] focusing on professional structure, training needs, expected changes in work content and opinions on staff training and education

To ensure reliable outputs from the proposed forecasting system, the results provided by the mathematical model will need regular updating. The related qualitative surveys will focus on those areas of the economy and labour market in which the need for more detailed knowledge of trends will be continually diagnosed. The sector and regional qualitative analyses will make it possible to formulate labour market needs in more detail and thereby propose projects to foster the appropriate skills structure. It will also generate material to justify claims for funding both from the Czech Republic's own resources and from the pre-accession funds and - later on - structural funds of the EU.

The training needs forecasting model proposed for the Czech Republic is currently in the form of a research paper. This describes the realistic possibilities for labour market forecasting in the Czech Republic; the problems experienced with practical verification of the proposed methods in both the quantitative and qualitative component; and the conditions that must be met for the system to be implemented.

The project objective of verifying the proposed qualitative forecasting methodology in practice was met using **the tourist industry sector in the North West Bohemia Region of the Czech Republic** as an example. Tourism was also chosen for regional analysis by the project partners in France and Slovenia owing to its level of development and its importance for their economics. In the Czech Republic, tourism is underpinned *inter alia* by the "Concept of the Tourist Policy of the Czech Republic" (6) and by the "Sector Operational Programme" of the National Development Plan 10), for which the Czech Ministry for Regional Development is responsible as part of the general support for tourism and the preparations for EU accession. The pilot survey took place in North West Bohemia. This region is currently experiencing severe economic difficulties and is undergoing restructuring, but on the other hand has strong tourism potential thanks to its traditions and to new opportunities.

2. Study elaboration methods

This study is based mainly on the documents listed in the Bibliography and the sources given in Table 1, with particular emphasis on the questionnaire survey and expert opinions. The preliminary conclusions were discussed in focus groups. In presenting the results of the comparative study, priority has been given to providing clearly arranged, captioned outputs in tables and charts.

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Table 1 Sources for the study and selected aspects of their use

Source	Selected aspects of use
The *LABOUR*atory project quantitative model, elaborated by CERGE	Discussion of qualitative influences on quantitative developments based on a labour market model; selection of optimum model output with regard to the labour force structure
Regional data – NUTS2 North-West Bohemia	Analysis of the regional potential of the Czech Republic and the opportunities for exploiting this *inter alia* in relation to the labour market; context for conclusions from the questionnaire surveys in the region and from the data for the nation as a whole
Questionnaire survey	Semi-quantitative evaluation - source materials for sector trends, skills needs and the requirements for meeting them, employment trends, labour force structure
Information on the tourism sector around the world and in the EU	General framework for deriving trends in tourism generally and in the Czech Republic and their effects on the labour market and on labour force skills in the sector
Information on trends in the tourism sector in the Czech Republic	Drawing of basic conclusions for qualitative effects on the quantitative model of the labour market; comparing and contrasting with research in the North-West Bohemia region; extrapolation of trends, discussion of the influence of planning and regulation of tourism on the labour market
Focus group discussions	Evaluation of the preliminary conclusions of the study; incorporation of expert opinions into the study

■ TOURISM

Tourism is a phenomenon permeating the information and consumer society with no sharp boundaries[49], and it therefore has many definitions. These most often include:
- ■ a space definition vis-a-vis the usual residency environment of the individual (activities outside this environment);
- ■ a definition of the purpose of or motivation for such activities (leisure, business or other);
- ■ a contractual time limit for such activities[50];
- ■ some link with the economic benefit of the activities for the destination (tourism generally encompasses business trips as well as recreational activities; it does not include regular gainful activity, e.g. frontier workers and employment remunerated at destination).

Tourism meets people's needs in many different ways. These needs include:
- ■ exploration, the search for adventure, satisfaction of curiosity (new and unknown countries, cultures and people, unusual experiences, visits to places of significance, exposure to the *genius loci*, etc.);
- ■ changes of pace and routine;
- ■ rest and relaxation;
- ■ religious and faith-related needs;
- ■ social contacts, etc.

The wide spectrum of ways in which these needs can be satisfied gives rise to various forms of tourism. Their development is closely linked the marketing of tourism; with strategic planning of the development of a tourist destination and its life cycle; and with the degree to which tourism affects the natural and anthropogenic environment.

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[49] and is therefore difficult to define
[50] as opposed to long-term residence

In very broad terms, two basic (extreme) types of tourism can be identified:

■ mass tourism, as typified by a familiar or standardised cultural and material environment and standardised services; by exact description of destinations using the media and IT; by the construction and creation of amusements and attractions; and by a high tourist density to, in and around attractions;

■ individual tourism, with freer exploration of nature and local cultures in conditions closer to local customs (typical local guest houses, private accommodation, camping), with a minor impact on local communities and nature.

Both these basic types of tourism depend on a diverse[51] material base (hotels and restaurants; travel agents; air, rail, boat and bus travel companies; TICs; tourist attractions; etc.) and employ people with various occupations and skills. In practice, the two types are interconnected. The tourist industry is currently clearly focused on mass tourism, which allows concentration of tourist services and lower prices, long-term preparation of market products, freer choice of destination and form of tourism for the client, etc.

Diversity in the tourism industry, the size, legal form and market orientation of businesses, and seasonality – these are some of the factors that affect corporate strategy and decision-making, product ranges, innovations, workforce size and the training required for tourism workers. These factors are conditional on a whole range of dimensions – supply and demand on the labour market, the culture and history of the sector or region (advanced vs. developing nations), economic system (market vs. planned economy) and other economic factors affecting demand for, and prices of, products and services.

1. Tourism around the world and in Europe

In the second half of the 20th century, tourism[52] became one of the biggest social, economic, environmental, cultural and international phenomena. All the available information on trends suggests that it will continue to be so this century. Travelling for exploration, recreation, leisure and work has become an integral part of people's lifestyles, especially in the advanced nations of the world, including the Czech Republic. In addition to changes in lifestyle, travelling is being fostered to an ever-increasing extent by the development of transport infrastructure, aviation, communications, car ownership and by political and economic change. According to statistical information[53] (on the numbers of tourists crossing borders and on foreign exchange income from international tourism), more than one tenth of the Earth's population engages in international tourism each year. Even more people participate in domestic tourism inside their own countries (the exact number is difficult to monitor statistically, but the benefits for economic development are also very significant).

Tourism has recorded non-stop growth over the last 50 years. According to WTO figures, between 1950 and 2000 the number of international tourist arrivals world-wide rose approximately 27-fold[54] (from 25 million to 670 million), an annual growth rate of 7 %. At least the same can be assumed for domestic tourism (travelling within one country). Over the last decade, the number of international tourist arrivals has been rising by around 4 % a year

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[51] partially

[52] for WTO statistical purposes defined as "activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business or other purposes"

[53] monitored regularly for the whole world by the WTO in particular

[54] tourism receipts also rose analogously

on average and average annual growth in international tourism receipts has exceeded 6.5 %. Over the next 10 years, the WTO expects annual growth of 4–5 %, which means that the number of international tourist arrivals is forecast to double in the next 20 years[55]. The WTO and other organisations and experts are predicting that the contribution of new regions and macro-regions as areas of tourism interest will steadily rise. This process is being accelerated to varying extents not only by the rising interest in new tourist destinations, but also by the support which the target nations[56] are providing for tourism development. Europe will remain the primary tourist region, but second place – currently occupied by America – will switch to the East Asia and Pacific region. Arrivals of foreign tourists in Europe will rise by 3 % a year on average, and by 2020 the number of tourists will have doubled from the current 381 million to 717 million. At the same time, however, Europe's market share will shrink from the current 55 % to 47 % in 2020.

The scope of tourism activity is clearly demonstrated in the Standard International Classification of Tourism Activities (SICTA – see Annex 1) and the List of Tourism Characteristic Products (see Annex 2). The SICTA identifies tourism-related economic activities and gives the share of each activity in total activity in the region. The SICTA breakdown is very detailed and exhaustive at a general level, but does not contain inter alia economic information, including an overview of employment and demand on the labour market.

According to WTO and WTTC[57] figures, tourism is the biggest employer[58] and one of the most lucrative economic activities in the world. Tourism turnover ranks in third place behind trade in oil and oil products and the automobile industry. Overall tourism receipts, including receipts from international passenger transport, estimated at USD 548 billion for 1999, lay in first place among the foreign trade categories. For many countries, tourism is a major source of foreign exchange income. According to a 1998 WTO analysis (16) international tourism is among the five largest export sectors in 83 % of the countries of the world and in first place in 38 % of countries as regards generation of foreign exchange income.

With its multiplier effects (economic and social, and in employment, infrastructure, culture, etc.), tourism fosters higher employment, generates income for businesses in tourism and other sectors, supports investment activity and contributes effectively to the balance of payment of target countries. In particular, tourism:

■ **creates jobs** in a wide spectrum of economic activities, many of them in small businesses and in areas afflicted by the highest levels of structural unemployment

■ is a major **source of foreign exchange income** through foreign visitor spending on goods and services. As a percentage of goods exports, this income varies from country to country depending on export performance and the size and scope of tourism activities in the national economy. In the EU it was estimated at 14.2 % of total exports on average in 2000. The countries with a high contribution of tourism to exports include Austria (19.5 %), Germany (17.5 %), France (15.7 %), Greece (24.8 %) and Portugal (25.4 %). Those with low shares include the Netherlands (8.3 %) and Finland (7.6 %). In the Czech Republic, income from foreign tourism represented 9.9 % of goods exports at current prices in 2000 (11.6 % in 1999 and 14.1 % in 1998)

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[55] in 2020, 1.5 billion tourists and USD 2 billion in international tourism receipts
[56] chiefly for economically and socially motivated reasons
[57] The World Travel and Tourism Council
[58] overall, one job vacancy in nine is generated by tourism

■ **affects the construction and industrial sectors** – world-wide capital investment generated by tourism was estimated at USD 780 billion for 1998 (11.8 % of the total investment volume); annual growth of more than 4.5 % is foreseen.

■ **is a source of public revenue** (for state and local authorities) and a **recipient of public funds**. The total world-wide revenue from economic activities affected by tourism in 1998 was estimated at USD 800 billion (10.6 % of the total volume of taxes collected. State and public spending on tourism-related activities (e.g. on infrastructure) stood at USD 250 billion in 1998 (6.8 % of total state expenditure). By 2010, these revenues and expenditures are both expected to double.

Compared with surveying the movement of tourists[59] and directly monitoring tourist expenditure (done by banks and statistical offices), it is much more difficult to measure the overall economic benefits of tourism, i.e. the level of value added and overall employment. The appropriate methodological instrument for separately identifying, recording and analysing the economic and other benefits of tourism is the "Tourism Satellite Account". International standards for the Tourism Satellite Account, used to measure the real benefit of the sector to the national economy (in terms of percentage of GDP; jobs; capital investment; tax revenues; and its role in the balance of payments) were approved by the UN Statistical Commission on 1 March 2000. This makes tourism the first sector to have international standards for measuring its total economic benefits approved by the UN.

One problem with measuring the economic categories affected by tourism is the varying share of tourism in individual industries – from low through to high (see SICTA, Annex 1). This share is difficult to monitor statistically (e.g. determining the share of tourism in restaurant receipts from visitors and from residents[60], or the share of transport of visitors and transport of residents to employment or for other activities in bus transport receipts). Special surveys, statistical calculations, documentation and research from various organisations and bodies, ancillary methods and estimates often have to be employed to determine the share of tourism in individual categories.

The absence of certain information on tourism – in particular its positive effects on the economy and employment – is also a problem in the Czech Republic. The Concept of the Tourist Policy of the Czech Republic (6) states that the inadequate information content of the statistics is one of the main problems hindering further tourism development in the Czech Republic. This problem is not just one of incomplete application of Directive 95/57/EC on the collection of statistical information in the field of tourism, but also of defining the size and growth rate of tourism and of expressing its benefits for employment, GDP, state and local budget revenues, etc. To enhance this aggregate information, the Concept recommends that the benefits of tourism be identified and that Tourism Satellite Account be gradually compiled for the Czech Republic.

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[59] visitors generally, simplified for the study since much of the statistical data is reported for tourists (at least one overnight stay at the destination)
[60] including staff restaurants

■ 1.1 Trends in tourism

Motto: **Sustainable** *refers to tourism whose services and activities in conveying visitors to their destinations, services at those destinations and activities of those visitors affects the natural and anthropogenic environment, local community and biosphere as a whole only to an extent that does not irreversibly damage the global or local environment, local community and biosphere as a whole and so restricts neither the possibility of tourism or other anthropogenic use of the destination in the future nor the function of the biosphere.*

Tourism is subject to rapid qualitative changes, caused by:
■ external factors (political, economic, technological, ethical, social, legislative, etc);
■ changes in client motivation and behaviour (clients are demanding new products and activities, using new technology and starting to become aware of the relationship between tourism and the environment);
■ changes in its own internal development factors, which frequently anticipate external influences and client behaviour, and also actively influence them.

The dynamic components of tourism include:

■ certain entities (TICs, regional development agencies, professional associations and municipalities);

■ active application of technology in tourism (information and communications technology; technology in transport, hotels and restaurants, and technology used to mitigate the environmental impact of tourism);

■ the means of development, the marketing and the nature of modern tourism products (flexibility – the possibility of interactive product completion before or during the trip; comprehensiveness – regional and supra-regional products, programming, package creation, optimisation of product quality-price ratio, etc);

■ the targeted activities of individual managers, regional, municipal and state representatives, etc.

Following the world-wide adoption of Agenda 21[61], the role and concept of tourism is changing. We are seeing a gradual shift from exploitive to sustainable tourism. Selected factors affecting tourism, related trends within tourism and the impacts of tourism on the labour market are summarised in Table 2. The system overview of sustainable tourism in demonstrates *inter alia* the new labour force skills on the labour market connected with this fundamentally new concept of tourism.

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[61] The principal policy and implementation document concerning global promotion of sustainable development. It was adopted at the Earth Summit (the UN) – UNCED in Rio de Janeiro, 1992.

Figure 1 System analysis of aspects of sustainable tourism

client ethics, change in activities respecting the local community	choice of activities, means of implementation, effect on infrastructure	**service providers** change in management, codes of ethics supply of suitable activities, marketing, co-operation with local community

anthropogenic envir. of destination

local community
preservation of culture, use of financial flows, involvement in regulation and planning

local bodies
goal is optimisation, tourism regulation + planning, consider building attractions, renovation of attractions respeting history + tradition

attractions
part of local life, bearable load, visitor management

genius loci

conditions for tourism
legislation, codes of ethics, public opinion, research, long-term monitoring, education, training

natural environment

local + global resources – substitution of traditional energy sources, regulation of demand and resource useuse for tourism, renewal and protection of resouces

pollution – prevention, end-of-pipe, education local community and visitors, penalties, indicators, legislative and economic regulation

expansion of tourism – regulation, use of revitalised, development of appropiate activities (agrotourism, ecotourism, urban, congress tourism)

ecosystems – bearable load, protection of area, limited visitor movement, revitalisation

Table 2 Selected influences on tourism, related trends in tourism and influences on the tourism labour market[62].

	Factors affecting tourism	Trends and reflections in tourism	Effects on the tourism labour market and training
technical, technological and transport	information and communications technology – online access to vast amounts of data – and technology for e-business, secure communications, modelling, simulation, management, exact geographical information, customisation of information provided to clients, etc.	rapidly increasing requirements for computer literacy of varying degrees and for various occupations (some professions are becoming indispensable – service intermediation, marketing, etc.); decreasing employment in travel agencies; new jobs – virtual travel agencies	IT is widely used in tourism[63] – for management, marketing, logistics, presentation and distribution of products and individual services, e-business, serving clients, management accounting, etc.; IT as part of the product – amusement and theme parks; an increasing tendency to make last-minute holiday bookings and to compare quality and price of services
	new technology in restaurants (meal preparation), hotels (customer service and room fixtures and fittings), air transport (large-capacity aircraft, flight control, modern terminals, etc.), rail transport (high-speed trains; the renaissance of the railways as a means of transport)	hotels and restaurants – pressure for reduced workforces (meal preparation, cleaning efficiency); jobs in rail and air transport	greater speed, efficiency and safety of transport (shorter journey times as a percentage of holiday duration, increased client convenience); increased holiday frequency; long-haul travel [64]; combination of numerous means of transport in one trip
	construction of road networks (the European transport network, with transport corridors and bridges, e.g. the link between Central Europe and Scandinavia)	job opportunities in border areas, in services for individual clients and in services along transport routes	higher frequency of individual short- and medium-range trips; increased transport efficiency and shorter journey times as a percentage of holiday duration; increased client convenience
	the urban and social renaissance of technical and urban buildings and monuments (the industrial revolution becomes history with a hint of nostalgia	positions for guides at attractions, in renovation of monuments and change of use of buildings, and in other services in the locality	technical urban buildings and monuments as a tourist attraction – railways (mountain railways, narrow-gauge railways, viaducts, etc.), mines, mills, power stations, weirs, dams, etc.

[62] regardless of the order presented, which is heavily schematic, the individual factors and their pass-through into tourism are interconnected; factors affecting training are analysed in more detail in Tab. 14
[63] for a more detailed analysis see (20)
[64] the number of long-haul journeys between Europe and other continents is rising more rapidly than the number of intra-European trips

	Factors affecting tourism	Trends and reflections in tourism	Effects on the tourism labour market and training
sociological, change in motivation and behaviour of visitors	advanced nations – shorter working hours, continuing growth in living standards, rising life expectancy, better health and fitness (greater personal health awareness), good social security for families	development of a whole range of occupations – mountain guides, sports instructors, regional managers, professional guides; emphasis on skills: marketing (market research, marketing communication, etc.), creativity and others in creating products for pensioners and young people; IT skills required for creating package tours	travel in all age groups; increase in pensioner tourism and youth travel, discounts by age and social group; specific products – spa and recreational tourism and sporting holidays, gradual departure from the 4S model[65]
	changes in the motivation and behaviour of visitors[66]; motivation to travel more diverse – *inter alia* adventure (danger), social contact, direct experience of local culture, contact with nature, active sport, beach holidays (classic 4S model), physical fitness, wellness, fitness and curative stays, ecotourism, agrotourism, rural tourism		wide and differentiated product ranges (by price, location, length of stay, activity, etc.); supersegmentation of the market (for individual customers); concentration of products in one location; combination of winter and summer activities (downhill skiing, snow golf, swimming, bowling, etc.); no. of made-to-measure package tours growing rapidly compared with group holidays
	urbanisation; cities as centres of cultural, scientific and communal life; construction and expansion of conference centres and sports facilities; growth in the number of organised events of various types; construction of accommodation capacities; municipal activities; expansion of international scientific co-operation; co-operation between educational establishments; tourism as part of town planning	development of specialised agencies for congress tourism; other locations in cultural and sporting facilities – skills: organisers, interpreters, translators, marketing specialists, IT experts, town planners	increasing volume of urban, cultural congress tourism, including supporting events; both international and domestic tourism is evenly distributed throughout the year; reduced dependence of tourism on climate and weather; more even geographical distribution of tourism; mass tourism to locations with developed infrastructure
	better educated clients; greater emphasis on individual choice of time, location, duration, content and flexibility of travel by individual family members and individuals	experts at the regional and municipal level – interlinking of tourism, the environment and other regional activities; management – achievement of high quality of service	technical urban buildings and monuments as a tourist attraction – railways (mountain railways, narrow-gauge railways, viaducts, etc.), mines, mills, power stations, weirs, dams, etc.

[65] Sun, Sea, Sand, Sex
[66] a complicated result generated by numerous factors (social and cultural, life experience, education, references from friends, etc.)

67 squeezing out tourism-friendly smaller shops

	Factors affecting tourism	Trends and reflections in tourism	Effects on the tourism labour market and training
ekon.	rapid economic growth in many nations; stable growth in the most developed nations (the main sending nations)	the general and probably most important framework for growth in job opportunities in the sector	exponential growth in foreign tourism; continuing export of Anglo-American culture and influence on local communities
ekonomic	importance of inbound and domestic tourism for the economies of many nations – political, organisational, economic and legislative support for tourism; tourism viewed as a means of reducing unemployment	increasing number of jobs; multiplier effects in many sectors and countries (including the Czech Republic); support for development of human resources.	planned and expansionary development of tourism; pressure for increased volume of inbound and domestic tourism; investment in tourism infrastructure and in tourism generally
ekonomic	sizeable competitive pressure on both the national and international scale; concentration of services; establishment of hypermarkets[67]	squeezing out of labour in certain smaller service companies; shift in staff training to multinational chains	use of yield management; establishment of hotel and restaurant chains; integration trends
political and globalisation	globalisation – standardisation of consumer goods, cultures (dominance of Anglo-American culture) and content and provision of services; lower product prices; world-wide and macroregional competition; etc.	potential for greater international migration of labour; simpler training at new locations; need for language and intercultural skills	standardisation of services – hotel and restaurant chains; requirements for distribution of uniform consumer items; growing co-operation between various tourism entities; expanding range of services from each provider
political and globalisation	concept of sustainable tourism development (Agenda 21, declarations, international treaties, legislation, etc.)	requirements for new labour force skills – ecological and environmental, system thinking, new attitude to marketing; strategic + town and regional planning; etc.	development of tourism with low impact on the natural and anthropogenic environment; efforts to plan and regulate tourism at state, regional and municipal level; Agenda 21 for tourism; changes in management of tourism entities (green management, EMAS, ISO 14000+ and so on)
political and globalisation	establishment of macroregions and Euroregions with simplified (zero) border-crossing procedures (specifically the EU pursuant to the Schengen Agreement)	job opportunities in border regions, in services for individual tourism and along transport routes; language skills	increasing frequency of individual short- and medium-range trips

2. Tourism in the Czech Republic

The Czech Republic has great potential for tourism. Its advantageous geographical position at the heart of Europe; its accessibility by road, rail and air; its diverse landscape, with both individual tourist-friendly natural features and larger areas (mountains, forests and lakes); and its high concentration of medieval and modern historical and cultural monuments together make the Czech Republic an attractive tourist destination. The extraordinary expansion in foreign tourism over the last decade has been due mainly to:

■ the political and social changes at the beginning of the 1990s in the countries of Central and Eastern Europe;
■ the potential for tourism in the Czech Republic and its increasing exploitation and development (care for and renovation of monuments and revitalisation of historic city centres, castles, stately homes, etc.);
■ the opening of borders in the Czech Republic;
■ the interest in new and little-known destinations;
■ the growth in package tourism around the world;
■ quantitative and qualitative expansion of tourism services – improvements in infrastructure and organisation (including a better transport infrastructure and increased capacity at Prague Airport);
■ differences in relative prices, especially between the Czech Republic and Germany and Austria (shopping tourism);
■ (in recent years) new tourism products, more systematic marketing, and state and municipality support for tourism.

Numerous national professional bodies and associations operate in the Czech Republic:
■ the Association of Tourism Information Centres (ATIC);
■ the Association of Travel Agencies of the Czech Republic (ACK CR);
■ the Association of Museums and Galleries (AMG);
■ the Association of Tour Operators and Travel Agencies of the Czech Republic (AČCKA);
■ the Czech Tourist Club (KČT);
■ the National Federation of Hotels and Restaurants (NFHR);
■ the Association of Historic Settlements in Bohemia, Moravia and Silesia (SHS ČMS);
■ the Association of Spas in the Czech Republic;
■ the Association of Businesses in the Catering and Tourism Industry, etc.

There are also more than 100 regional and local associations for tourism promotion (the ORLICE Association of Towns and Villages, the Vysočina (Highland) Region, the Euroregio Egrensis Association of Towns and Villages, etc.). These organisations promote either national or regional tourism development, protect the interests of their members and monitor developments in tourism.

The present support for tourism at state level is based on analyses conducted by the MRD and published in numerous documents (1, 6). These documents state that the previous extensive growth factors have been exhausted and that systematic support for tourism is needed, directed in particular at:

■ building the position of the Czech Republic on the international tourism market using new products taking account of the clientele in source countries;
■ the quality of the tourism infrastructure;

■ the range and quality of basic and complementary tourism services;
■ expansion of the tourism product range and creation of new regional products;
■ maintenance and renewal of the nation's cultural and historical legacy;
■ the entrepreneurial climate;
■ consumer protection and safety;
■ preparation of human resources.

In the years ahead, such targeted support could have a major effect on the development of a new standard of tourism in the Czech Republic and on the quantitative and qualitative requirements for labour supply and demand in the sector. Promotion of the Czech Republic abroad and implementation of the SOP is the responsibility of the Czech Tourist Authority.

Rapid growth in foreign visitor arrivals and growth in tourism receipts had a particularly sizeable effect on tourism in the first half of the 1990s. In the second half of the decade, foreign tourism was flat – see
Chart 1 and Table 3. Between 1990 and 1999, arrivals of foreign visitors[68] to the Czech Republic rose 2.75-fold to fluctuate around 100 million people (around 17 million of them tourists). In the same period, foreign exchange income increased more than seven-fold. Following the recent stagnation (decline) in arrivals of foreign visitors, the year 2000 saw a modest improvement to 104.2 million people (47.9 million of whom entered via the state border with Germany), a 3.4 % increase compared with 1999[69].

According to statistical research, 4.75 million Czech citizens older than 15 years made at least one foreign or domestic trip[70] of four nights or more in 1999 – 76 % of which were within the Czech Republic. Average expenditure per domestic trip exceeded CZK 4,400, and total spending on these trips can be put at CZK 25 billion. Households' spending on tourism-related activities represented 7–8 % of their total expenditure. Trips abroad by Czech citizens saw sharp growth after 1989, peaking at 48.6 million departures in 1996. Since then, the number has fallen each year. In 2000, there was a further 4.5 % decrease compared with 1999, with 38.2 million citizens travelling abroad. As in the previous two years, this decline is associated primarily with the overall economic recession, accompanied by greater economising in household budgets. Given the expected growth in incomes in the years ahead, spending on foreign tourism should also gradually pick up[71].

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[68] i.e. with no distinction between tourists and one-day visitors
[69] sources: CSO, MRD
[70] shorter trips, i.e. of less than four nights, weekend trips and so on, are not given
[71] a 1 % increase in income generates 2–2.5 % growth in spending on foreign tourism

Chart 1 Arrivals of visitors in the Czech Republic and departures of Czech citizens abroad
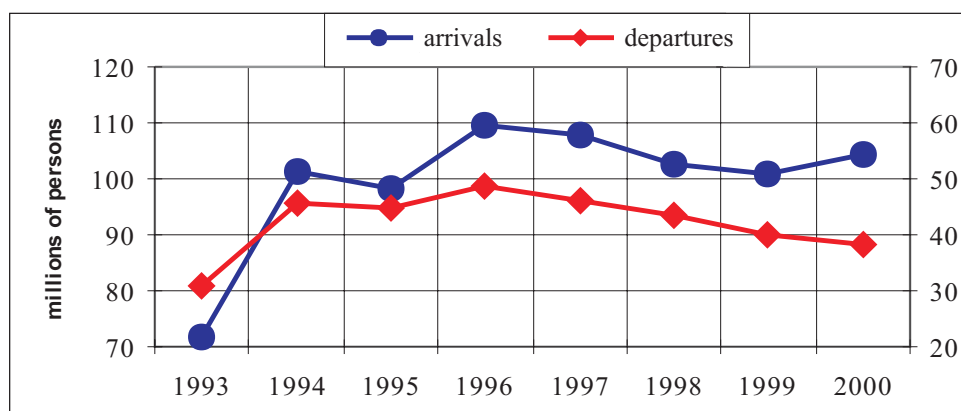
Table 3 The Czech Republic's economic results for foreign tourism since 1993[72]

Year	Tourism income		Tourism expenditures		Balance	
	in CZK millions	in USD millions	in CZK millions	in USD millions	in CZK millions	in USD millions
1993	45437	1,558.5	15,368	527.1	30,069	1,031.4
1994	64,170	2,229.7	45,606	1,584.6	18,564	645.1
1995	76,301	2,875.2	43,330	1,632.8	32,971	1,242.4
1996	110,620	4,075.2	80,170	2,953.4	30,450	1,121.8
1997	115,700	3,647.4	75,500	2,380.1	40,200	1,267.3
1998	120,000	3,718.8	60,300	1,868.7	59,700	1,850.1
1999	105,000	3,034.7	51,000	1,474.0	54,000	1,560.7
2000	110,700	2,868.6	48,500	1,256.8	62,200	1,611.8
2000/1999 index	105.4	94.5	95.1	85.3	115.2	103.3

Consistent with the increase in arrivals, foreign tourism income in Czech crowns rose by 5.4 % compared with 1999 to CZK 110.7 billion. Conversely, expenditures fell by 4.9 %, or CZK 2.5 billion. Owing to these opposing developments, the balance of income and expenditures from foreign tourism increased by 15.2 % compared with 1999. This surplus largely covers the trade deficit. It is important to note that the receipts were for the sale of services, i.e. of "goods" with relatively low material inputs, low import demand and conversely high demand for living labour. The Czech Republic's foreign exchange income, expenditures and balance in recent years are depicted in the following chart.

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[72] CSO News, Statistical Yearbook of the Czech Republic, Balance of Payments, MAG Consulting calculations, Czech National Bank

Chart 2 The Czech Republic's income, expenditure and balance from foreign tourism
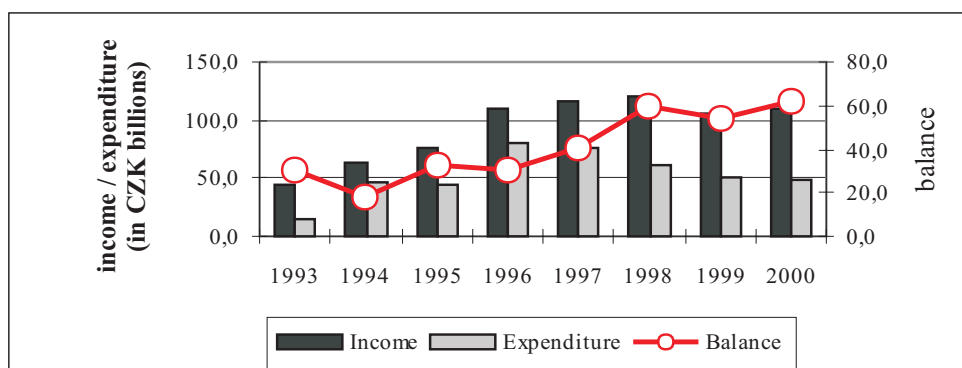
The areas in which tourism is concentrated in the Czech Republic are visited for various reasons and can be broken down broadly into five zones[73]: an urban and cultural tourism zone, a spa tourism zone, a water tourism zone, a mountain tourism zone and an undefined tourism zone. These zones are not defined in terms of their geographical position or history[74] (although the presence of historical and cultural monuments co-determines their use), but in terms of the nature (potential) of the area as regards its use for tourism.

The urban and cultural tourism zone[75] is a typical foreign visitor target. Hotel accommodation predominates – in 2000, the number of beds here represented 32 % of the total bed capacity in all zones. The Czech Republic has great potential for tourism development in this zone – use of historical monuments, congress tourism, etc.

The spa tourism zone, like the urban zone, is much used by foreign visitors, who account for almost 45 % of the total and stay for 6.6 nights on average. German visitors are in first place (with a share of around 45 %), followed by Russians (with a 10 % share and with the longest duration of stay – more than 10 days) then Slovaks, Austrians, Poles, US citizens and Britons. Spas have a long tradition in the Czech Republic. Particularly well-known internationally are those in Western Bohemia (Karlovy Vary, Mariánské Lázně and Františkovy Lázně)[76] and several smaller ones in the Bohemian and Moravian region (e.g. Teplice and Luhačovice). Stays in the spa tourism zone and curative stays directly in spa medical facilities can be of different content. The specific nature of spa services affects the employment structure in spa facilities and the special skills of staff, one specific group being the qualified nursing staff at spa facilities. Also needed are adequate language and communications skills in the case of staff working in restaurants, hotels and leisure and sports facilities. As at 30 April 2000, there existed a total of 63 spa companies, located in 24 districts, mostly the traditional spa districts of Cheb and Karlovy Vary in North-West Bohemia (each with 13 companies). Basic capacity indicators in the last three years are given in Table 4.

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[73] in these zones, basic tourism-related indicators are also monitored
[74] and have no direct link with the CTA's marketing regions
[75] development potential exists in the North-West Bohemia region (Klášterec n. Ohří, Kadaň, Louny, etc.)
[76] spas are the typical form of tourism in the North-West Bohemia region

Table 4 Spa tourism – accommodation capacity[77]

Year	Facilities in the spa tourism zone				of which: spa facilities			
	No. of facilities	No. of rooms	No. of beds	No. of staff	No. of facilities	No. of rooms	No. of beds	No. of staff
1998	675	19,648	43,172	13,974	89	10,926	22,387	9,878
1999	683	20,153	42,988	14,147	92	11,811	22,766	10,210
2000	665	19,640	41,671	13,782	96	10,696	20,462	9,337

Spas make up a major part of Czech tourism, and further development is expected. Priority support for the spa area was expressed in the State Tourism Support Programme for 2001, sub-programme 1: "Support for the development of towns and villages having spa status"; sub-programme 2: "Support for owners of spa infrastructure"; sub-programme 3: "Expansion of accommodation capacity in the category of private accommodation in towns and villages having spa status"; and sub-programme 4: "Spa tourism development programmes". The growth in preventive, convalescent and relaxation stays will be a further impetus for expansion of spa and climatic services and for supply adjustment to the new segment of customers. The rapid growth in the number of foreign visitors at Czech spa facilities during the 1990s is shown in the following chart (Chart 3).

Chart 3   Numbers of foreign patients at spas in the North West Region – Karlovy Vary area
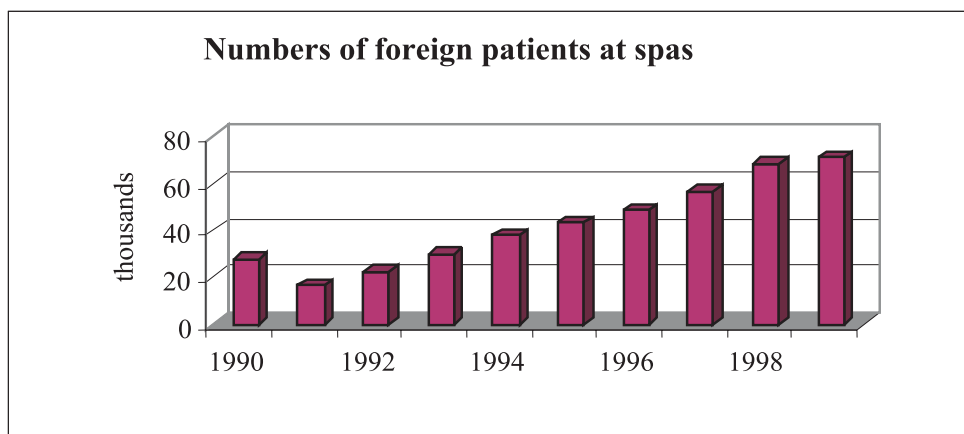
Around 75 % of the tourists using facilities **around stretches of water**[78] are domestic visitors. The foreign visitors come mainly from Germany, the Netherlands, Poland, Slovakia and Russia. Hotels make up just a small proportion of the facilities in this zone – second homes, campsites and guest houses predominate. In addition to the dominant tradition forms of recreation (bathing), active forms such as yachting, beach volleyball and bungee-jumping are being developed. Tourism infrastructure is under development.

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[77] CSO
[78] such areas are also to be found in the North-West Bohemia region

As regards visitor numbers, the **mountain tourism zone** is in second place behind the urban and cultural tourism zone. All the border-area mountain ranges are used, including the Krušné hory range in North-West Bohemia. The number of beds in this zone stands at 25.3 % of the total number in all zones and the equivalent share for visitor numbers exceeds 20 %. Foreign tourists make up 35 % of total visitors. Smaller non-hotel facilities predominate – guest houses, hostels, chalets – although in the major mountain centres (chiefly the Krkonoš range) large hotels also exist. Mountain tourism is very seasonal, which causes lower full-year use of accommodation facilities and affects employment – seasonal use of labour force strongly predominates.

The **undefined tourism zone** accounts for more than 30 % of accommodation facilities, with around 24 % of the beds. The number of visitors to this zone represents more than 20 % of the total, and over 35 % of the guests are foreign. This zone includes the steadily developing agrotourism, facilities near castles, stately homes and karst areas, and so on.

■ 2.1 Economic development of tourism in the Czech Republic since the start of the 1990s

The economic position of wholesale and retail trade, and hotels and restaurants in the national economy can be seen from the selected basic indicators for this sector relative to the economy as a whole shown in Table 5. The share of wholesale and retail trade, and hotels and restaurants in GDP has been fluctuating around 15 % on a long-term basis. Employment has declined since 1996 (owing to concentration and restructuring) from 18.5 % in 1996 to 16.7 % in 1999. As a percentage of total investment, the sector is fluctuating around 12 %. As regards wages, in trade (CZ NACE-G) they were, over a long period, at a below average level of 92 % of the national average. However, they reached 98.5 % in 2000. Wages in catering and accommodation (H) are far below the national average – at around 60–62 %. 2000 saw a considerable decline to 56.9 %. The development of wages in catering and accommodation reflects the situation in the sector as a whole in recent years. The decline in 2000 was partially caused by a slow growth of wages in the sector as compared to the overall growth of wages in the national economy (the average wage in catering only accounts for 57 % of the national wage in trade – see Table 7.).

Table 5 Selected basic indicators for wholesale and retail trade (G), and hotels and restaurants (H) relative to the economy as a whole[79]

CZ-NACE categories G and H as a percentage of:	1996	1997	1998	1999	2000
gross domestic product (at current prices)	16.3	14	13.8	15.1	15.3
whole-economy employment, incl. entrepreneurs (Q4)	18.5	17.9	16.9	16.7	16.3
whole-economy employment of women (Q4)	23.6	23.2	21.5	20.7	20.4
gross investment in tangible goods	11.9	14.3	12.3	12.4	10.2
total number of business units (RES)	35.8	36	36.9	37	36.3
Ratio of category G average wage to national wage	92.1	91.4	90.6	92.8	98.5
Ratio of category H average wage to national wage	61.9	61.8	62.3	60.4	56.9

Table 6 gives a comparison of certain indicators for hotels and restaurants in 1989 and 2000. In 1989, 2,863 facilities – with a total of 196,637 statistically reported beds – were providing "free tourism" accommodation. In addition, there existed a network of "tied tourism", i.e. facilities owned and operated by companies and organisations primarily for their own staff and a network of union-owned recreation facilities, the capacities of which were not statistically reported. Most of these were privatised after 1990 and became commercial facilities, so the growth in accommodation facilities compared with a decade ago is not just due to new construction, but to the transformation of "tied" capacities to "free" capacities. The ratio of accommodated foreigners to the total number of guests was 35.2 % in 1989. This ratio peaked in 1993 at 54.8 % and stood at 43.0 % in 2000.

Table 6 A comparison of certain hotel and restaurant indicators in the last decade

Year	Total no. of facilities	No. of staff	Av. monthly wage (CZK)	No. of accomm. facilities	Price index for htls and rstrnts	No. of beds	No. of guests (thous.)
1989	19231	89520	2671	2863	100	196637	9108
2000	41270	160563	7235	12806	379.6	502246	10849
index 00/89	214.6	179.4	270.9	447.3	X	255.5	119.1

Table 7 contains some other hotel and restaurant indicators. The number of active businesses has been rising on a long-term basis, although the growth rate slowed to 0.5 % in 1999. Since 1995 the number of workers has grown from 145,000 to around 160,000. The average wage characterises the situation in the sector in terms of its low absolute value and slower growth in comparison with the national average. An exception is 2000 (in this year the growth in the sector was 7.9 % and the average growth in the national economy was 5.9 %).

Table 7 Basic indicators in the hotels and restaurants category[80]

Year	No. of businesses	No. of workers	No. of employees	Av. monthly wage (CZK)	Effective consumption (CZK millions)	Book value added (CZK millions)
1995	30975	144871	112820	5215	32942	15, 674
1996	32429	151279	118278	5989	39054	23, 581
1997	34241	148536	112839	6221	42143	15, 251
1998	40888	162300	118694	6308	46769	15, 124
1999	41101	160756	117634	6705	46424	15980
2000	41270	160563	117219	7235	51713	19133
Index 00/99	100.4	99.9	99.6	107.9	111.4	119.7

Table 8 gives the average wage in hotels and restaurants in 1998 and 2000 broken down by size of business. In none of the size categories is the average national monthly wage achieved[81]. The highest average monthly wage was in businesses employing more than 100 people (CZK 13,258, with growth of 8.8 %), followed by businesses with 20–99 employees (CZK 9,696, with the highest year-on-year growth: 12.4 %). By far the lowest average wage was recorded in businesses with

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[80] CZ-NACE 55
[81] in 1999, CZK 12,658 in businesses with 20 employees or more

0–19 employees – just CZK 5,915, with a growth rate of 8.0 %. The extraordinarily low average wage in this category provokes doubts about the reliability of the figure – in many cases other forms of compensation of employees can be assumed.

Table 8 Average wage in the hotels and restaurants category in 1989 and 2000 by size of business[82]

CZ-NACE 55	Businesses with								
	100 employees or more			20–99 employees			0–19 employees		
	1999	2000	i. 00/99	1999	2000	i. 00/99	1999	2000	i. 00/99
In CZK	12,184	13,258	108.8	8,628	9,696	112.4	5,477	5,915	108.0
Relative to CZ-NACE 55 average[83]	181.7	183.3	x	128.7	134	x	81.2	81.8	x
Relative to national average[84]	96.4	98.3	x	68.2	71.9	x	43.1	43.8	x

■ 2.2 Employment in tourism in the Czech Republic

Information on employment in the tourist industry is important not only for analysing the sector, but also for formulating employment policy. Tourism offers a wide variety of employment opportunities, from unskilled work with low value added (cleaners and auxiliary labour) through to highly skilled jobs generating considerable value added. For employment policy it is significant that, in addition to highly skilled jobs, tourism provides many jobs which do not require high qualifications and generates employment in areas that are less economically developed and/or suffering from structural unemployment (rural and mountainous areas, border areas, areas undergoing restructuring, etc.). Tourism therefore helps to reduce unemployment among difficult-to-employ individuals, particularly those with poor qualifications or none at all; members of ethnic minorities and foreign nationals with limited language skills; young people; school-leavers; the long-term unemployed; and women seeking work after a long break. Tourism also offers job opportunities to those seeking casual work.

As noted in previous sections, the employment generated by tourism is for many reasons more difficult to measure than in other sectors. It is characterised by seasonality, part-time work, a high proportion of own work by entrepreneurs and low-paid or unpaid work by family members (especially in smaller facilities, agrotourism and the like), and by illegal "black" labour, which can distort the employment and wage statistics[85]. These factors are also associated with sizeable turnover in many occupations in the sector, which affects the quality of the services provided. Much of the work in tourism is performed on a contractual basis through various recruitment agencies. The value of the work is not reflected in wage costs but in material costs, and is reported in the commercial services category rather than under tourism, which is where these employees work.

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[82] CSO – publication code 19 02-99

[83] as a percentage of the average wage in the hotels and restaurants category overall

[84] as a percentage of the average wage in the national economy (in businesses with 20 employees or more)

[85] the methodology for assessing employment in tourism is contained in Annex 3 The Conceptual Framework of Employment in Tourism and Annex 4 Monitoring Employment in Branches of the Sector of Tourism

Tourism and related sectors play an important role in the present **transition phase to an information and post-industrial society**[86] affecting the labour market as a whole. The labour market is not a homogeneous market with clearly defined and relatively steady jobs, but is developing into a very diverse market with a new flexible structure and organisation of labour. This shift is due not only to technological developments and changes in organisation of labour, but also to new trends in tourism such as deep segmentation of the market (up to supersegmentation), supply flexibility and differential distribution of goods and services, global availability of services, etc. (see Table 2 for more details).

Also characteristic of tourism – besides the fact that it offers a whole range of attractive, well-paid and therefore precious jobs – is sizeable volatility in demand for goods and services. This, combined with increasing world competition and pressure to cut costs, is leading to endeavours by employers to replace human resources with technology (machinery and equipment, communications and information technology, automation of repetitive activities - infoboxes, etc.), to standardisation of goods and services and to the subsequent employment of less skilled labour.

Employees and jobs in tourism are divided into primary and secondary. Primary workers (the core of the company) have steady full-time employment complete with fringe benefits and job security. They receive high remuneration and have a wide range of functions, tasks and skills. The typical workers in this group are professionals and managers, who are in short supply on the labour market and whom employers are trying to attract.

There are several groups of secondary workers:

1. Workers who work regularly for the firm, often seasonally. These workers have less job security and little chance of career development within the firm. Often they are either only partially skilled or entirely unskilled. Such work can be performed by workers with minimal professional knowledge. There is no shortage of such workers, hence they are numerically flexible.

2. Short-term and temporary employees, part-time staff, casual workers and students. These workers form a reserve of labour hired and fired depending on demand. This applies mainly to medium-sized and larger firms operating in the tourism industry (hotels and restaurants, and recreational services). In small firms, employers turn to their friends and relatives where necessary.

Tourism-related services are provided by businesses of various sizes. These can differ markedly in terms of ownership, organisational structure, skills requirements, full-year or seasonal employment, and level of wages provided. In many tourism-related sectors, especially those with low inputs (small hotels and restaurants, tour operators and travel agents, retail outlets – souvenir shops – and recreational services), small family firms or firms with no employees predominate. These rely on low prices, the personal touch, market niche, help from family members, hand-picked staff and little or no use of modern technology. Low investment, small financial reserves and low market stability mean that such firms have a precarious position.

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[86] or a services and leisure society

In addition to small family firms, the tourism industry is made up of large companies (often with joint-stock status – transport companies, hotel and restaurant chains, amusement parks, large tour operators). These typically use labour other than family members and have a high level of capital investment, specialised labour, steady management, and shared ownership and management. The tourism industry is undergoing horizontal and vertical concentration, the aim of which is to make savings through division and specialisation of labour. Most of these firms offer their staff better training, career progression, employment conditions and pay. On the other hand, some larger firms (e.g. hotels and restaurants in a climate of increasing competition and low purchasing power) typically offer poor employment conditions – low pay, little training and long and irregular hours. In the case of less-skilled labour, this can lead to high employee turnover and instability.

There is a great need for human labour in tourism-related sectors, despite the increasing use of new technology (information and communications technology, new technology in hotel, restaurant and transport services, etc.). But the impact of new technology on employment is difficult to estimate – it may replace human labour and reduce the number of jobs (through the use of semi-manufactures in restaurants, for example), but it may also lead to lower prices (by raising productivity), increased demand for goods and services, and to greater employment (e.g. in travel agencies, tour operators and fast food outlets). Some of the new technology may require better qualified labour (a typical example being IT) or change the demands on the labour force through increased work flexibility and new organisation of labour. Other kinds of new technology may also create low-skilled jobs.

The human factor plays an important role in tourism. Businesses, be they large or small, should be making the most of the knowledge, experience, motivation and social skills of their workers to provide quality services and boost their competitiveness. Despite the widely acknowledged importance of the human factor in tourism, the willingness in practice to invest in education and training of workers in tourism businesses (especially in the hotels and restaurants area) is low compared with other sectors. Planning in the human resources area is often too short-term, particularly in the small and medium-sized businesses which predominate in tourism. The seasonal nature of the work, the large proportion of part-time workers, the high staff turnover and the limited opportunities for career progression deter both employees and employers from investing in education and training. If training is offered, it usually involves short courses where workers only learn to perform specific tasks. The problem of a lack of skilled workers and insufficient education and training of workers in the tourism industry thus persists, even though the range of education on offer is improving. Annexes 3 and 4 give the wider context of employment in tourism. The particular characteristics of the Czech Republic are presented in the following paragraphs.

Workers in hotels and restaurants are hit twice as hard by fluctuations in employment compared with the national average. These swings are caused chiefly by the nature and seasonality of the work and also by the overall situation in the national economy. The number of people unemployed who formerly worked in the sector relative to the jobless total is higher than the proportion for the number of workers currently in the sector. For example in the fourth quarter of 1998, the unemployed formerly working in the sector accounted for 6.7 % of the total number of people unemployed, whereas the sector accounted for just 3.2 % of total employment. In the same period, women working in the sector accounted for 4 % of the total, whereas the share for unemployed women from the sector was 8.4 %. The trend since 1994 is shown in the following table (Table 9).

Table 9 Unemployed persons formerly working in the hotels and restaurants category (CSO figures)

Period	Unemployment, total		of which			
			Men		Women	
	Absolute number in thous.	Share of the total in %	Absolute number in thous.	Share of the total in %	Absolute number in thous.	Share of the total in %
December 1993 to February 1994	11.5	6.6	3	4	8.5	8.6
December 1994 to February 1995	11.3	6.5	3.8	4.5	7.5	8.3
December 1995 to February 1996	8	5.7	1.8	2.7	6.1	8.6
December 1996 to February 1997	13.2	7.5	5	5.8	8.2	9.3
1997 Q4	16.2	6.8	6.3	6	9.9	7.4
1998 Q4	19.7	6.7	5.8	4.5	13.9	8.4
1999 Q4	24.5	6.5	8.6	4.7	15.9	8.1
2000 Q4	21.4	6.5	6.7	4.6	14.7	8

The number of people working in travel agencies[87] (see Table 10) in 1999 was around 7 % higher than a year earlier at 5,974, of which 4,570 were employees. The number of travel agency employees showed a similar growth rate.

Table 10 Number of people working in travel agencies (CSO figures)

	1996	1997	1998	1999
Total	5944	6928	5588	5974
of which: employees	4588	5244	4298	4570
of which: part-time employees	721	1305	625	653

[87] employees including part-time workers (the proportion of employees was 76.5 % in 1999 and is stable on a long-term basis), and sole proprietors

■ THE NORTH WEST BOHEMIA REGION

1. Brief Description of the North West Bohemia Region

The North West Bohemia Region (NUTS2) is situated in the north-west of the Czech Republic. Territorially it covers an area of $8\,650$ km^2 (11.1 % of the territory of the ČR), and its population (1.13 mil.) represents a comparable proportion of the total national population of the ČR. It is a strongly urbanised region, with more than 80 % of people living in towns. The region is made up of both mountain areas (Krušné hory, Český les, Slavkovský les) and lowland in the areas around the rivers Ohře and Labe. The administrative divisions and geographical location of the region is shown in Illustration 2.

Illustration 2 NUTS 2 in the Czech Republic, source MRD

The North-West Region plays a major role in the fuel-energy complex of the Czech Republic. It is one of the country's most important areas of brown coal extraction, as well as of mining and processing of other raw materials (production of porcelain, ceramics and glass)[88]. Despite marked improvements in recent years, the concentration of thermal power stations and chemical industry has had a damaging impact on the environment, with long-term intensive and mainly surface mining representing a fundamentally negative phenomenon in terms of its effect on the landscape. One important factor for development, however, is the spa industry, based on the abundance of therapeutic springs in the area and a long historical tradition. Cross-border co-operation is very important for the region, which has a large number of border crossings that are used for short-distance contacts with neighbouring areas of Germany. A high rate of short-term visits from Germany is a typical feature of the region.

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[88] the whole diverse spectrum of industrial activity in the region is not described here, but only those aspects relevant to tourism in the region or specific to the region

The North West Region is an important transport corridor linking the Czech Republic to Western Europe. The transport infrastructure currently needs modernisation to increase the speed and capacity of transport links, and there is as yet no direct motorway connection between the Czech and German motorway networks here. All types of transport are represented in the region, but in some areas cutbacks in public transport have meant a deterioration in services. The railway network is dense but some tracks are in very bad condition and threatened with cutbacks or even complete closure (especially links to outlying areas). Other rail routes, however, are part of cultural heritage. The River Labe (Elbe) is an international waterway. Use of railway and water transport is helping to reduce the burden on the environment. There are plans to develop an integrated system of transport service with investment from spa and travel businesses on both sides of the border.

The region's most serious socio-economic problem is high and long-term unemployment. The problem is worst in districts where coal mining has been cut back, and in these the unemployment rate is the highest in the entire republic (on the 31st of December 2000, Most District 21.5 %, CR average 8.8 %, on 30rd of September 2001, Most District 21.4 %, CR average 8.5 %).

Administratively, the North West Region includes the Ústí and Karlovy Vary counties. The Ústí county is strongly urbanised with many large settlements. A one-sided orientation to coal-mining, energy production and associated heavy, chemical and machine-tool industry has affected the social and professional structure of the population and is now hampering the requalification of workers who have been made redundant and reducing their chances of finding a new job.

The population of the Karlovy Vary county is relatively young and less skilled, employed mainly in coal-mining, power and associated industries. The spa towns and especially Karlovy Vary itself, on the other hand, have a higher proportion of older and better qualified people, thanks to the specific social and economic profile of these towns.

2. Tourism in the North West Region

The negative effects of industrial activity and the restructuring of industry in the region are balanced by the existence of many attractive areas that are important from the point of view of prospects for the future development of tourism; these areas include Krušné hory, Česky les, Děčínské stěny, Slavkovský les, and sites of natural mineral springs. For the West Bohemian border areas one-day shopping trips across the frontier and other short-term visits have become the typical pattern since the Eighties, and have brought not only economic revival but also certain problems, such as a rise in crime and prostitution. In the North-West Region the conditions for the development of tourism are different in the two counties mentioned.

The tourist industry in **Ústí county** is relatively limited, especially in terms of visitors' length of stay, and this reflects the state of the environment, unattractive and inconvenient patterns of urban planning, and the loss of the genius loci of the landscape. Even here, however, there are areas where tourism could develop more vigorously. Krušné hory [The Krušné Mountains], where in the past the local econ-systems were damaged by acid rain, offer possibilities for both down-hill and cross-country skiing in the winter months. Mined out areas require costly recultivation, but subsequently these areas can also be magnets for recreational activities – summer recreation in flooded open mines[89], construction of theme parts and tourist infrastructure, afforestation, sports, water transport, and the use of the CHKO and NP [Protected Landscape Areas and National Park] Labské pískovce[90]. The towns of Teplice, Bílina and Dubí are all well-known spas.

For the **Karlovy Vary county** tourism is one of the most important branches of the economy. As a result of favourable natural resources it contains three of the world's most famous spas (Karlovy Vary [formerly Karlsbad], Mariánské Lázně [Marienbad], Františkovy Lázně). The spa industry has exceptional importance and is of a high standard; it's overall economic benefits are evident throughout most of the district, and it is the reason for the high numbers of visitors to the district. In 1999 the number of guests in accommodation facilities in the Karlovy Vary district reached almost 700 thousand, of which 361 thousand were visitors from abroad. Alongside catering for domestic guests[91] the spas primarily concentrate on more affluent foreign clientele[92]. In recent years there have been ever more Russian visitors (in second place after guests from Germany). The effect of spa tourism and popularity of spa facilities and other accommodation facilities in the area is further reflected in the high level of use of accommodation capacities – in the Karlovy Vary district, for example, the average proportion of bedrooms used in 1999 (42,4 %) and of beds used (56,4 %) was very much above the average for the Czech Republic and was on the level of Prague. The use of accommodation facilities is also comparably high in the Cheb district. The importance of the spa industry for the North West Region (in this case the Karlovy Vary district) in comparison with the other counties elsewhere in the country is clear from a comparison of spa facility capacities by district, see Chart 4.

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[89] as in neighbouring Saxony, for example the spa Sybillenbad

[90] its international important has been emphasised by declaring it a national park

[91] the number of patients from the Czech Republic has fallen significantly and absolutely from its level at the end of the Eighties

[92] spa centres are attracting foreigners not only as guests and patients, but also as entrepreneurs and property purchasers

Chart 4   Spa Accommodation Capacities by District (up to 31.7.2000)[93]
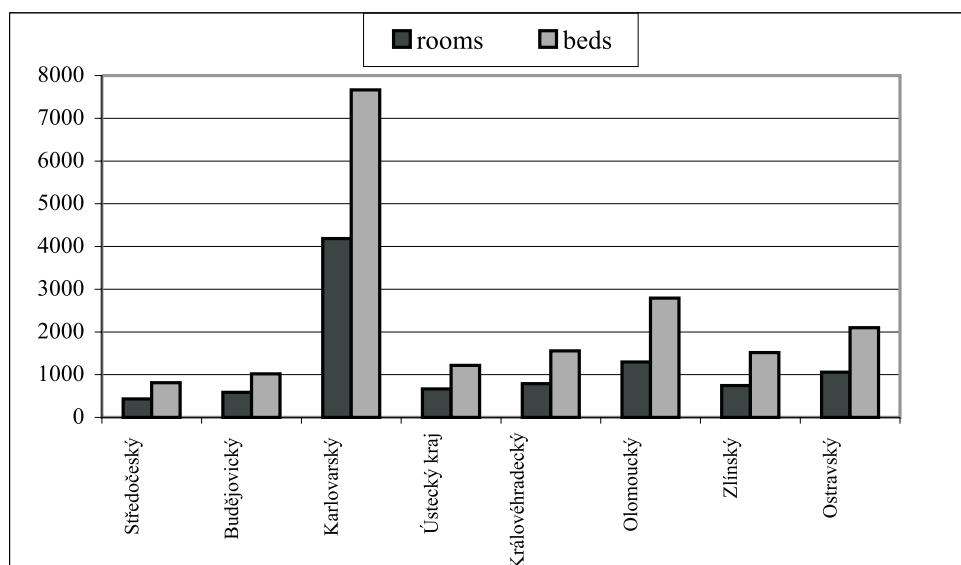
The SWOT analysis in Table 11 below provides a useful summary of the potential of the North West Region in relation to tourism.

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[93] In the other counties this data has not been published for reasons of individual data protection – 3 or less businesses in the district

Table 11 SWOT Analysis of the Potential for the Development of Tourism in the North West Region

Strengths	Weaknesses
■ closeness to German border, accessibility of region from Germany and Prague ■ variety of natural landscape ■ mineral springs and developed spa industry, the tradition and fame particularly of Karlovy vary and Mariánské Lázně ■ large number of foreign visitors to spa facilities ■ relatively young population ■ high level of employment in the tertiary sector	■ devastation of the landscape and high pollution levels, loss of the genius loci (particularly in the Ústí county) ■ raised levels of crime and illegal activity (sex tourism) ■ lower levels of education ■ unsatisfactory standard of services in tourist facilities, and great unevenness of standards ■ poor knowledge of foreign languages, lack of professionalism among waiting staff ■ poor maintenance and dilapidation of some spa buildings
Opportunities	**Threats**
■ structural funds for the region as part of preparation for EU entry, and more opportunities for collaboration with neighbouring areas after entry to the EU ■ development of new tourist products (ecotourism, incentive tourism, cultural tourism – festivals, town tourism etc.) ■ opportunities to increase use of hotel capacities for international events (spa towns) – congress tourism ■ development of the spa industry with state funding support ■ increased funding for building up tourist infrastructure (state, EU funds, business activities, towns, counties) ■ improvement of the quality of the environment, linking recultivation and the rehabilitation of the landscape with tourism (possibility of obtaining funds from EU) ■ link-up to the long-distance Prague-Berlin cycle track ■ link-up to the German motorway network	■ failure to appreciate importance of an active policy of support for tourism in the region, reliance on automatic interest of public in spas (this attitude lingers on even among the managers of accommodation and spa facilities, as the questionnaire results show) ■ failure to appreciate the need for professional training and the importance of qualification level among staff in tourism – the less developed infrastructure of tourism schools at the vocational and higher educational level ■ too slow a tempo on measures to improve the quality of the environment ■ negative reputation of the region, its continuing association with an image of industrial devastation

3. Questionnaire Survey in Tourist Businesses in the North West Region

At the turn of the year 2000/2001 a questionnaire survey was conducted in 16 towns of the North West Region among businesses of various sizes and categories in the tourist sector[94]. The survey questions focused on current and anticipated future structure of employment within the next two years, staff qualifications and the possibilities for improving qualifications, relations with schools offering training in tourist services, and analysis of the development of tourism in general and of the development of the respondents' own businesses.[95] A total of 24 businesses[96] took part in the survey (9 businesses with 1–10 employees, 7 businesses with 11–25, 6 businesses with 25–100 employees, and 2 businesses with over 100 employees). The low number of participants in the survey mean that it cannot be regarded as statistically significant; it is essentially a case study of the individual businesses and analysis of the results provides no more than a pointer to current trends. The results obtained were scrutinised in the light of the views of experts from the tourist sector and specialists on problems of employment and education[97], as well as the opinions of other individuals

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[94] major attention was devoted to accommodation facilities, with the other respondent businesses comprising spas and spa houses, tourist information centres, travel agencies and regional development agencies.

[95] see Annex 6 Questionnaire for Employers in the Tourist Sector – North West Region, Czech Republic

[96] the original plan for survey of a sample of 30 businesses could not be realised since some of the businesses were unwilling to take part.

[97] three discussion meetings were held in the framework of "focus groups", and were attended by a total of cca 25 professionals and representatives of businesses and schools

and organisations with practical experience in the field, and were compared with overall national and international trends in tourism and with general socio-economic development in the region. The survey was carried out in the form of face-to-face interview. The design of the questionnaire reflected the expectation that it would be the qualitative outputs of the survey that would prove particularly interesting, i.e. most of its sections are qualitative in focus and it contains a range of questions of open type, allowing for free answers.

■ 3.1 Perceived Trends in the Sector and Related Business Intentions

The answers of the respondents – representatives of the business subjects surveyed – partially confirmed rends that have already been described as typical (rising demands on the part of clients, growing competition in the field, see Table 2 and reflected the specific features of the Czech Republic. They also, however, showed that tradition and traditional approaches are still too predominant in the industry, with little exploitation of marketing, very limited work with human resources and insufficient appreciation of the latter's importance for the development of individual businesses. The more frequent answers to the questions on views of expected development of the sector are conveniently summarised with a commentary in the following table (Tab. 13) and Chart 5 Respondents' Expectations of Change in the Tourist Sector in Percentages (Chart 5). One or two respondents also mentioned the view that there would be increasing differences in the solvency of clients[98]. Conservative views anticipating only slow development in the sector were quite frequently expressed (respondents from accommodation facilities). In percentage terms, respondents most frequently attributed changes in the sector to the necessity of providing new services to clients (here there is a clear association with stated changes in client demand and the expansion of the range of services – more than 50 % of answers), and more than 50 % of respondents link changes in the sector to the influence of IT.

Table 12 Development of Tourism over the Next Five Years.

Respondent Answer	Commentary
Rising demands from clients	A general trend, strongly manifest in tourism in connection with differentiation of services, global competition, and the character of the sector (tourism services are used above all in the part of the year when the client most often wants relaxation, minimum worries, warmth in social contacts, unusual experiences etc.)
Growing competition in the field	Linked to globalisation and increase international access to information on services, and the possibility of their reservation
Changes for the Czech Republic in connection with entry into the EU	Generally expected further removals of barriers to travel and increase in numbers of tourists in Czech Republic
The growing impact of information technologies to improve quality and lower price of services	Some of the respondents were aware of the growing influence of IT on tourism (communication, publicity, distribution of services), use IT intensively, link the use of IT with demands for higher qualifications in their staff, and are planning to use IT to expand the range of services for clients (introduction of Internet link in guestrooms, solarium, swimming-pool etc.) and to improve the quality of their own agendas (accounts etc.)
The influence of technology – rationalisation of services	A slight effect in terms of reduction of employment was suggested

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[98] to which the tourist industry will be able to react flexibly by more pronounced segmentation of products by price

Chart 5   Respondents' Expectations of Change in the Tourist Sector in Percentages

changes in sector

Category	
new client services	
change in client demands	
ibroadening of supply of services	
more use of IT	
change in structure of clients	
development of human resources	
changes in organisation of work	
more versatility of work force	
changes on market	
management technology	
other changes	
changes in content of work	
higher volume of external services	
changes in marketing	

%

0   10   20   30   40   50   60   70   80
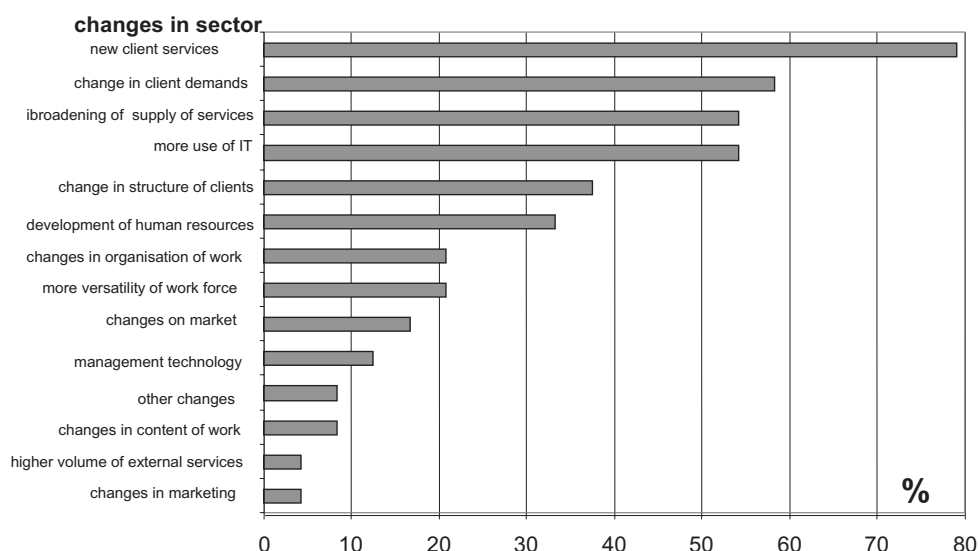
It is also interesting to analyse the potential dynamics of the sector as these emerge from the specific future plans of the individual businesses, the degree to which the businesses monitor trends in the sector and their interpretation of these trends, new technologies etc. Here there appears to be a conspicuous difference between accommodation facilities and other businesses – spa facilities, travel agencies, tourist information centres and regional development agencies. This difference was expressed not only in the kinds of planning mentioned above, but in the trend in employment that respondents expect as a consequence.

■ managers of **accommodation facilities** are excessively professionally introverted and focused on tradition and have a tendency not to consider wider contexts. They expect the situation to continue much as it is today, and anticipate change only in relation to the entry of the Czech Republic into the EU. There is little emphasis on new products. Employment is stagnating or falling slightly (rationalisation, pressure of competition on prices), and any potential increase in employment is associated mainly with plans to expand capacity or the content of services provided.

■ **spa facilities** – have a strong sense of their traditions, but are aware of new trends – the need to offer new approaches to spa use, to combine traditional spa services with relaxation and sports holidays (for example family holidays) – and their prognosis on employment is linked to the development of these new activities.

■ **tourist information centres** – are a conspicuously dynamic element in the field, stressing the importance of new technologies for their activities, especially information technologies, communication with clients, good language skills, and change in the character of the services that they offer. In this context they are also aware of the importance of life-long education and co-operation with other subjects in the field (cities, regional associations, travel agents, other tourist information centres). There is interest in building up and using a nation-wide tourist information system. They are planning new business activities – provision of accommodation and guide services.

■ **regional development centres and sector associations** – another dynamic element in the sector, linking up regional development and tourism, entrepreneurs in the region, development in the sector and the appreciation of new trends with the overall progress of tourism in the region and its long-term strategy.

■ 3.2 Attitude to Graduates/School-Leavers, and Continuing Education Needs

This part of the survey was concerned with identifying the attitude of the businesses to fresh graduates/school-leavers, the method by which they filled job vacancies, their assessment of the need for continuing education of their employees and the way in which they met this need from internal or external sources.

This part of the survey was aimed at identifying and analysing the attitude of business subjects to new school- and college-leavers, the way in which they filled vacancies, their view of the needs for further education of staff and the internal and external sources of the content of that education. Attitudes to fresh graduates/school-leavers are expressed at several different levels – readiness to employ fresh graduates/school-leavers, level of satisfaction with them and form of co-operation with schools/colleges. The majority of respondents expressed an interest in fresh graduates/school-leavers – cca 17 % answering "yes definitely", 54 % answering "yes", and roughly 8 % answering "yes, but only in a job created by the labour office". The seemingly large (cca 20 %) percentage of answers expressing lack of interest in fresh graduates/school-leavers is very clearly associated with current stabilisation of work force rather than "in principle" hostility on the part of the employers concerned. This was not only explicitly stated in the answers but is also evident from the prevailing satisfaction with graduates/school leavers from different types of school. The only real exception to the expression of satisfaction with school-leavers related, in isolated cases, to graduates of Secondary Vocational Schools (SOUs) and family schools.

Possible forms of co-operation between employers and schools were divided into the following categories: negotiation of jobs for school-leavers/graduates at the school; consultation on the launch of new subjects/courses at schools; contribution to teaching in schools; consultation on school-leaver profile; sponsorship of study programmes; provision of work practice for students and other forms of co-operation – see Chart 6. Answers confirmed the frequency of provision of specialist work practice opportunities to students (cca 86 %), and also showed the relatively high frequency of negotiation on the possibility of obtaining school-leavers for jobs (cca 36 %), as well as a surprisingly strong contribution to teaching in the form of input by specialists from the business concerned (cca 27 %, typically at larger tourist businesses) and consultation on school-leaver profile (22,7 %). Other types of co-operation were mentioned much less often.

Chart 6 Links between Tourist Business Subjects and Schools
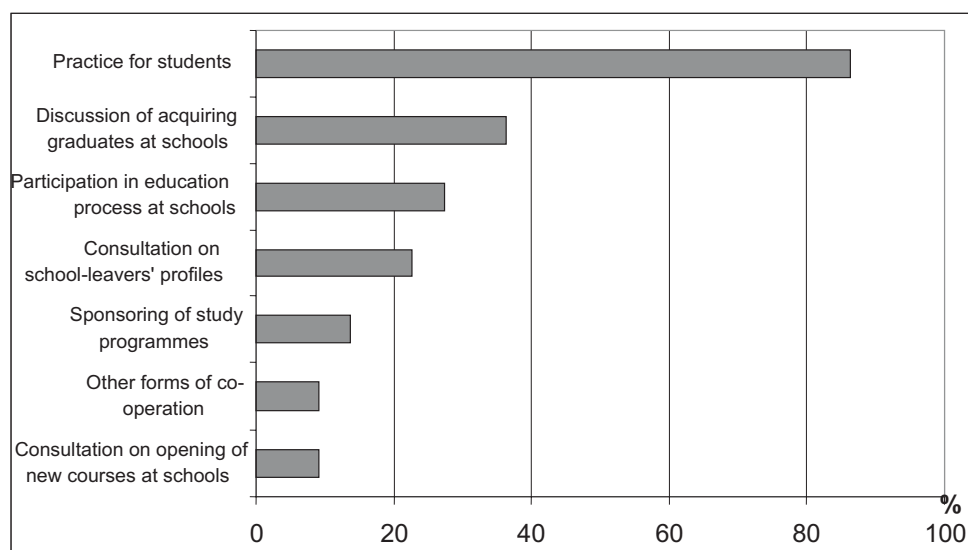
Respondents did not report any serious problems in finding suitable employees to fill vacancies. Roughly 60 % of respondents did not even mention one profession in which they found posts difficult to fill, either because their work force had been stabilised for some time or because they genuinely experienced no problems finding staff. There is no doubt that this is an attitude related to the high unemployment rate in the region (14 % in 2000) and to the satisfactory quantity and quality of graduates of tourist and catering courses. The exception here was the least skilled end of the job market (ancillary work) in which, as could be expected and in line with the pattern in other sectors, fluctuation of employees was high (16 % of respondents were looking for auxiliary workers for various unskilled posts). Other professional categories in which respondents were looking for staff were hotel receptionists with complete secondary-school education (3 respondents), an information worker with full secondary education and a publicity worker (secondary or university education). In one case a respondent mentioned doctors with full clinical accreditation (balneology, rehabilitation) as a shortage profession.

The improvement of staff qualifications is an area so far generally undervalued especially by accommodation facilities, as emerged from answers to questions on the formulation of job requirements, view of trends in the sector, and the flexibility of staff. Among the businesses surveyed, cca 38 % were not buying any training, and some regarded personal career growth and the improvement of qualifications as purely a matter for the employee. These tendencies, evident in both stated goals and practice as far as the extent and content of continuing training of staff is concerned, are definitely a reflection of the low skills structure that is typical of employees in this business sector and is associated with the character of work activities and typical division of activities between different members of staff.

The most important sources of information on the range of further education available remain the classic information sources, i.e. professional organisations and advertisements, see Chart 11, where they appear as the most frequently mentioned sources. Personal recommendations are also relatively important, above all as an additional source of information (second and third in order of stated importance as a source of information).

Chart 7 Percentage Use of Different Sources of Information on the Supply of Continuing Education
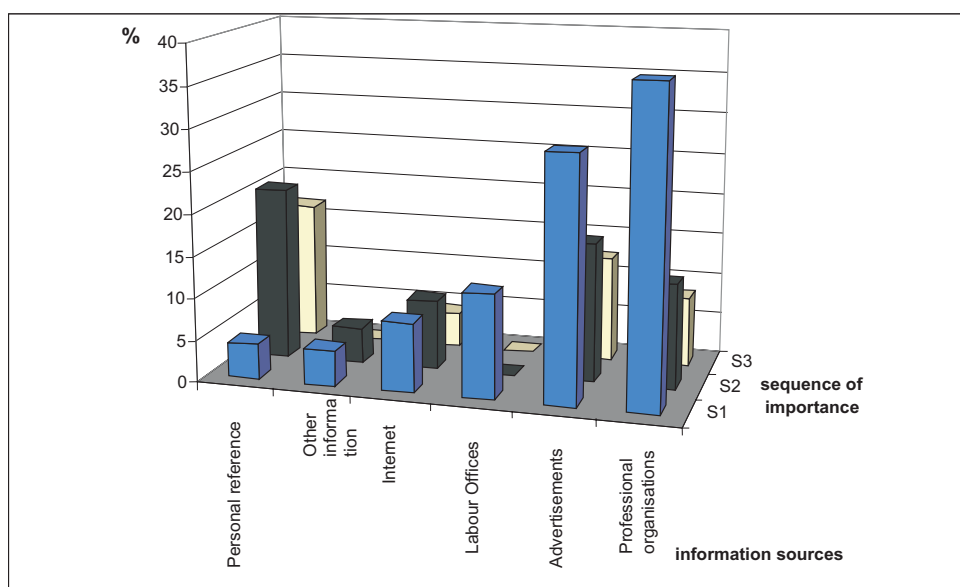
According to respondents the problem of the further training of staff in the tourist industry is not the range of external courses offered. The most frequently mentioned problems are cost and the degree of adaptation of the courses to the needs of the business (a general problem of the current range of courses offered in the Czech Republic, Chart 8, see also (19)) but the overall frequency of these complaints is low in percentage terms. With one exception, the respondents had not introduced internal training, and the subjects of the survey did not own training facilities. Thus the favourable assessment of the range of courses on offer is primarily associated with low demands on quality of courses and declared lack of need to raise qualifications in the region.

Chart 8   External Problems with the Continuing Training of Staff[99]
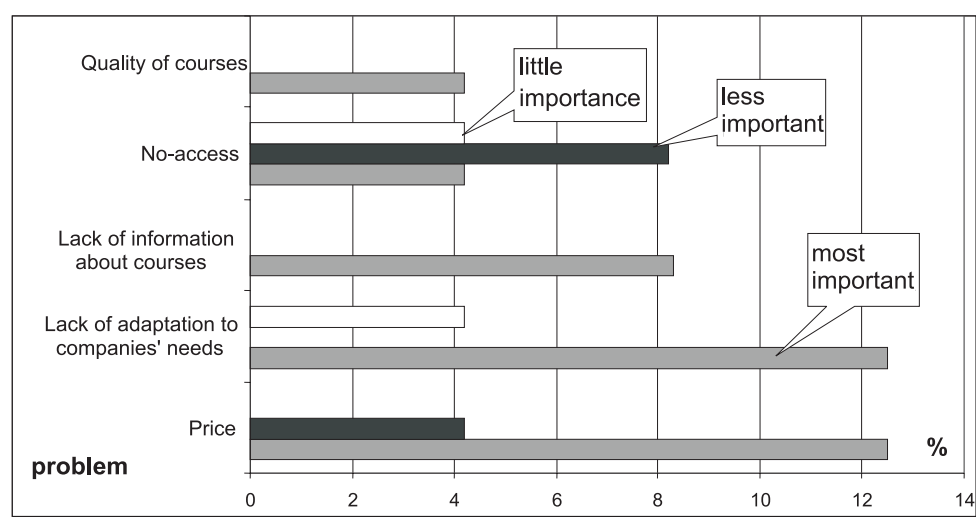
The respondents expressed satisfaction in their assessment of the current skills of their staff, as is clear from Chart 9. A lack of knowledge sufficient to threaten the competitiveness of the business was mentioned in only a very small percentage of answers and only in relation to knowledge of languages, marketing, financial knowledge, work with computers, management skills, skills (dexterity) in the given field and sales skills. On all other areas of competence stated, the predominant opinion was that the knowledge and skills of staff fully met the needs of the business. This area of answers should, however, be interpreted with great caution in view of the fact that senior staff were commenting on the competence of staff in their own firms, and in view of the conservatism (in the accommodation facilities) of attitudes to anticipated development. The views of respondents from the region show little correlation with surveys conducted by the WTO, for example, in which interpersonal communication, management and marketing were identified as key areas of insufficient competence.

One important aspect of the lack of emphasis placed on the training of existing staff is probably the fact that businesses have little problem finding a replacement for a member of staff who is leaving (with the exception of the least skilled workers). Factors that have yet to provoke much thought in this context include technological development in the field and the influence of new technologies, including IT and the Internet, on the content of business and the flexibility and creativity of management staff in particular. Nor are market research and its interpretation part of the ordinary activities of the businesses (see their general views on the development of the tourist industry mentioned above).

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[99] white in the graph – least importance, grey – middling importance, black – least importance

The content of the courses purchased so far (the internal training facilities were an exception) in accommodation facilities is focused above all on the fulfilment of legal requirements (safety at work, the employment code) and the improvement of specific professional skills (book-keeping, work with PCs, restaurant services). Here there appears to be a tight correlation between awareness of the importance of management and marketing, interpersonal communications and the use of IT for success in business and the purchase of training in these skills. In tourist information centres training is focussed on work with PCs, interpersonal communication and languages, all of which is in line with the importance these centres explicitly attribute to these skills for their activity and future development.

Chart 9   Assessment of Knowledge and Skills Potential of Own Staff[100]
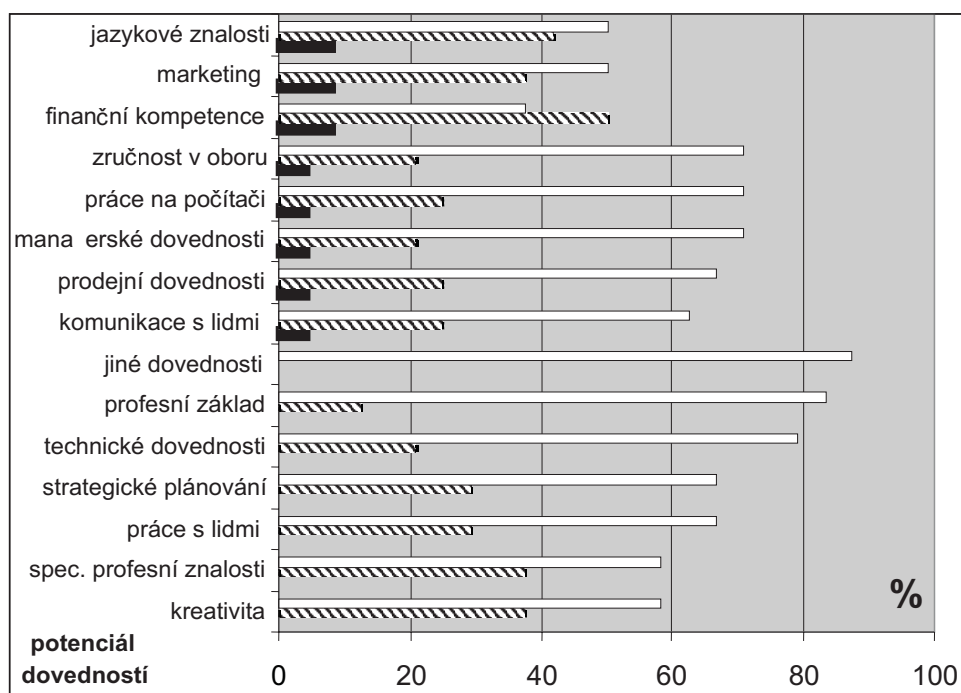
Chart 10   Reasons for Possible Changes in Employment
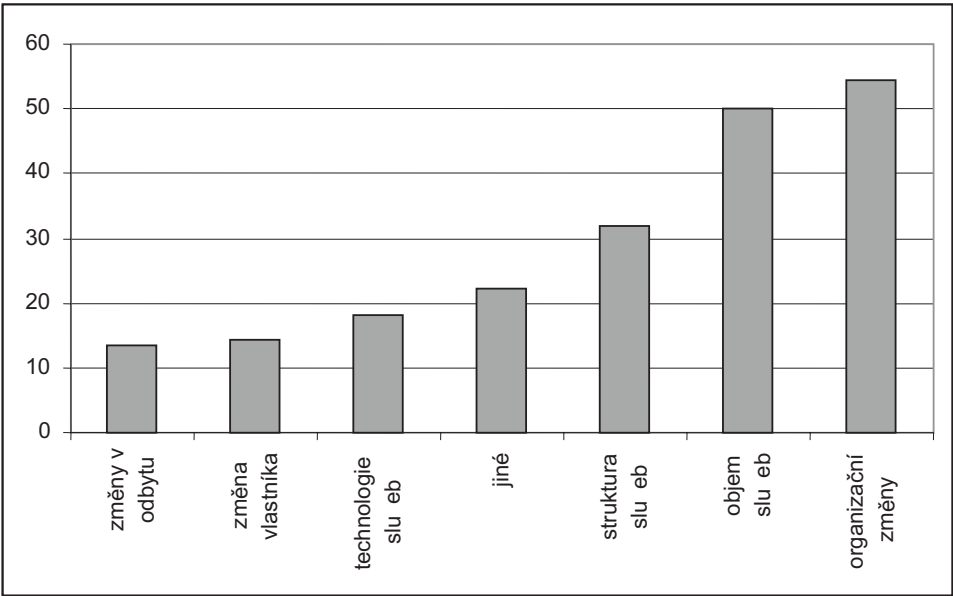
The respondents do not expect any fundamental changes in levels of employment in the sector. They believe that employment levels will continue much as they are now, with only minor increases or reductions. As is clear from the chart (Chart 10), respondents relate expected changes in employment to the general and universal factors of organisational changes and changes in the volume of services, but the specific features of the sector are evident in other reasons stated for change in employment, i.e. the structure of services and their technologies.

4. Conclusions

Conditions for the development of the tourist industry differ according to area within the North West region, but in both counties studied there is potential for the successful expansion of the industry in various forms. The questionnaire survey shows, however, that only a proportion of the businessmen in the region are aware of trends in tourism, the general and regional possibilities for using the potential of tourism to the full, the importance of professional skills and qualifications for business success and the need to invest in the improvement of skills and qualifications.

In the **Karlovy Vary county** the dominant sector of the economy is spa tourism, which has a long tradition and a high standard. After a certain decline in numbers of visitors in the period of economic transformation, the popularity of the spas has once again been rising. The continual growth of the foreign clientele is economically beneficial for spa businesses. In view of its rich tradition and advantageous location the region is in a good position to recover its status as a major European spa area that collaborates with the recreational and spa centres in neighbouring Germany. One necessary step in the process will be to continue with the recultivation and revitalisation of the landscape, especially in the Sokolov area following the mining of brown coal.

The Ústí county is ecologically one of the most damaged areas in the country as a result of the emissions of thermal power stations and the surface mining of brown coal. Nonetheless, even in this area there is potential for the development of recreation and tourism (spa tourism, recreation in artificial lakes, building of attractions, cycle touring, tourism in protected areas, exploitation of water transport etc.) The development of services and tourism could be a useful generator of job opportunities here. The obstacles to the development of tourism are the state of the landscape and the district's image as an industrially damaged area in the minds of visitors from home and abroad, the unsatisfactory level of education in the area, which is far below the national average in this respect, lack of a developed network of tourism schools, a significantly high rate of crime, prostitution and other social problems.

■ QUALIFICATIONS AND LIFELONG EDUCATION IN TOURISM

The multidisciplinary character of tourism makes it hard to define precisely and this in turn creates problems when it comes to defining the content of education for people working in tourism. The structure of subjects for training in tourism has to be such as to cover a wide range of knowledge and skills, and must take account of the development of the sector so as to project the main trends and changes into the syllabus (globalisation of the market, supersegmentation of supply, new technologies, sustainability of tourism and reduction of the negative impact of tourism on the environment etc.) Modern tourism requires a modern system of education that is able on the one hand to meet the demand for high staff flexibility, based on a system of knowledge /21/ and rounded general education supplemented by training of staff directly in businesses and lifelong education, and on the other hand can meet the demand for higher specialisation as a result of the growing segmentation of the market, which involves specialised professional education.

The international accreditation of study programmes carried out by specialist organisations (for example in hotel management by EFAH – the European Foundation for the Accreditation of Hotelprogrammes) is important for the international recognition of qualifications. Another form of international accreditation is the inclusion of schools within certain school associations like the CEMS (Community of European Management Schools), a prestigious association of European economic and management schools formed in 1988 as a response to integration processes in Europe with the aim of creating a European model of top economic and management studies[101]. As of the end of 1999 CEMS had grown to include sixteen European economic schools and almost fifty international companies which collaborate closely in the educational process with the CEMS schools.

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[101] After international evaluation in 1998 the Economics University in Prague became a full member of of the CEMS

1. The Training of School-Leavers/Graduates and Workers for the Tourist Industry in the CR

Since 1989 there has been a growth in the number of schools concerned with training for the tourist industry and increasing differentiation between them in terms of levels and quality. The process of the establishment of more state, public and private schools (a process still continuing today) has led to a considerable broadening of the range of educational programmes on offer, and the creation of competitive conditions in the sphere of education and training. The quantitative development of schools that teach tourism-related courses, however, has been characterised by lack of regulation and overall conception (e.g. in relation to the establishment and position of VOŠ – higher vocational schools, ease of student movement between different levels of school, such as VOŠ and bachelor studies), and has often lacked feedback in terms of the quality of the teaching process. In recent years, therefore, efforts have been made by the MRD, MEYS, NÚOV [National Institute of Vocational Research, formerly VÚOŠ – Research Institute of Vocational training in Prague) and professional associations and organisations to improve the quality of training for workers in the sector. Educational standards for secondary schools teaching hotel management were drawn up in 1992–97 by NUOV in close collaboration with the tourist sector itself and selected schools; these could be an important tool for improving the quality of the teaching process at technical and vocational secondary schools offering tourism studies, provided that they are fully and properly applied to the appraisal of schools, the expertise of inspectors in the field of tourism is increased and the standards rigorously implemented.[102] Currently a standard is being drawn up for secondary schools with teaching of tourism, and standards for Higher Vocational Schools (VOS) and universities are under discussion. It may be made a condition for business activity in tourism that the school attended met the standards for courses in hotel management or other forms of tourist business.

The need to improve the quality of training for workers in tourism is also coming to the fore in connection with the anticipated accession of the Czech Republic to the EU, i.e. from the point of view of the competitiveness of graduates of schools of various levels and their job prospects on the EU employment market. Table 13 gives a SWOT analysis of vocational training in tourism in the Czech Republic. The weak sides of vocational training and the schools system as presented in the SWOT analysis are currently manifest to different extents in different types of school, and the positive possibilities and strong sides presented need to be systematically developed.

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[102] discussion for example at the 1st International Conference on Education in Tourism in 1999 in Jihlava.

Table 13 SWOT analysis of vocational training in tourism in the Czech Republic /19, 4/.

Strenghts	Weaknesses
■ long tradition of training in hotel management and catering ■ high standard of some elements in the educational system (linkage with foreign schools with similar focus, planning for the future, flexibility of graduates etc.) ■ relatively rapid reaction of the school system to change in the social situation, strong dynamics of development of education in the last decade, including education in tourism – the expansion of secondary schools, higher professional schools and universities ■ overall high qualification level of the population and comprehensive system of basic education ■ inclusion of the CR in international projects and programmes ■ relatively comprehensive basis of knowledge in "traditional" subjects for tourism (history, geography, languages)	■ unbalanced age structure of teaching body, many senior lecturers and professors at schools teaching tourism were originally qualified in other disciplines ■ insufficient and undifferentiated remuneration for teachers, drain of qualified teachers from the schools system ■ lack of integration between education, research and practice ■ isolation and introversion of the educational system, low level of participation from social partners ■ uncontrolled and chaotic development of tourism training in some areas, and patchiness of availability depending on region ■ lack of information about schools ■ little use of active forms of learning
Opportunities	**Threats**
■ opportunity to obtain support from EU structural funds – conditional on the drawing up of an overall government strategy and the formulation of clear priorities and goals ■ recognition of education as a key priority for the state ■ increasing unemployment underlines the role of lifelong education (/9/) ■ more businesses will begin to appreciate the key importance of the development of human relations and will begin to regard this as an essential investment ■ the use of new technologies (IT) will increase demands for qualification in the tourist industry (especially on flexibility) ■ technical conditions for the rapid introduction of IT can increase the possibilities of education (i.e. distance forms of study, active forms of learning at seminars)	■ the educational system will remain at the margins of social interest (politically, and in terms of planning and essential funding) ■ lack of interest from society in the need to support the educational system will mean that the drain of experienced and capable experts to the management sector will not be halted ■ the social prestige of teachers will fall and young people will not be motivated to enter the educational system as teachers. ■ education is not universally regarded as a priority with decisive importance for the economy and society

2. New Trends in Tourism and Possibilities for their Reflection in Courses at Technical and Vocational Schools

One of the factors on which the standard of education and the quality of the graduates of schools teaching tourism depends is the capacity of the schools to change their curricula on a running basis by introducing new subjects, reacting to the most recent research in particular areas, using active forms of learning, cultivating a strong linkage with practice, and creating a balance between theoretical and practical knowledge and skills. In training for work in tourism the emphasis should be placed on language and communication capabilities and skills, understanding of marketing and its practical application, a solid grasp of trends in international tourism, knowledge of the customs, wishes and needs of travellers from different countries and backgrounds (intercultural management) and IT skills. The greatest changes need to be made in the training of top and middle managers, i.e. at universities and higher vocational schools, since senior management should be the vector of progressive changes that contribute to improving the efficiency and quality of the activities of businesses in the tourist sector. The

following table (Tab. 14) gives a summary of specific demands on vocational training in tourism based on trends and factors specific for the Czech Republic. Table 15 presents general selected trends in the sector[103] and their corresponding expression in the skills required of workers and managers in the sector.

Tab. 14 Trends and Factors Specific to the Czech Republic, and their impact in terms of requirements on the competence of workers and managers in the sector /19, 4/, author

Selected trend in the sector	Requirement on education and skills
accession of the CR to the EU and membership of international bodies and organisations	good orientation in legal aspects of doing business in the CR, knowledge of national and international law, language competence, knowledge of specific features of other nations, communication abilities
the penetration of supranational companies onto the market of the Czech Republic, with an increase in pressure for quality in services provided, and competitive conditions	sufficient attention to psychology and sociology, business ethics, social and diplomatic protocol, intercultural knowledge and positive attitude to intercultural relations
increase in the volume of cultural and urban tourism, conditional on systematic and planned development, has major significance for the CR	planning for the development of regions, towns and villages requires special knowledge from the fields of strategic and territorial planning, management and marketing, sustainable development of tourism, creation of regional products, environmental issues, systems analysis etc.[104]
potential for the further development of congress tourism in the Czech Republic	teaching of specific skills- see Table 2 (linguistic, organisational, marketing, managerial, interpersonal communication, intercultural knowledge etc.)

[103] for trends in tourism see also Table 2
[104] including the need for education in government and public administration

Tab. 15   Selected Trends in Tourism and their Reflection in Knowledge and Skills Required by Workers and Managers in the Sector (/19/, author).

Selected Trends in the Sector	Corresponding Demands on Education and Skills
■ high emphasis on personal and (technically) mediated communication with the customer ■ concentration of services in networks and chains (hotel and restaurant chains, tour operators, travel agencies) ■ growing use of IT by tourism businesses (information – reservation systems, the Internet, GDS, GIS etc.), online access to information, online services ■ customer demands and competitors offer new services, and via IT services can be easily compared. ■ high international mobility of qualified work force ■ programming of entertainment in leisure time, facilitation ■ specific qualification differences between kindred professions (e.g. catering services – hotel gastronomy, special catering, fast food) ■ more experienced clients with a broader spectrum of needs and stimulation aspects, requiring a higher standard of services, quality based on individual needs and requirements, requiring a personal approach. ■ globalisation of competition and supply of services and products, new technologies supporting, and also requiring from the point of view of competitiveness, a synergy between different activities (economic, managerial, marketing, development of new products etc.) ■ long-term sustainable development of tourism with emphasis on the preservation of natural and anthropogenic environments including specific national features and the genius loci of a place, pressure for corresponding environmental behaviour by all tourist subjects.	■ **general foundation of personality:** knowledge of psychology, social behaviour, internal and external verbal and non-verbal behaviour, general language capabilities, ethics and ethical behaviour, techniques to encourage systematic and procedural thinking ■ **general foundation for the subject:** basic capacities, skills and approaches in the given sector and relation to the sector, the development and content of company culture, more emphatic perception and adoption of the concept of quality, orientation to flexibility of product, an open approach to marketing and management in products and behaviour ■ **general knowledge and skills basis:** active knowledge of information and communication technology, specific language skills, systematic education in the principles of natural, technical and social sciences, principles of systems thinking (important basis for dealing with environmental problems) ■ **specific knowledge and skills:** organisational and managerial capacities, marketing including identifying short-term and long-term competitive advantages, analysis of future market developments and new trends and electronic marketing and electronic market research, creative thought, techniques and technology of tourist services, strategic and operational management, the management of change, knowledge of national differences (e.g. cuisine, intercultural competence), knowledge of sport and social games, sharing a specific company culture, grasp of systems and planning to achieve quality as defined by different models, particularly ISO 9000+ and TQM, exploitation of new technologies, Yield management, selected IT products (GDS and products above GDS, GIS), personnel management ■ achievement of a comprehensive general foundation for the sector and a general knowledge and skills foundation for the sector will increase flexibility of work force, and reduce the length and cost of on-job training

3. Continuing Vocational Training

Lifelong learning and vocational training (CVT – Continuing Vocational Training) together represent the many educational possibilities open to the individual throughout his or her lifetime, both as initial education in a subject and as further education in a subject. All over the world great importance is attached to CVT, since the rapid development of knowledge and technology means that there is constant pressure on the individual to update his or her skills. While many sectors have already accepted the concept of CVT, however, this is not yet the case in tourism, and the tourist industry is struggling with problems in the field of human resources – a shortage of workforce, frequent change of profession, lack of vocational training and education. The basic problems in the tourist industry consist of frequent change of employees, problems with obtaining qualified work force (one reason is an insufficiently developed plan of professional development), a negative image of the sector among potential workers, demographic changes and an unsatisfactory level of education and vocational training in the sector. These factors are mutually interlinked and reinforcing – frequent change of workers is caused by the lack of a defined plan of professional development, the negative image of the sector is a barrier to attracting work force, the lack of vocational training contributes to the negative image of the sector and to insufficiently defined plans of professional development.

The results of a survey conducted in Great Britain in the mid-Nineties may serve as an example of the relatively unsatisfactory level of education in the field of tourism. Only 6 % of senior staff in the sector had a university degree, while in other sectors the average is 30 %. 35 % of employees in the sector were unqualified while the corresponding figure in other sectors was 24 %. One reason for the low level of vocational qualification is the unwillingness of businesses to cover the costs of vocational training. In Ireland the main provider of short-term vocational courses is the CERT state agency, which came to the conclusion that it is essential to subsidise as much as 50 % of the costs of these courses. Even this compromise figure represented a barrier to the development of vocational courses, however, and so the agency is now striving in line with government instructions to move over gradually to full coverage of costs.

In the Czech Republic, CVE in hotel management, hotels and catering[105] is provided by specialised firms (e.g. Profit klub Hradec Králové – tourist guides, travel agency staff), and professional organisations (e.g. Prague Information Centre – tourist guides to Prague. The National Federation of Hotels and Restaurants (NFHR) has set up a university-level school, and organises educational courses and trips abroad for its members). The broadest range of CVE is, however, provided by tourist schools (most often language courses[106], courses for tourist guides, and IT). A few examples:

■ **TYRKYS, škola kultury podnikání v cestovním ruchu** [School of Enterprise Culture in Tourism] – Requalification courses "Tourist Guides", "Guides to the Prague Region"
■ **VOHŠ Opava** [Higher Vocational Economic School] – courses in Hospitality and Hotel Management, Gastronomy, Tourist Guiding, the Entrepreneur in Catering Services

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[105] the regional distribution of these facilities is very uneven. There is a major concentration in Prague especially, but a minimal supply in the North West Region.
[106] e.g. SHŠ [Middle Economic School and VOŠ [Higher Vocational School] in hotel management and tourism at Poděbrady, ŠECR [School of Economics and Tourism] Žďár nad Sázavou, the School of Economics and Tourism in Jihlava

4. The Benefits of a Policy in the Field of Vocational Training

A pro-active and dynamic policy in the field of vocational training brings multiple benefits. High costs on work-force are a convincing argument for the employer to invest more time, effort and money in the professional training of his or her employees. This approach, which is often known as the **productive approach**, regards investment in human resources as an essential condition for the maximisation of the business's profitability. Investments in vocational training are as productive as investments in capacity and material equipment.

A detailed analysis produced in 1989 on the productivity of the hotel industry in the Federal Republic of Germany and Great Britain revealed that German hotels were much more productive. The reason was partly to be found in somewhat greater German investment in the equipment of hotels, but the main difference was in the approach to vocational training. In Germany there were double the number of people in training for hotel work that there were in Britain. The differences were primarily in the training of operational staff, among whom four times as many had been through training as compared to the situation in Britain.

Many hotels emphasis the provision of perfect services in their publicity literature. If their promises in this area are to be kept, then the hotel staff need to receive vocational training on a running basis. A guest who is paying a significant amount of money for a room and for food and drink expects a high standard of professionalism, and this can only be achieved on the condition of staff training of an appropriate kind. The key competencies are good communication skills, mastery of all elements of hotel equipment, knowledge of the content and means of provision of all the services on offer, and identification with the policy of the hotel.

In a situation in which many employees are working in the hotel industry without having had the benefit of suitable vocational training, the most important task is to provide them with training while in employment. Vocational training may include school training for employment, the training of employees outside the premises, and in-house staff training on-the-job. There are, however, four basic obstacles to the provision of vocational training on a scale that corresponds to the numbers of staff in the hotel industry: employees cannot attend evening courses because of their work hours; employees have too much work in the hotels to allow them to attend vocational courses; hotels are unwilling to finance the training of their staff; the forms and content of the courses do not meet the needs of employers or employees. Yet all these obstacles can be overcome or at least minimised: courses can be held in morning or afternoon hours, one-off courses can be organised before the beginning of the season, courses can be offered on the premises, the costs of the courses can be covered by agreement on a contribution from the staff member combined with funds from company expenses, and the content and form of organisation of the courses can be adjusted by consultation between employers' representatives and professional associations.

5. Conclusions

The hotel and tourist industry in many countries is struggling with a personnel crisis, since **companies in the sector are unable to attract and retain a sufficient number of suitably qualified staff**[107]. This problem is also typical for conditions in the Czech Republic and will probably increase with the rising demands on quality of services in most of the regions of the Czech Republic. One partial solution to this high fluctuation lies in the introduction of modern training programmes and in greater financial support for vocational education. In current market conditions, in which earlier unifying elements – unified principles of service, unified recipes, unified principles of inspection etc – have been abolished, the demands on the general gastronomic education of operators of restaurant facilities and waiting staff gave risen.

Despite the intensity of work in the field of hotels and tourism and despite the good standard of vocational knowledge and practical skills that tourism and hotel schools in the Czech Republic are able to offer (as was confirmed by the satisfaction expressed by respondents to the questionnaire), these schools are generally regarded as secondary schools of an inferior kind, attended by students who have not won places elsewhere. Another problem is that hotel schools in the individual regions, which are financed exclusively by the state, receive very limited funds and are badly equipped. Schools run by private companies are bringing a certain improvement.

■ SCENARIOS OF THE DEVELOPMENT OF TOURISM IN THE CZECH REPUBLIC

In the period of the transformation of the economy during the Nineties, the development of the tertiary sphere contributed significantly to maintaining employment levels. There was a major fall in the number of workers in the primary sector (agriculture, forestry), and the secondary sector (industry, construction), but the importance of the service sector grew. Particularly in the first half of the Nineties, the tertiary sector absorbed a considerable proportion of the redundant workers, and this was reflected in a relatively low rate of unemployment. The growth of employment in the tertiary sector can be documented in several branches, see Table 16.

Table 16 Growth of Employment in the Tertiary Sector in Selected Branches[108].

Branch	Number of Workers		index % 1999/90
	1990	1999	
Total number of workers in CR	5351242	4693096	87.7
Trade, repairs of automobiles and consumer goods	523760	670467	128
Hotels and catering	89520	161659	180.7

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[107] one extreme example is the average length of employment of waiting staff in open-air sections of Prague bars and restaurants offering refreshment to tourists – 10–14 days.
[108] CSO

The trend in hotels and catering in particular (as one of the basic branches of the "tourist industry") displayed a strong capacity to create employment opportunities in response to development in tourism. Trends of this kind, usual in economically advanced countries, may also be realistically predicted in future in the Czech Republic. On the basis of a SWOT analysis (see Table 17) of world trends, analogy with development in countries with similar conditions and an estimate of the effect of other influences, we can produce alternative scenarios of the development of tourism in the Czech Republic. These alternative scenarios – optimistic, realistic and pessimistic, are presented in concise form in Table 18.

The tables should be supplemented by factors that according to experts will undoubtedly have an impact on tourism in the Czech Republic (or have already even been legislated for):
- there will be further development of regional associations – currently there exist 106 of these associations, which are emerging in connection with the use of EU funds, and there is a demand for middle management for microregions and Euroregions
- legislative measures are imposing an obligation for tourist activities to be considered as part of the territorial planning process

Rather unpredictable factors for projected scenarios and also for a related quantitative prognostic model of supply and demand for labour on the Czech employment market include both factors that are universally applicable in tourism and factors that are specific and mostly historically determined:
- the low barrier to entry into the sector – rapid reaction to market demand
- the degree of attractiveness of the Czech Republic (and its regions) as a tourist destination
- the influence of planning by the MRD of the Czech Republic on tourism – quantitatively, qualitatively, and in terms of the time scale of change.
- the entry of the Czech Republic into the EU and conditions of entrance, in particular: date of entry[109], existence/length of transitional period for the free movement of work forces, level of migration and immigration of work force in the sector and the influence of the further opening of the frontiers on the intensity of tourism from EU countries.

The following table presents an extensive SWOT analysis of the conditions and potential for the development of tourism in the Czech Republic, with the emphasis on human resources, but also attention to the impact of trends in tourism. The criteria behind the goals of the desirable development of tourism in the Czech Republic relate not just to the traditional economic and social benefits of tourism, but also the development of its potential for the future and sustainability of tourism.

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[109] or whether the Czech Republic will accede to the EU at all – referendum results

Table 17 SWOT Analysis of the Conditions and Potential of the Development of Tourism in the Czech Republic, with an emphasis on Human Resources /6, author/.

Strengths	Weaknesses
■ advantageous position of the Czech Republic, varied landscape, good climatic conditions for year-round tourism ■ abundance of cultural, historical and technical monuments and other cultural and folklore attractions, tradition of spa tourism, natural attractions (protected landscape areas and national parks) sports complexes. ■ Prague as a tourist phenomenon of world significance, development of Prague as a centre of congress tourism ■ dense, maintained and well signposted network of tourist paths and trails throughout the republic ■ editions of high quality tourist maps on the scale of 1:10000 for all important tourist areas ■ sufficient accommodation capacity ■ flexible work force ■ dense road and rail network ■ elaborate system of public transport ■ building up of integrated transport system in major towns ■ good quality guide service at cultural and technical monuments ■ the revival of many historical town centres, castles and chateaux, historic sites	■ low quality of basic and auxiliary tourist services (including accommodation, taxi service, public transport) ■ absence of marketing studies of the development of tourist regions ■ insufficient promotion of the Czech Republic and its regions abroad, and of the regions at home ■ inadequate tourist infrastructure (especially imperfect information system, transport and connections etc.) ■ imbalance of supply and demand for quality staff ■ inadequate supply, extent, flexibility and quality of lifelong learning ■ lack of a system for training teachers in tourism ■ too limited opening hours for monuments (afternoons) ■ lack of sufficient specific skills in work force – linguistic, communicational, intercultural, marketing etc. ■ too heavy an emphasis on the traditions of the sector and traditional products, lack of creativity and courage to develop new tourist products ■ insufficient collaboration between entrepreneurs in introducing and organising tourist products ■ insufficient capital for the restoration of monuments ■ quality of the environment, especially in some regions

Opportunities	Threats
■ systematic state support for tourist industry ■ development of spa tourism combined with the building of infrastructure and creation of new products ■ improvement of the environment ■ recultivation and revitalisation ■ segment-orientated and nationally sensitive marketing based on the creation of a "tourist" image for the Czech Republic, and of regional and thematic products ■ extension of collaboration with neighbouring regions and other regions and centres with their international partners in the field of tourism ■ development of specific tourist products: rural tourism, ecotourism, congress tourism, incentive tourism, cultural tourism, cycle tourism and so forth, including accompanying programmes with attention paid to the specific features and needs of the regions ■ use of the "Programme for the Renewal of the Countryside" for the development of tourism in the regions ■ preparation of the tourist sector to receive EU structural funds ■ building up of a nation-wide tourist information system ■ building up of a quality system of lifelong learning, support from the PHARE programme ■ continuing development of international tourism ■ economic growth in the Czech Republic – development of domestic tourism, tourist infrastructure ■ gradual entry of post-1990 graduates of tourism schools into management positions (application of modern approaches – management, marketing, regional planning, management accounting etc.) ■ potential of knowledge and skills for the restoration of monuments ■ increasing the quality of conferences on tourism ■ deepening collaboration between tourist schools ■ creation of quality printed materials and electronic aids for studies in tourism ■ link-up of the Czech transport system with the European transport system and transport systems of neighbouring states ■ expansion and modernisation of services at the airport in Praha–Ruzyně	■ underestimation of importance of the legal framework of business and control of quality of services ■ lack of capital for the stabilisation and further development of enterprise in tourism ■ underestimation of importance of co-ordinating joint efforts by central And local government bodies, regional development agencies, regional tourist associations and professional associations in the tourist industry. ■ underestimation of importance of tourist activities for the development of small and middle-sized businesses and the creation of new employment opportunities in the regions. ■ underestimation of the human factor and vocational training of specialists for the tourist sector, or of advisory and educational activities for people starting businesses. ■ inadequate supply and low quality of study materials ■ negative experience of clients with the quality of services ■ too little reinvestment of earnings from tourism back into development of tourism at national, regional and local level ■ unwillingness to join professional associations ■ lack of co-operation in the sector – problems of communication, marketing ideas, failure to give quality of services priority ■ lack of grasp of the importance of standardisation (in some cases also certification) of services, including standardisation of the educational system (standards for education) ■ large numbers of business subjects in some branches of tourism (travel agencies, accommodation and restaurant facilities) combined with the low purchasing power of local populations and Czech visitors – low prices, which make development of the businesses concerned impossible ■ with integration of the Czech Republic into European structures Czech workforces will lose competitiveness (managerial positions in tourist businesses will be occupied by foreign managers)

Tab. 18 Scenarios of the Development of the Sector of Tourism in the Czech Republic over the Next 5–10 Years (optimistic, realistic, pessimistic).

Variant	Assumptions	Time scale	Commentary	Influence on the employment market
Optimistic	Entry of CR into EU, CR fully prepared including the regional level and tourist industry	by 2005	**Influx of resources from prestructural and structural funds, facilitation of entry to CR on western and southern (northern and eastern) borders, rise in incoming tourism, more short-term trips**	Emigration and immigration of workforces, growth in job opportunities
	High level of efficacy of measures by MRD of the CR, i.e.:	from 2001	CTA becomes implementer of a sector operational plan, a new concept of a government policy on tourism, annual up-dating of Sector Operational Plan for Tourism with sensitive selection of priorities and efficient means to support them (spa tourism, development of new products, supraregional products etc.), support drawn from EU funds	Creation of job opportunities in regions and sectors with the support of specialised programmes and grants
	quality marketing of the CR and its regions	from 2001	Improvement of quality of activities of CTA (electronic marketing, CTA IT presentation, linked to ME presentation, standard for printed materials etc.), activation of regional agencies etc. – conditions for raising the circulation of visitors, channelling them, promoting new activities and products	Crowth in job opportunities with increased incoming tourism
	intergration of regional development and tourism in planning	from 2001	At level of Regional Operational Plan and Sector Operational Plan, development of overall policy, supports for drawing on EU funds	Requirement for experts for regional development and tourism (several thousand vacancies for staff for municipalities/communities, counties)
	building of comprehensive system of lifelong learning	from 2002	Effect on the field cca within 1 year of implementation, involvement and link-up of tourism schools, modern technologies (IT), quality aids, information sources, certification	Change in workforce – increase in quality, effectiveness of further training and migration from other sectors
	building of nation wide IS for tourist industry in the CR	from 2002	The IS includes standards and training for TIC and other partners, staff of municipal and local departments, improvement of marketing, communication, co-operation between subjects in the sector, increased efficiency in the tourist industry, a fall in prices of products (E-business, efficiency of promotion and publicity etc.), creation of information base for the sector	New skills required of workforce – IT, communication, creation of products, new job opportunities in tourist information centres, exodus of workforce from travel agencies.

Variant	Assumptions	Time scale	Commentary	Influence on the employment market
Optimistic	Creation of a Ministry for Tourism	by 2003	Advantageous in view of the potential of tourism in the Czech Republic and the importance of tourism for the Czech Republic – greater circulation of funds for reinvestment in tourism, support for research, statistics, management of the sector, quality, prestige of the sector etc.	Prerequisite for further dynamic development of the sector in subsequent years – job opportunities in tourism, higher demands on quality of work
	Completion of linkage of transport network to transport networks of neighbouring states and European transport system	by 2006–2010	Major improvement in access to transport, fall in transport prices, greater passenger comfort, opportunity to link products to transport routes and combined transport (cycle paths, cars + rail with reduced impact on environment etc.)	New job opportunities in tourist industry
	Research conducted on tourism industry	from 2002	Development of methods for regional and national research – formulation of priorities and problems of the development of tourism in the CR, planning and methods for sustainable development, motivation of visitors, synergetic development of new products, systems model and building up of skills among workers in the sector etc.	New demands on competence of workforce in the field of regional development, planning, management and IT.
	Major improvement in quality of teaching at tourism schools	from 2002–2003	Introduction of minimal standards of teaching for all types of school, creation of quality study materials, strong feedback relationship to practical needs of sector etc. Changes in the tourist industry in the CR become clearly evident within 3–10 years of these measures.	Flexible school leavers/graduates with a good general educational foundation and foundation in the subject, high readiness to move in response to job market within their speciality of outside it (effective reaction to demand for workforce)
	Reduction of number of countries with visa controls for travel to the Czech Republic	from 2002	Linked to overall foreign policy, development of new ways of regulating undesirable immigration, improvement in the economic level of the CR and reducing economically motivated emigration. The result is a growth in incoming tourism	New job opportunities in tourism
	Higher reinvestment of earnings from tourism in the infrastructure and restoration of monuments	from 2002	Linked to the introduction of a satellite account and better quantification of the earnings of tourism, development of potential of tourism in the CR, growth in incoming tourism and tourist earnings, conservation of cultural heritage.	New job opportunities in tourism, and in related sectors (construction, monument conservation etc.)
	Lengthening of visits of tourists to the CR	continuous process	The result of the creation of new more comprehensive, planned, regional and supraregional tourist products in the CR, higher quality services.	New job opportunities in tourism (demands for new skills in the workforce – communication, a holistic approach, regional planning etc.)

Variant	Assumptions	Time scale	Commentary	Influence on the employment market
Optimistic	Development of international tourism will continue on global level	continuous	A very probable trend linked to economic, social and other factors, see Chap. 0	New job opportunities in tourism.
	Major improvement of quality of tourist services	continuous increase	Linked with the development of domestic tourism, the membership of tourist businesses in associations, the categorisation, classification and certification of tourist services.	Demands on competence – relationship to sector, systems of quality and standards, professional skill etc.
Realistic	Entry of the CR into the EU, CR fully prepared including regional level and tourist industry	by 2007–2010	**Influx of resources from prestructural and structural funds, facilitation of entry to CR on western and southern (northern and eastern) borders, rise in incoming tourism.**	Migration and immigration of workforces, growth of job opportunities in the CR, limited migration of workforce to the EU (transitional period)
	Partial efficacy of measures taken by the MRD of the CR, i.e.:	from 2001–2002	CTA becomes implementer of Sector Operational Plan, new government policy on tourism, annual updating of the SOP for tourism with selection of priorities and means to support them.	Creation of job opportunities in the regions and sectors with the support of specialised programmes and grants
	improved marketing of the CR and regions	from 2002	Improvement of quality of activities of ČCCR, activation of regional agencies	Growth in job opportunities with increased incoming tourism.
	linkage between regional development and tourism	from 2002	At the level of Regional Operational Plans and Sector Operational Plans, draft policy, supports for drawing on EU funds	Demand for experts on regional development and tourism in selected towns/communities, counties.
	building up of system of lifelong learning	from 2003	Involvement of tourism schools, gradual exploitation of modern technologies (IT) and new study literature	Change in workforce – increase in quality, effectiveness of further training, and migration from other sectors.
	gradual building up of nation wide IS for tourism	most of IS created in 2002–2003	IS includes standards and training for TIC, improvement of marketing, communication, co-operation between subjects in the sector, improvement in efficiency of tourism, drop in prices of products (E-business, efficiency of publicity etc.)	New skills required of workforce
	Further development of organisational structure for tourist industry within the MRD of the CR.	by 2002	Increased circulation of funds for reinvestment in tourism, support for research, statistics, management of the sector, quality, prestige of the sector etc.	Precondition for the further development of the sector in subsequent years – job opportunities in tourism, higher demands on quality.

Variant	Assumptions	Time scale	Commentary	Influence on the employment market
Realistic	Further development of linkage of the transport network to neighbouring states and the European transport system	by 2010–2015	major improvement in transport accessibility, fall in prices of transport, more passenger comfort, possibility of linking products to transport routes (cycle trails, combined transport etc.))	New job opportunities in tourism.
	Improvement of quality of teaching at all tourism schools	from 2003–2004	Introduction of minimum standards for middle schools, progressive creation of study materials, feedback relation with needs of practice etc.	More flexible school-leaver/graduates with good general educational foundation and foundation in the subject, capable of mobility on the job market within and outside his/her speciality
	Stabilisation of the number of countries with visa controls on travel to the CR	from 2002	Completion of process of introducing visa controls for reasons unrelated to tourism.	Neutral influence
	Higher reinvestment of earnings from tourism into the infrastructure and restoration of monuments	from 2003	Linked to introduction of satellite account and better quantification of the benefits of tourism.	New job opportunities in tourism
	Slow increase in length of tourist visits to the CR	continuous process	Result of creation of new tourist products in the CR, higher quality of services	New job opportunities in tourism
	Increase in international tourism will continue on global level	continuous	Very probable development associated with economic, social and other factors, see Chap. 0	New job opportunities in tourism
	Slow improvement in quality of tourist services	continuous increase	Linked to the growth of domestic tourism, membership of tourist businesses in associations	Demands on competence – relationship to subject, systems of quality and standards, professional dexterity etc...
Pessimistic	Change in political supports for tourism – reduction of support	from 2002	Tourist industry left to develop haphazardly, without planning, strategy or regulation	Stagnation of number of job opportunities.
	Slow and gradual improvement of the marketing of the CR and its regions	from 2002	Partial improvement of quality of activity of ČCCR, gradual development of regional agencies	Slight growth in number of job opportunities, demand for competence in marketing, regional development.
	Weak (formal) linkage between regional development and tourism	from 2002	Regional Operational Plans and Sector Operational Plans and their implementation remain undeveloped, little support for drawing on EU funds	Stagnation of number of job opportunities.
	No comprehensive system of lifelong learning	continuing	System of lifelong learning left without systematic support, low supply of quality courses in tourism for school-leavers, the unemployed and those already in employment	Rather ineffective system of lifelong improvement of qualifications, which gails to meet the dynamics and requirements of tourism.

Variant	Assumptions	Time scale	Commentary	Influence on the employment market
Pessimistic	Gradual development of a nation-wide IS for tourism	from 2002	Slow rate of development of nation-wide IS for tourism, little support of regions and businesses, problems in management of the project	Gradual increase in requirements for competence in IT (TIC, CK).
	The CR does not enter the EU, or entry is deferred to after 2010		Resources only from prestructural funds, possibility of investing in border areas and rural development (agrotourism, rural tourism etc.)	Slight growth in job opportunities.
	Existing organisation al structure for tourism under the Czech MRD remains unchanged	from 2001	Continuation of present top structure of support for tourist activities, limited possibilities of expert support, transfer of know-how, support for research etc.	Slight growth in number of job opportunities, support for priority areas (spa tourism) with growth in job opportunities depending on specific activities and regions.
	Gradual building of links to the travel network of neighbouring states and the European transport system	by 2015–2020	Slowdown in development of transit and incoming tourism by land routes, problems on the borders at national holiday periods (FRG)	Stagnation of number of job opportunities.
	Teaching at all tourist schools slowly improves in quality	continuous	Slow improvement in literature, teaching methods, integration with practice etc.	School-leaver profile gradually corresponds more to the needs of the labour market.
	Reinvestment of earnings from tourism in infrastructure and restoration of monuments stays at current levels	continuous	Very slow improvement in the state of tourist infrastructure and especially of monuments, the potential of tourism for the CR cannot be fully realised.	No strong positive or negative influence on the demand for workforce
	Stagnation of length of tourist visits on the territory of the CR	continuous	The result of many factors – especially the low supply of more comprehensive products, ineffective marketing, slow development of the tourist infrastructure, lack of co-operation at regional and supraregional level etc.	No strong positive or negative influence on the demand for workforce.
	Slowdown of worldwide development of international tourism	continuous	Could result from a slowdown of economic growth in the main countries from which tourists come, political instability and suchlike.	Slight growth in number of job opportunities.
	Quality of tourist services remains at current levels or improves slightly	continuous	Improvement of services under pressure of competition, client demands, little pressure from associations or the state, insufficient support for the educational system.	Slight growth in number of job opportunities – gradual improvement of conditions for incoming and domestic tourism.

Scenarios for the Development of Tourism in the North West Region

Using the SWOT analysis presented above, expert discussion, and statistical materials in longer time series etc. different scenarios of the development of tourism and its impact on the work market in the North West Region can be derived in the same way as in the Czech Republic as a whole. We set out their basic premises below:

Optimistic variant – most of the opportunities for tourism cited in the SWOT analysis will be realised in the region (see Table 11) and the strong sides of the region will be strengthened further – the maximum exploitation of the tourist potential in the region is linked, inter alia, with the building up attractions, recultivation and revitalisation encourages the expansion of tourist capacities, and spa tourism urban, cultural and congress tourism are all vigorously developed.
Realistic variant – a balance of the opportunities and threats presented in the SWOT analysis emerges, the strong sides of the region in relation to tourism are partially strengthened.
Pessimistic variant – the threats rather than opportunties for tourism from the SWOT analysis are realised.

CONCLUSIONS AND RECOMMENDATIONS FOR THE METHODOLOGY OF ANALYSIS OF THE LABOUR MARKET NEEDS

One of the most difficult tasks involved in the project, "Forecasting Education and Training Needs" proved to be the integration of various different methodological approaches. Here we shall only offer brief and selective comments on the testing of different instruments in the Czech part of the project. These comments relate to the analysis of qualification needs in the tourist sector, but many are relevant to a broader range of prognostic activities focused on qualification needs of the future labour market.

The project has **two basic components**. The **quantitative component** was focused on the development of a mathematical prognostic model at the national level with limited applicability for the regional or sector level. The **qualitative analysis** component, on the other hand, was focused on the production of basic materials that would correct and supplement the outputs of the quantitative model in the case of the tourist sector. Both components in fact used both qualitative and quantitative elements of prognostic instruments. We therefore regard the titles of the two methodological sections of the project as simplifications, and use them only as working terms.

1. From Reality – to Numbers

The importance of precise definition of the classifications and data structures analzsed and their relationships

One of the basic problems of any kind of numerical expression of real phenomena is the question of the precise definition of their content and interdependencies. Thus, for example, in the case of the sector of tourism, which includes a wide range of activities, it is important to be precise about exactly how broadly the sector will be defined. For this reason the degree to which employment trends in hotels and catering can be identified with (or regarded as sufficiently representative of) employment trends in the sector of tourism as a whole should be the subject of independent analysis. The analysis ought also to show how the multiplication effect of tourism works, and how trends in employment in tourism influence employment trends in other sectors.

We encountered another problem in relation to forecasting obtained from a quantitative model of demand broken down by groups of professions. At present the quantitative model uses 50 clusters of occupations formed out of 119 occupations (ISCO–88) using a 3-digit ISCO. In trying to select the professions that fall within the tourist sector, and in view of the overlap between tourism and other sectors (or the share of individual occupations in the activities and operation of the sector of tourism – see SICTA, Annexe 1) it would be more useful to employ a 4-digit and in some cases even a 5-digit ISCO.

This would mean that the occupations monitored in the framework of the quantitative model in the Czech ISCO (KZAM) available would include, for example, 12117 – senior managers of large cultural, recreational, sports and travel organisations, 1225 – senior managers in restaurants and hotels, 1315 – senior managers, directors in restaurants and hotels, 13191 – senior managers of small cultural, recreational, sports, travel and entertainment organisations, 13193 – senior managers of small healthcare facilities, convalescent homes, spa organisations, 3143 – pilots, navigators and aviation technicians, 3144 – air-traffic controllers, 5111 – service personnel in transport and stewards, 5113 – guides, 3414 – tour consultants and organisers, 4221 – travel agency staff, 4222 – receptionists, 5122 – chefs, 5123 – waiters, waitresses, 5124 – barmen, 51491 – hostesses, 51495 – worker in recreation or rehabilitation facility, 83337 – funicular railway and lift staff, 91325 – auxiliary worker, hotel cleaner, maid.

Use of a more detailed occupational classificatory scheme for more exact definition of the occupational groups whose development is to be predicted, however, faces the obstacle of the current data on employment in the Labour Force Sample Survey (LFS) produced by the Czech Statistical Office, which provide the primary basis for the quantitative model and which are accessible for reasons of method only in a 3-digit classification of occupations. The current classification into 50 groups of occupations has a number of faults of lack of precision that make it impossible to get a clear view of the job opportunities falling within the tourist sector in the pilot analysis (clusterings – see Chapter 2, Table A.2a **Occupational Classification**). Thus, for example, Group 422 – workers providing various kinds of information – includes not only travel agency staff and receptionists but all other junior clerks, commercial representatives and agents. Executive workers in art and entertainment and guides belong to Group 46, but this also includes staff of facilities, teachers of special schools, social workers and other occupations.

The classification of 88 occupational groups based on expert opinions and a 4-place occupational subdivision is also not entirely satisfactory (Chapter 2, Annexe A2b An Expert Clustering of Occupations – Czech Version). Here, for example, Group N75 (specialist workers in trade, tourism, accommodation, catering, transport, post and telecommunications) presents too broad a range of activities, many of which do not relate to travel and tourism at all, and separated off from Group N55 – operational workers in catering, accommodation and tourism. For the future we recommend that researchers try to produce their own definitions and clusterings of occupations, based on more detailed Occupational Classification and "tailormade" for the research needs in particular sectors. It would be useful if the breadth of the categories were harmonised with the professions in the Integrated System of Standardised Working Positions (MoLSA CR), which provides a platform for discussion of the content of work and demands on the worker. These categories might then serve as a link between the qualitative and quantitative analyses.

Special calculations and clustering "tailormade" for research needs

One potential source of a input data of a more precisely ordered kind (at least a 4-digit ISCO) for the quantitative model might be the data on employment contained in the investigation of wages as part of the Information System on the Price of Labour operated by the Czech Ministry of Labour and Social Affairs. This source of data, however, cannot be used until certain problems of method are solved. These are linked to the number and structure of organisations and individuals included in the investigation of wages and the reliability of calculations of data on employment for the national, regional, sector, branch and other levels.

Another problem that has already been mentioned in Chapter 2 of this publication, i.e. the insufficient precision of educational classifications in the LFS classification and related model calculations only in 59 educational groups represents a considerable limitation for interpretation of results. According to preliminary analysis, the fields of economics, trade and services do not have bad prospects on the labour market. More detailed analysis by Classification of principle educational fields subject is impossible because of the way these are allocated to fields of education in the LFS.

2. From Numbers – to Predictions

At a sectoral regional level forecasting of trends on the labour market cannot be baset on a quantitative model alone, but must be augmented and corrected by qualitative analysis

The case study of the tourist industry has confirmed the initial assumption that prognosis of trends in selected sectors of the labour market cannot be made on the basis of a quantitative model alone, and that the quantitative model must therefore be augmented and corrected by qualitative analysis. At the same time, however, it has demonstrated that it is no simple matter to translate the premises of qualitative analysis (which can be formulated in terms of scenarios of development, for example) into quantitative parameters that could be inserted directly into the quantitative model. Prognoses of employment in individual sectors are potentially very useful, but in tourism the crucial issue is to define the sector and classify occupations in a way that facilitates inputs for quantitative calculations. This issue should be the subject of future research projects, testing and development of methods proposed.

In the course of construction of the quantitative forecasting model (see Chapter 2 of this publication) it was stated that a range of data was lacking, including the basic input data necessary for the drawing up of medium-term predictions of the development of the needs of the labour market. Thus, for example, there is no prediction of the development of employment in 15 branches in the one-digit OKEČ (NACE) classification. The projection of employment in 4 basic sectors – input from the HERMIN model (see Chapter 2) – must be combined with the projection of a simple chronological progression based on data from the past and also expert testing. For the moment, for the branch of hotel and catering the result of prediction of employment up to 2005 (CERGE-EI) is based on the estimates of the HERMIN model and only partially on trends in employment in services in the Czech republic derived from statistical data of recent years. Because the chronological span is so short in this case, the data have been augmented by information based on trends in the EU countries. The result is presented in the following chart.

Chart 11 Employment in Hotels and Catering – Forecast up to 2005 (CERGE-EI)
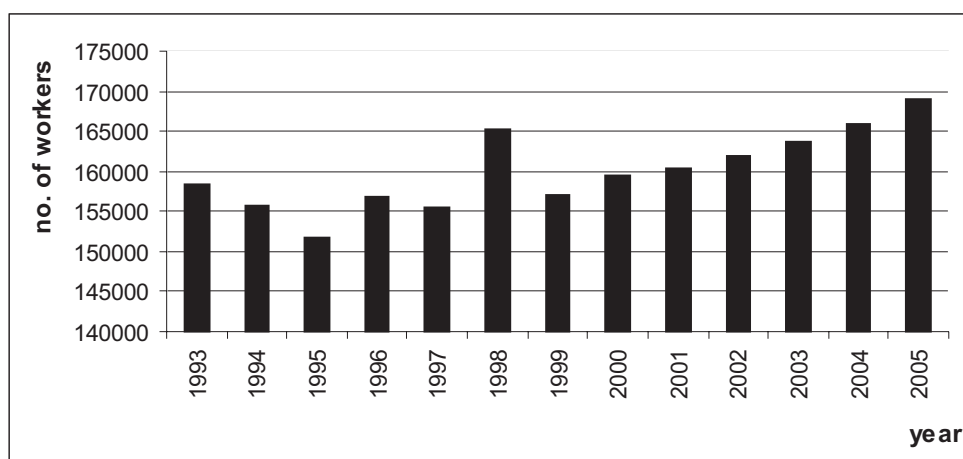
During expert assessment of the reliability of this forecast it was discovered that the anticipated slight growth in employment linked to a general trend of the increasing strength of the service sector, the potential of the tourist industry in the CR and state support for the tourist industry in recent years, corresponded to the realistic scenario. If we take into account the trend towards external purchase of services for hotels and catering (outsourcing), the impact of the growth of this area on employment need not be so clear. Most of the hotels in large towns are already purchasing cleaning services. It can be expected that this trend will soon be evident in smaller towns as well, and this will finally result in a formal (but of course not real) drop in employment in hotels and catering.

On the basis of the preliminary estimates already produced (see Chapter 2, CERGE, figures 9–11), among school-leavers with qualifications in accounting, trade and services, it is school-leavers with a secondary school education that have the best prospects on the labour market. This trend however can be desired from the past data time series which may substantially change in the future as the first boom in demand for management and economics professions of all levels is rather a matter of the past. In the context of analysis in the field of tourism, this kind of development is however entirely probable, as is also evident from the as yet still limited impact of technological changes on employment trends in the sector (see the survey results). This trend could change markedly in the eventuality of qualitative changes in the sector. Growing demands on the part of employers for the use of information technologies, integration tendencies in regional socio-economic and territorial planning, including the infrastructure and the environment, the growing importance of information networks at various levels and other trends are increasing demands for comprehensive services in tourism and therefore increasing the requirements for qualifications and skills in workers in the sector. Expert surveys have shown that demands on the skills and professionalism of middle management will grow. It can thus be anticipated that university graduates in economic and business subjects will enjoy increasingly good job prospects on the employment market. Their entry into occupations requiring no more than full secondary school education on the employment market will mean that they will partially replace school-leavers of this type. On the other hand, in view of the overall good job prospects of graduates in economic and business subjects on the job market, the question arises of how far the forecast trend will be affected by the relatively modest wages on offer in the tourist sector.

	Sectoral studies (regional or national) need to be based on a comprehensive methodological approach. Apart from linking and comparing such studies to the results of the quantitative model, business surveys and the assessment of standard statistical data, the most important analytical element and research instrument here is the identification of the views of professionals from the world of practice.
Obtaining the views of professionals in the field	

The creation of thematic focus groups and the identification of expert opinions on an ad hoc basis proved to be the most effective source of information in a situation characterised by the low interest of businesses in participation in the questionnaire survey, the shortcomings of the data basis in the sector, developments generated by globalisation and the linkage of markets, the emergence of new "hybrid" (mixed) occupations and resulting lack of new definitions (e.g. definitions of individual occupations and qualifications).

	The identification and comparison of professional views is based on discussions in smaller groups, created with an eye to maintaining a certain balance in the representation of employers, associations, schools at different levels, the decision-making sphere and so on. The discussions are guided on the basis of carefully defined sets of questions. The themes
The method of shared diagnosis	

discussed mainly derive from the need to augment areas in which information or statistical data are lacking, to test unreliable or ambiguous data and results of the survey or other quantitative or semi-quantitative analyses. Ideally a certain consensus of opinion between the professionals should emerge, and we have therefore called this method "shared diagnosis" (see also the input from our French partners). We were inspired by experiences from France, where this method is often used and has been tried and tested over many years as an effective tool bringing useful results. The method is particularly valuable in combination with others, such as the Delfi method, questionnaire surveys, client assessment of services etc.

	Other problems that emerged in the course of work on analysis of the qualification needs of the tourist sector related to the chosen method of questionnaire survey. The unwillingness of employers to co-operate with the interviewer network for the face-to-face interview was reflected in the very low percentage of participation and therefore the imperfections of the sample.
Shortcomings of the chosen method of questionnaire survey	

In order to obtain greater participation from businesses in surveys, allowing samples with the desired structure of business size, geographical distribution, types of companies etc, it is useful to collaborate with the employment offices. By involving branch organisations and securing a more active role for professional associations in this process, more extensive co-operation can be obtained from the businesses, perhaps on a more regular basis as well. In addition to the possibility of using the results of surveys conducted by the Czech Central Tourist Authority – focused primarily on quality of services, structure and expenditure of visitors, sociological features of visitors, length of stay, assessment of quality of service etc., and analysing CCTA materials – it is useful to compare the development of tourism with other data (Czech Statistical Office, MRD, professional opinions etc.) and so gain a more complete view of the sector.

> ***Using contacts between schools and former students***

Another promising way to obtain certain kinds of information on employment in general is to exploit the contacts between some schools and their graduates. In this way data can be obtained on the development of a subject, the success of school-leavers on the job market, and various qualitative aspects of the process of job-finding including contacts to other professionals in the field. It should, however, be remembered that at present only a small fraction of schools maintain contacts and monitor the success of their former students at work in the long term. There should be active support for the development of this practice in all levels of school. In some West European countries the monitoring of the work or further study careers of school-leavers and graduates has become an important element of the information system on the employment market and education.

3. From Prognosis – to Practice

In conclusion we regard it as useful to make some further important comments. The gathering of information on future trends on the job market and the requirements of businesses is not in itself enough to improve the balance between the supply of knowledge and skills of workers and the demands of businesses. Apart from the essential task of actively disseminating the results of analysis and producing school-leavers with a broad profile, certain other methods should also be exploited fully.

> ***The joint creation of scenarios with the active input of all actors substantially increases the likelihood of the implementation of analytic conclusions and recommendations in practice***

The method of shared diagnosis presupposes the active participation of all partners in the development of a certain opinion. This opinion can be elaborated further in the form of variant scenarios of development. The joint creation of scenarios in branches of industry, economic sectors or other segments of social life with the active participation of the social partners, political and legislatively decisive bodies, and all actors of the segment concerned, is a tested tool that substantially increases the likelihood of the realisation of the analytic conclusions and recommendations in practice. It is an old rule: your own decision – your own responsibility.

ANNEXES

Annex 1 Standard International Classification of Tourism Activities (SICTA), defining average weightings of the shares of individual industries in tourism activities

The classification given below is the literal wording of the "Standard International Classification of Tourism Activities" (SICTA). The classification of certain activities differs (in the third digit or further) from the national version of the NACE rev.1 classification (OKEČ – CZ-NACE) used by the Czech Statistical Office. Some of the activities are not typical for the Czech Republic or are not separately classified in CZ-NACE. The shares of the individual classes and subclasses in sales-purchases in individual activities – high, medium or low (columns 8 and 9) – are derived from international experience.

Tabulation fields description:

- *Column 1:*   *SICTA category (alphabetical code) and division (two-digit numeric code) – (comparable to classification based on NACE rev. 1 in EC Member States and also to the UN's ISIC rev. 3 – International Standard Industrial Classification of All Economic Activities and to CZ-NACE).*
- *Column 2:*   *Group – corresponds to CZ-NACE sub-division (three-digit numeric code). In some cases, CZ-NACE differs from SICTA in the third digit.*
- *Columns 3–4:*   *Class – subclass – the fourth and fifth digits of the classification. CZ-NACE expresses certain specific national characteristics and so may differ from the SICTA classification.*
- *Column 5:*   *Corresponding CZ-NACE code; X denotes that the activity is not classified in CZ-NACE (and is part of a higher classification level).*
- *Column 6:*   *T/P is specific to SICTA: "T" indicates subclasses dedicated to tourism; "P" indicates part involvement in tourism.*
- *Column 7:*   *Name of economic activity.*
- *Column 8:*   *Estimated percentage of industry receipts (supplies) explicitly from tourism: H = High – above 60 %, m = Medium – 20–60 %, l = Low – below 20 %.*
- *Column 9:*   *Estimated percentage of total expenditure (purchases) of tourists going to this category (symbols – see col. 8).*

Table 19 Shares of selected sectors in tourism activities – SICTA classification

Divi-sion	Group	Class Main-sub		P/T	Name of economic activity	% sales to tourism (share of tourism purchases)	
		SICTA	OKEČ				
1	2	3 4	5	6	7	8	9
F					**Construction**		
45					**Construction**		
	450	4500-1	X	T	Commecial facilities – hotels, retail, etc.	H	L
		4500-2	X	T	Recreational facilities – ski areas, golf courses	H	L
		4500-3	X	T	Civil works – transportation facilities, terminals, dams	M	L
		4500-4	X	T	Resort residences – second homes, weekend homes	H	H
G					**Wholesale and retail**		
50					**Sale and maintenance of motor vehicles and fuels**		
	501	5010	50.1	P	Motor vehicle sales	M	M
	502	5020	50.2	P	Motor vehicle maintenance and repair	M	M
	503	5030	50.3	P	Sale of motor vehicle parts and accessories	M	M
	504	5040	50.4	P	Sale, maintenance and repair of motocycles	L	L
	505	5050	50.5	P	Retail, sale of motor vehicle fuels	M	L

Divi-sion	Group	Class Main-sub		P/T	*Name of economic activity*	*% sales to tourism (share of tourism purchases)*	
		SICTA	OKEČ				
1	2	3 4	5	6	7	8	9
52					**Non-specialized retail trade**		
	521				Non-specialized retail trade		
		5211	52.11	P	Retail food sales	L	L
		5219	52.12	P	Other non-specialized retail trade	L	L
	522	5220	52.2	P	Retail specialized food sales	L	L
	523		52.3,4		Other retail, specialized		
		5231	52.31	P	Retail sales, pharmaceutical	L	L
		5232	52.41, 42,43	P	Retail sale of textiles, clothing, footwear and leather goods	L	L
		5232-1	X	P	Retail sale of travel accessories, textiles	L	L
		5232-2	X	P	Retail sale of travel accessories, clothing	L	L
		5232-3	X	P	Retail sale of travel accessories, footwear	M	L
		5232-4	X	T	Retail sale of travel accessories, luggage	H	L
		5232-5	X	T	Other retail sale of travel accessories in specialized stores	H	L
		5239	52.48	P	Other retail sales in specialized stores	M	L
		5239-1	52.48 4	T	Retail sales, skin-diving and scuba equipment	H	L
		5239-2	52.48 4	T	Retail sales, ski equipment	H	L
		5239-3	52.48 4	T	Retail sales, camping and hiking equipment	H	L
		5239-4	52.48 4	P	Retail sales, hunting and fishing equipment	H	L
		5239-5	52.48 1	P	Photographic sales and services	M	L
		5239-6	52.48 9	T	Retail sales, gift and souvenir shops	H	L
		5239-7	52.48-9	P	Retail sales of other transport vehicles	H	L
	524	5240	52.5	P	Retail sales of second-hand goods		
		5240-1	52.5	P	Retail sales, antiques	L	L
	525		526	P	Retail sales not in shops		
		5252	52.62	P	Retail sales in stalls and markets	L	L
H					**Hotels and restaurants**		
55					**Hotels and restaurants**		
	551	5510	55.1,2	T	Hotels,camping sites and other commercial accommodations		
		5510-1	55.11	T	Hotels and motels with restaurants	H	M
		5510-2	55.12	T	Hotels and motels without restaurants	H	M
		5510-3	55.21	T	Hostels and refuges	H	L
		5510-4	55.22	T	Camping sites, including caravan sites	H	L
		5510-5	55.23 1	T	Health-oriented accomodation	H	L
		5510-9	55.23 9	T	Other provision of lodging, n.e.c.	M	L
	552	5520	55.3,4	P	Restaurants, bars and canteens		
		5520-1	55.4	P	Bars and other drinking places	M	M
		5520-2	55.3	P	Full-service restaurants	M	M
		5520-3	55.3	P	Fast food restaurants and cafeterias	M	M
		5520-4	55.51	P	Institutional food services, caterers	M	M
		5520-5	55.3	P	Food kiosks, vendors, refreshment stands	M	M
		5520-6	55.4	P	Night clubs and dinner theaters	M	M

Divi-sion	Group	Class Main-sub		P/T	Name of economic activity	% sales to tourism (share of tourism purchases)	
		SICTA	OKEČ				
1	2	3 4	5	6	7	8	9
I					**Transport, storage and communications**		
60					**Land transport, transport via pipelines**		
	601	6010		P	Transport via railways		
		6010-1	60.1	T	Interurban rail PSGR services	H	L
		6010-2	60.1	T	Special rail tour services	H	L
	602				Other land transport		
		6021	60.21	P	Other scheduled PSGR land service	L	L
		6021-1	60.21	T	Scheduled interurban buses	H	L
		6021-2	60.23	T	Long distance tour buses	H	L
		6021-3	60.21 1	P	Scheduled local and metropolitan transit services	H	L
		6021-4	60.21	P	Specialized scheduled vehicles	M	L
		6022	60.23	P	Other non-scheduled PSGR land transport	M	L
		6022-1	60.22	P	Taxis	M	L
		6022-2	60.22	P	Chaufferured vehicles	L	L
		6022-3	60.23	T	Local tour vehicles	H	L
		6022-4	60.23	P	Charter buses, excursions (same-day visits)	M	L
		6022-5	X	P	Man or animal-drawn vehicles	L	L
61					**Water transport**		
	611	6110		P	Sea and coastal water transport		
		6110-1	61.1	T	Cruise ships	H	L
		6110-2	61.1	T	Ship rental with crew	H	L
	612	6120	61.2	P	Inland water transport		
		6120-1	61.2	T	Inland water PSGR transport w/accomodation	H	L
		6120-2	61.2	T	Inland water local tours	H	L
		6120-3	61.2	P	Inland water taxis, ferries	L	L
62					**Air transport**		
	621	6210	62.1	T	Scheduled air transport		
		6210-1	62.1	T	Scheduled air PSGR transport	H	M
	622	6220	62.2	T	Non-scheduled air transport		
		6220-1	62.2	T	Non-scheduled air PSGR transport	H	L
		6220-2	62.2	T	Aircraft rental with crew	L	L
63					**Supporting and auxiliary transport activities**		
	630	6303	63.2	P	Other supporting transport activities	M	L
		6303-1	63.21	T	Other supporting land transport activities	H	L
		6303-2	63.22	T	Other supporting water transport activities	H	L
		6303-3	63.23	T	Other supporting air transport activities	L	L
		6304	63.3	T	Travel agents, tour operators and guides	H	L
		6304-1	63.30 1	T	Travel agents	H	L
		6304-2	63.30 1	T	Tour operators, packagers and wholesalers	H	L
		6304-3	63.30 1	T	Ticket offices not a part of transport companies guides	H	L
		6304-4	63.30 2	T	Guides	H	L

Divi-sion	Group	Class Main-sub		P/T	*Name of economic activity*	*% sales to tourism (share of tourism purchases)*	
		SICTA	**OKEČ**				
1	2	3 4	5	6	7	8	9
J					**Financial intermediation**		
65					**Financial intermediation not insurance/pensions**		
	651		65.1		Monetary intermedation		
		6519	65.12	P	Other monetary intermediation	L	L
		6519-1	65.12	P	Exchange of currencies	M	L
	659		65.2		Other financial intermediation		
		6592	65.92	P	Other credit granting	L	L
	660		66		Insurance and pension funding		
		6601	66.01	P	Life insurance	L	L
		6601-1	66.03	T	Travel insurance	H	L
		6603	66.03	P	Non-life insurance	L	L
K					**Real estate, renting and business activities**		
70					**Real estate activities**		
	701		70.1		Real estate activities with own or leased properties		
		7010	70.12	P	Buying or selling of own or leased property		
		7010.1	70.12	T	Buying or selling of own or leased tourism property	L	L
	702		70.3		Real estate activities on a fee or contract basis		
		7020	70.2	P	Letting of own or leased property		
		7020-1	70.2	T	Leffting of own or leased tourism property	H	L
	703		70.31		Real estate agencies		
		7030	70.31	P	Real estate agencies		
		7030-1	70.31	T	Real astate agencies for tourism properties	H	L
		7030-2	70.32	T	Tourist property management	H	L
71					**Renting of machinery and equipment w/o operators**		
	711		X		Renting of transport equipment		
		7111	X	P	Renting of land transport equipment	M	L
		7111-1	71.1	T	Automobile rental	H	L
		7111-2	71.21	T	Motorcycle rental	H	L
		7111-3	71.21	T	Recreational vehicle, camper, caravan rental	H	L
		7113	71.23	P	Renting of air transport equipment	N	L
		7113-1	71.23	T	Renting of air transport equipment for personal use	H	L
	713	7130	71.4	P	Renting of personal and household goods	L	L
		7130-1	71.22	T	Rental of water craft and related facilities	H	L
		7130-2	71.4	P	Rental of saddle horses	M	L
		7130-3	71.4	T	Rental of bicycles	H	L
		7130-4	71.4	T	Rental of ski equpment	H	L
		7130-5	71.4	T	Rental of tourist – related goods, N.E.C.	H	L
73					**Research and development**		
	732	7320	73.2	P	Research and development in social sciences	L	L
		7320-1	73.2	T	Tourism research	H	L

Divi-sion	Group	Class Main-sub		P/T	Name of economic activity	% sales to tourism (share of tourism purchases)	
		SICTA	OKEČ				
1	2	3 4	5	6	7	8	9
74					Other business activities		
	741		74.1		Legal accounting, book-keeping and auditing, tax consultancy, market research and polling, business and management consultancy		
		7413		P	Market research and polling tourism market research	L	L
		7413-1	74.13	T	Tourism market research	H	L
		7414	74.14	P	Business and management consultancy activities	L	L
		7414-1	74.14 74.15	T	Tourism business and management consultancy services	H	L
	742		74.2		Architectural, engineering and other technicla activities		
		7421	74.20 1	P	Architecture and engineering	L	L
		7421-1	74.20 1	T	Tourism architecture and engineering	H	L
	743	7430	74.4		Advertising		
		37042	74.4	T	Tourism advertising	H	L
	749		74.8		Business activities, N.E.C.		
		7494	74.81	P	Photographic activities	L	L
		7494-1	74.81	T	Passport phographers	H	L
		7499	74.84	P	Other business activities, N.E.C.	L	L
		7499-1	74.83	P	Translation services	L	L
L					**Public administration**		
75					**Public administration and defence; compulsory social security**		
	751				Administation of the state		
		7511	75.11	P	General public service activities	L	L
		7511-1	X	P	Customs administration	M	L
		7511-2	X	P	Taxation, fees, fines, tariffs	L	L
		7511-3	X	T	Information bureaus	H	L
		7512	75.12	P	Activities of service agencies	M	L
		7512-1	X	P	Provision of transport – related functions	M	L
		7512-2	X	P	Provision of cultural, recreational services	M	L
		7513	75.13	P	Business regulation	L	L
		7513-1	X	T	Tourism administration	H	L
		7513-2	X	T	Regulation of private transport activities	H	L
		7513-3	X	P	Fishing, hunting regulation	M	L
		7513-4	X	P	Regional and economic development administration	L	L
		7513-5	X	P	Provision of transport infrasturcture	M	L
	752		75.2		Provision of services to the community		
		7521	75.21	P	Foreign affairs	L	L
		7521-1	X	T	Visa issuance, consular affairs	H	L
		7523	75.24	P	Public order and safety	L	L
		7523-1	X	T	Police special, border guards, airport security	H	L

Divi-sion	Group	Class Main-sub		P/T	*Name of economic activity*	*% sales to tourism (share of tourism purchases)*	
		SICTA	OKEČ				
1	2	3 4	5	6	7	8	9
M					**Education**		
80					**Education**		
	803	8030	80.3	P	Higher education	L	L
		8030-1	X	T	Hotel schools	H	L
		8030-2	X	T	Tourism education programmes	H	L
		8030-3	X	T	Recreation and park schools	H	L
		8030-4	X	T	Tourism-related education, N.E.C.	H	L
	809	8090	80.4	P	Adult education	L	L
		8090-1	80.41	P	Driving instruction	L	L
		8090-2	X	T	Ski instruction	H	L
		8090-3	X	P	Swimming, scuba instruction	H	L
		8090-4	X	P	Flying instruction	L	L
		8090-5	X	P	Boating instruction	M	L
		8090-9	X	T	Tourist instruction, N.E.C.	H	L
N					**Health and social services**		
O					**Other community, social and personla services**		
91					**Activities of membership organizations, N.E.C.**		
	911		91.1		Activitiesof business, employers and professional organizations		
		9111	91.11	P	Activities of business and employer organizations	L	L
		9111-1	X	T	Visitor and convention bureaus	H	L
		9112	91.12	P	Activities of professional organizations	L	L
		9112-1	X	T	Activities of tourism – related professional orgs	H	L
	912	9120	91.2	P	Activities of trade unions	L	L
		9120-1	X	T	Activities of tourism industry related to trade unions	H	L
	919		91.3		Activities of other membership organizations		
		9199	91.33	P	Activities of other membership organizations	L	L
		9199-1	X	T	Travel clubs	H	L
		9199-2	X	T	Travellers aid societies	H	L

Divi-sion	Group	Class Main-sub		P/T	Name of economic activity	% sales to tourism (share of tourism purchases)	
		SICTA	OKEČ				
1	2	3 4	5	6	7	8	9
92					**Recreational, cultural and sporting activities**		
	921				Motion pictures, radio, TV and other entertainment		
		9212	92.13	P	Motion picture projection	L	L
		9213	92.2	P	Radio and television activities	L	L
		9214	92.32	P	Dramatic atrs, music and other art activities	M	L
		9215	92.32	P	Operation of ticket agencies	M	L
		9219	92.34	P	Other entertainment activities, N.E.C.	M	L
		36950	92.33	P	Amusement parks	H	L
		36951	92.34	P	Other entertainment activities, N.E.C.	M	L
	923				Libraries, archives, museums and other cultural activities		
		9231	92.51	P	Library and archive activities	L	L
		9232	92.52	P	Museum activities and preservation of historic	M	L
		9232-1	92.52	P	Museums of all kinds and subjects	M	L
		9232-2	92.52	P	Historical sites and buildings	M	L
		9233	92.53	P	Botanical and zoological gardens and nature reserve activities	L	L
		9233-1	92.53	P	Botanical and zoological gardens	L	L
		9233-2	92.53	P	Nature and wildlife preserves	M	L
	924				Sporting and other recreational activities		
		9241	92.6	P	Sporting activities	L	L
		9241-1	92.61	P	Physical fitness facilities	L	L
		9241-2	92.61	P	Operation of sporting facilities	M	L
		9241-3	92.62	P	Activities related to recreational hunting	L	L
		9241-4	92.62	P	Other sporting activities, N.E.C.	L	L
		9249	92.72	P	Other recreational activities	L	L
		9249-1	92.72	P	Operations of recreation parks and beaches	L	L
		9249-2	92.72	P	Activities related to recreational fishing	M	L
		9249-3	92.71	P	Gambling and betting operations, casinos	M	L
		9249-4	92.72	P	Operations of recreational fairs and shows	M	L
		9249-5	92.72	P	Operations of ski lifts	L	L
93					**Other service activities**		
	930				Other service activities		
		9309		P	Other service activities, N.E.C.	L	L
		9309-1	X	P	Porters, valet parking sevices, doormen	M	L
P					Private household with employed persons		
Q					**Extra-territorial organizations and bodies**		
99					**Extra-territorial organizations and bodies**		
	990	9900	99	P	Extra-territorial organizations and bodies		
		9901-1	X	T	International tourism bodies	H	L

Annex 2 List of Tourism Characteristic Products

Accommodation services	
63110	Hotel and motel lodging services
63191	Holiday centre and holiday home services
63192	Letting services of furnished accommodation
63193	Youth hostel services
63194	Children's training and holiday camp services
63195	Camping and caravanning site services
63199.1	Sleeping-car and similar services in other transport media; hall residence of students
72211.1	72211.1 Support services to time-shares activities
Food and beverage serving services	
63210	Meal serving services with full restaurant services
63220	Meal serving services in self-service facilities
63290	Other food serving services
63300	Beverage serving services for consumption on the premises
Passenger transport services	
64111.1	Scheduled rail services of passengers
64111.2	Non-scheduled rail services of passengers
64213	Interurban scheduled road transport services of passengers
64214	Interurban special purpose scheduled road transport services of passengers
64219.1	Scheduled ski-hills services
64219.2	Teleferics – funiculars services
64221	Taxi services
64222	Rental services of passenger cars with operator
64223	Rental services of buses and coaches with operator
65111	Coastal and transoceanic water transport services of passengers by ferries
65119.1	Other coastal and transoceanic scheduled water transport services of passengers
65119.2	Other coastal and transoceanic non-scheduled water transport services of passengers
65119.3	Cruise ship services
65130.1	Rental services of passenger vessel for coastal and transoceanic water transport with operator
65211	Inland water transport services of passengers by ferries
65219.1	Scheduled passenger services
65219.2	Sightseeing excursion services
65219.3	Cruise services
65230	Rental services of inland water passenger vessels with operator
66110	Scheduled air transport services of passengers
66120.1	Non-scheduled air transport services of passengers
66120.2	Sightseeing services, aircraft or helicopter
66400	Rental services of aircraft with operator
Supporting passenger transport services	
67300	Navigational aid services
67400	Supporting services for railway transport
67510	Bus station services
67530.1	Parking of passenger terminal transport
67610	Port and waterway services (excl cargo handling)
67690.1	Vessel fuelling services
67690.2	Maintenance and upkeep services
67710	Airport operation services (excl cargo handling)
67790	Other supporting services for air or space transport
Passenger transport equipment rental	
73111	Leasing or rental services concerning cars and light vans without operator
73114.1	Leasing or rental services concerning campers/motor without operator
73115.1	Leasing or rental services concerning passenger vessels without operator
73116.1	Leasing or rental services concerning passenger aircraft without operator

	Maintenance and repair services of passenger transport equipment
87143	Maintenance and repair services of trailers, semi-trailers and other motor vehicles n.e.c.
87149.1	Maintenance and repair services of leisure vessel of own use
87149.2	Maintenance and repair services of leisure aircraft of own use
	Travel agency, tour operator and tourist guide services
67811	Travel agency services
67812	Tour operator services
67813	Tourist information services
67820	Tourist guide services
	Cultural services
96230	Performing arts facility operation services
96310	Services of performing artists
96411	Museum services except for historical sites and buildings
96412	Preservation services of historical sites and buildings
96421	Botanical and zoological garden services
96422	Nature reserve services including wildlife preservation services
	Recreation and other entertainment services
96510	Sports and recreational sports event promotion and organization services
96520.1	Golf course services
96520.2	Ski
96520.3	Race circuit
96521.5	Recreation park and beach services
96590.1	Risk sport and adventure
96910.1	Theme park services
96910.2	Amusement park services
96910.3	Fair and carnival services
96920.1	Casino services
96920.2	Slot machine services
	Miscellaneous tourism services
71100.1	Travel card services
71100.2	Travel loan services
71311.1	Travel life insurance services
71320.1	Travel accident insurance services
71320.2	Travel health insurance services
71334.1	Passenger's aircraft of own use insurance services
71334.2	Passenger's vessel of own use insurance services
71339.1	Travel insurance services
71552	Foreign exchange services
73240.1	Non-motorized land transport equipment leasing or rental services
73240.2	Winter sports equipment leasing or rental services
73240.3	Non-motorized air transport equipment leasing or rental services
73240.4	Water sports and beach equipment leasing or rental services
73241.5	Camping equipment leasing or rental services
73290.1	Photographic camera rental services
85970	Trade fair and exhibition organization services
97230.4	Spa services
91131.1	Fishing license services
91131.2	Hunting license services
91210.1	Passport issuing services
91210.2	Visa issuing services
96620.2	Guide services (mountain, hunting and fishing)
97910	Escort services

Annex 3   The Conceptual Framework of Employment in Tourism

Employment is broad, complex and continuously changing phenomenon that is tightly linked to other socio-economic phenomena – the production process, distribution of incomes, education, conditions of life, wealth and demography. The following factors are also inseparably connected with employment: the job market, demand for work, supply of job opportunities, unemployment, human resources and paid work, unpaid work, remuneration levels, earnings and costs of workforce, governments, unions, representative organisations and other institutions such as personnel agencies. Work, paid or unpaid, has several aspects:

1. **social context** – people derive social status from their employment depending on level of earnings, social contacts and the attitude of society to a given occupation. Work and employment are social phenomena.
2. **work as a production factor** – the extent, quality and flexibility of production depend on factors that include the amount and quality of the work force that shares in the production process, the technologies used and the quality of management.
3. **work as a market commodity on the labour market** – earnings from the point of view of the employee and labour costs from the point of view of the employer may be discussed in terms of supply and demand for labour. This naturally affects tripartite negotiations and, in the broader sense, trends on the labour market. Each vacancy has its specific features: required level of education, skill and experience, work hours and pay...

Part of value added from the production process is divided up in the form of wages for employees and earnings for the employer and his family members. Important aspects here include form of wage (minimum wage, wages based on collective agreement), and components of wage or earnings and related work conditions (short or interrupted work hours, work in difficult conditions) The supply of workforce is strongly effected by demographic trends and the qualifications of workforce, and in branches connected with tourism it can be subdivided as follows – school-leavers/graduates of schools focused on tourism, school-leavers/graduates of other vocational schools, the unemployed, persons employed in other branches. These people will have differing qualifications, knowledge and skills, motivation, personal characteristics, and expectations. When looking for work they will use advertisements, direct approach, personal contacts, personnel agencies, state employment offices and other means. The supply of work is also effected by the extend of the migration of workforce between states (people living in border areas who commute to the neighbouring state for work, immigrants). In the main tourist season, when tourism suffers a shortage of workers, immigrants are often employed as seasonal workers who frequently undertake poorly paid, insecure and unpleasant work. The employment of immigrants also effects both the local employment market and the employment market in their countries of origin – e.g. unemployment may be "exported" back to their countries at the end of the tourist season. Employers exploit the work of immigrants, students and occasional workers as a way of reducing wage costs. We should also mention "black work" which can lead to a fall in supply and demand for legitimate work force, and is also problematic in the sense of failing to appear in official statistics and therefore not being reflected in the overall economic performance of tourism.

Rising competition between businesses and organisations that are trying to obtain appropriately qualified workers including school leavers/ graduates on the employment market can also influence the labour supply. The competitive advantage of counties integrated into the global economy depends ever more obviously on the availability of qualified work forces,

including in branches of the economy related to tourism. This means that the structure and organisation of vocational training for employment is extremely important. In order **for it to be possible to create a policy for the labour market, it is necessary to identify the qualifications and extent of experience of the work force and also the demands placed on individual jobs**. Level of education, for example, may be linked with level of pay and a certain kind of employment.

Supply and demand on the labour market are also strongly influenced by the activities of a whole range of organisations and bodies – the government, unions and employers' associations. These have a greater or lesser influence on fiscal policy, the school system and vocational training, job creation, protection of employees, work conditions of employees, and also infrastructure, investment, support for enterprise and marketing. The public sector is very often the main employer in the field of tourism (museum employees, tourist information centres, transport and attractions in the ownership of the state). Decision-makers at high levels are therefore justified in regarding tourism as an instrument of economic growth and development. A high ratio of labour to capital, the ease of entry into the market, low start-up costs and high dynamics of development all make tourism, in contrast to other branches (e.g. manufacturing) a very attractive form of regional development, especially in more backward regions.

Tourism includes a range of activities in different branches that are linked merely by a common end – satisfying the needs of visitors. The variety of the activities involved in tourism is reflected in different structures of workforce in the individual branches related to to tourism and in different structures of employment in different regions. There is no unified labour market in tourism, and businesses and organisations involved in tourism typically find workers in various secondary labour markets that differ from region to region and from activity to activity. Low mobility of work force between secondary labour markets is a frequent phenomenon, and the difference between these markets derives from different levels of education, qualification and experience, and from the very limited scope that employers have for changing the characteristics and requirements of jobs. Work in tourism can therefore demand anything within a whole spectrum of levels and content of qualification, from the lowest to the highest level, from general knowledge and skills to highly specialised knowledge and skills.

Annex 4 Monitoring Employment in Branches of the Sector of Tourism

Statistics and probes into the situation in employment have two main benefits:
- the data can be used to analyse the current situation on the job market in selected branches typical for tourism. They this make it possible to identify and formulate the characteristic features of the workforce from the point of view of social demography, work conditions, mobility of workforce, structure of workforce, work productivity, costs of workforce, qualifications of work force, strategy for obtaining workers and situation in vocational training,
- the data can be used in analysis and prediction of the impact of changes in the inflow of visitors and their expenses on the level and structure of employment in different branches related to tourism.

Information on employment should be up-to-date, of high quality and useable, since it can serve as a basis for the decision-making and planning activity of people in central and regional government, public tourist facilities and private companies. Examples of the use of this information can include increasing the productivity and competitiveness of work by means of vocational training, improvement of the efficiency of the job market by reducing the gap between supply and demand (from the point of view of qualifications and vacancies offered), reduction of the costs linked to high turnover of staff, reduction of unemployment, support for the flexibility of the work force, assessment of labour costs, and ensuring the stability of jobs on the basis of assessment of the structure of the work force and work conditions.

The overall level of employment in characteristic branches of the tourist industry can be expressed by the number of jobs and the number of persons employed, and the best indicator of the labour intensity of the job is the number of working hours per year:

■ **The number of jobs** and the **number of persons employed** in selected branches of the tourist industry, distinguishing between jobs for employees and independently economically active persons. The date should be presented in the form of annual averages[110], that can be calculated on a twelve-month or quarterly basis.

■ The average annual number of jobs can be translated into the **Full Time Equivalent** (FTE). Since jobs may vary in the number of hours worked (full time/part-time contract), FTE is the best indicator of the labour intensity of the production process and at the same time offers the best possibility for comparing the different branches of the industry. The FTE can be derived by dividing the overall number of hours worked annually in the given branch or group of jobs by the average individual annual number of hours worked in a full-time position within the branch or group.

■ **Comparison** of the number of jobs identified, the FTE and the **overall number of employed persons in the country**.

If the necessary data were available, it would be possible to identify the following phenomena:

■ **Seasonal character of employment** – instead of giving one figure expressing (average) employment (number of jobs, FTE or number of employed persons), to give data for each month of the year. Often this figure can be obtained only for employee-status jobs.

■ **Secondary employment**, i.e. jobs performed by persons already employed in different branches of industry.

---

[110] data relating to a single date in the year do not give such a reliable picture of the real situation.

Annex 5 Selected Indicators in the North West Region

indicator	1995	1996	1997	1998	1999
Mean population [persons]	1 130 722	1 130 276	1 130 499	1 131 454	1 131 514
Natural growth (decline) in population[111] [%]	− 0,9	− 1,4	− 1,1	− 1,1	− 1,1
GDP per head of population as proportion of average in CR [%]	936	919	876	*	*
Average number of employees. [persons]	345 058	329 071	366 763	353 011	337 436
of which: in industry [persons]	145 290	133 429	151 256	147 999	141 798
in construction [persons]	27 245	24 348	30 073	24 516	20 983
Average Gross Monthly Wage of employees [Kč]	8 038	9 402	10 253	11 064	11 883
Unemployment rate (on 31.12.) [%]	478	583	849	1144	1400
Unplaced job-seekers (on 31. 12.) [persons]	27 810	33 906	48 354	65 951	80 194
Job vacancies (on 31. 12.)	8 269	7 869	5 549	3 389	3 782

Annex 6 Questionnaire for Employers in the Sector of Tourism
The North West Bohemia Region

1. The company's name and place of residence
. . . .

2. Other data about the company
1) Number of employees – individuals (including working owners and assisting family members as of 31 October 2000) . . . .
2) Sector (NACE) – activity focus – main business activities of the company:

. . . .
. . . .
. . . .
3) Form of ownership . . . .
4) Organisation set-up (one workplace, a network of branches etc.)

. . . .

3. Structure of emploees (a precise number or an estimate – this concerns ordinary employees and other labour[112])
a) Permanent employees (permanent employment contracts and temporary employment contracts which are regularly renewed): . . . .
b) Other labour (persons who carry out occassional jobs – for a short period of time as well as in various intervals – and perform certain activities, employees with short-term contracts (less than one year) who carry out seasonal work, persons with a contract for a specific task or activity, self-employed persons, persons/foreigners working on the basis of a contract with an intermediary, etc.) . . . .

[111] excluding migration, only difference between birth and death rate
[112] i.e. the sum of the number of persons in questions 3a) + 3b) = total number of employees – this may be higher than the number of employees in 2.1 question

c) What is the highest level of completed education of your employees: (state a number <u>or at least a rough estimate of the proportion</u> – this concernes question 3a),b)). If you state the proportion, <u>add the sign %</u>)

	Permanent employees number %	Others number %
c1) basic	....	....
c2) vocational without "maturita"	....	....
c3) vocational with "maturita"	....	....
c4) secondary general with "maturita"	....	....
c5) secondary technical with "maturita"	....	....
c6) post-secondary technical	....	....
c7) university	....	....

d) Age structure of employees: (state <u>the number</u> or at least <u>a rough estimate of the proportion</u>; if you state the proportion, add the sign % – this relates to questions 3a),b))

	Permanent employees Number %	Others Number %
d1) under 29	....	....
d2) 30–49	....	....
d3) 50 and more	....	....

e) Professional structure of employees: state the professions which occur most frequently during the year in your company. State the number of employees in each of these profession or the proportion in the total number of employees – this relates to questions 3a),b))

Most frequent professions			Number of employees or proportion in the total number of employees (for proportion add the sign %)	
Name of professsion	Brief description of the work activity	ISCO	total	of which women

f) Do you employ foreigners? (are they employed directly by your company or based on a contract with an intermediary?) Which professions are concerned? . . . .
. . . .
. . . .

4. Do any employees work part-time (question 2.1)? If so, do they represent a siginificant proportion of all employees? Make an estimate. Which professions are mainly concerned? . . . .
. . . .
. . . .

5. Employee turnover (relates to question 2.1)
Do you have a problem maintaining a stable number of employees? If so, state (estimate) the proportion of employees that changes annualy. Which professions are mainly concerned?
. . . .
. . . .
. . . .

6. Envisaged reduction in the number of employees (relates to question 2.1)
    a1) in 2001: . . . .
    a2) in 2002: . . . .

6a. If you intend to reduce the number of employees in the coming years (relates to 3a),b)), which professions will be <u>most</u> affected? State the anticipated number of redundancies in the given period specifically for each profession.

Redundant professions			Number of employees laid off in	
Name of profession	Brief description of the work activity	ISCO	2001	2002

7. **Envisaged increase in the number of employees** (relates to 2.1)

     a1) in 2001: (number of persons)   ....
     a2) in 2002: (number of persons)   ....

7b. If you intend to increase the number of employees in the coming years (relates to 3a), b)), state which professions will be most affected. State what knowledge and skills do you particularly expect the new employees to have.

State the envisaged number of recruited employes in the given period specifically for each profession.

Recruited professions			Number of recruited employees in:			Permanent employees		Others	
Name of profession	Brief descrip-tion of the work activity	ISCO	2001		2002	Education	Particularly required knowl-edge and skills	Education	Particularly required know-ledge and skills
			Perm. empl.	Other labour	Perm. empl.				

8. **In the case you intend to recruit new employees (relates to 2.1), will you be interested in recent graduates of vocational, secondary and tertiary educational institutions?**
   1. certainly yes
   2. yes
   3. yes, but only for jobs created with the financial support of the LO
   4. certainly not

9. **In the case you are entirely disinterested in employing recent school graduates, state the relevant reasons.**
   (you may select more than one reason, or state other reasons – list the reasons by the level of importance)
   1. schools fail to equip them with good professional knowledge
   2. they are not able to work independently on assignments
   3. they require a long initial period to get acquainted with the job
   4. they have excessive pay demands
   5. they lack broader general knowedge
   6. they lack specialist knowledge and skills (foreign languages, driver's licence, PC skills)
   7. another reason (please, specify): . . . .

10. **When recruiting graduates are you interested in cooperation with the relevant schools/vocational training centres)?**
   1. yes, such cooperation is already under way
   2. yes, however, we haven't yet done this
   3. no, we are not considering this

11. In the case you are in contact with school, what is the nature of this cooperation?
(answer all alternatives – mark the appropriate answer)   YES – NO
   a) We discuss the possibilities of recruiting the graduates for our company
   b) Schools discuss with us the introduction (abolishing) of new courses
   c) Our specialists are involved in teaching (examinations) at the school
   d) Schools consult us for a specification of their graduates' professional profile
   e) We sponsor certain study or training courses
   f) We make it possible for the students/trainees to do their placement in our company
   g) Other forms of cooperation with educational institutions or other institutions which lead to the shaping of your prospective employees' professional profile – what are they? . . . .
. . . .
. . . .

12. In the case you have already employed recent school graduates, what is your experience in this respect?
   a) We have predominantly good experience with graduates from the following schools and courses: (state the type of school and the name of the course)

school	course (study programme)
....	....
....	....
....	....
....	....
....	....

   b) We have rather bad experience with graduates from the following schools and courses: (state the type of school and the name of the course)

school	course (study programme)
....	....
....	....
....	....
....	....
....	....

13. Which jobs are the most difficult to fill? State the professions or activities which you have problems to cover, possibly the field of education which is important for the relevat job:

profession/activity (incl. ISCO – if possible)	level and field of education
....	....
....	....
....	....
....	....
....	....

14. When filling work positions, do you have any requirements for the level or a specific field of education? What are these requirements derived from? (internal regulations of your company, legal regulations, another reason) . . . .
. . . .
. . . .

15. Do you undertake additional training and retraining of employees/other labour in your company?

(mark the alternative which best describes the situation in your company)

1. yes – we have developed special qualification plans for this purpose and we provide training ourselves or cooperate with an expert institution
2. yes – we regularly review the qualification needs of our employees, however, the relevant training is provided by expert institutions
3. qualification needs of our employees are reviewed occasionally, depending on the operational needs of the company
4. we do not pay special attention to this issue – if the employees themselves show interest, we take steps to help them (e.g. unpaid vacation etc.)
5. only entry training courses or short instruction for new employees
6. we have not yet addressed this issue
7. another answer: . . . .

16. In the case you address systematically the issue of improving and changing qualifications of your employees, which groups of professions are particularly concerned?

(mark the appropriate answers)

	Entry training courses/initial instruction	In-company training courses	No training
Permanent employees (relates to 3a))			
a) senior staff (management)			
b) specialists with secondary and tertiary education			
c) manual work, servicing and lower administrative professions			
Other labour (relates to 3b))			

17. Do you experience any problems associated with the training of employees? (relates to 3a),b))

(mark the appropriate answers – you may add information, and make a list according to importance)

a) obstacles outside your comany
   a) cost of training courses
   b) courses are not available in the region
   c) quality – the training offered is not focused on practice
   d) training is not customised
   e) lack of information about training on offer
   f) other obstacles – what? . . . .

b) obstacles inside your company
   b1) lack of resources for training
   b2) work organization makes it impossible for employees to be trained in the working hours
   b3) employees are not motivated
   b4) we have not enough information about courses
   b5) other obstacles – what? . . . .

18. What is your main source of information about training on offer?
(mark the appropriate answers and the level of importance)
1. advertisements in the media, promotion leaflets
2. personal references
3. labour office
4. the Internet
5. professional associations/organisations
6. other sources of information – what? . . . .

19. Do you have your own training facility?
(mark the appropriate answer)   1. YES
                                 2. NO

If YES, what type of training does it provide? . . . .
. . . .

20. What type of training do you buy? . . . .
. . . .

21. What financial amount did you contribute last year to the training of your employees
(relates to 2.1) **(retraining, additional training, professional growth etc.)?**

.... (state the % of the volume of wages)

22. Do you undertake activities related to research and development? (marketing research, product development, etc.)? Please specify: . . . .
. . . .
. . . .
. . . .

23. Do you cooperate with professional or employers' organisations, associations or unions? If so, is this cooperation in the area of employee qualifications? Describe briefly such cooperation. In the case you do not cooperate, please, specify the reasons why: . . . . . .
. . . .
. . . .
. . . .

24. In the case there are changes in the nuber of employes in your company (relates to 3a),b)) (increase or decrease), what will be the main reasons for this? (you may state several reasons – mark the appropriate answer and make a list according to importance)

                                                          YES   NO
(a) changes in the volume of services provided
(b) changes in the structure of services
(c) changes in service provision technology
(d) organisational changes
(e) changes in sales
(f) change in ownership
(g) other, please specify: . . . .

25. In the case you intend to change considerably the subject of your main activity in the upcoming period, please, state what the change will be:
a) expansion (by the following activities) . . . .
b) reduction (by the following activities) . . . .
c) another change, please, specify: . . . .

26. Do you consider the <u>branch</u> of your business to be fast-developing and subject to numerous changes? . . . .
. . . .
. . . .

27. Are you interested in buying certain services or activities from your suppliers which they do not offer? Specify which services or activities:
. . . .
. . . .

28. What specific changes do you expect to take place in your branch in the coming years?
(mark the appropriate answers, possibly add a short explanation)
1. changes in customer requirements . . . .
2. changes in customer structure . . . .
3. new services offered to customers . . . .
4. changes in the market . . . .
5. management technologies . . . .
6. product marketing . . . .
7. human resource development (qualification changes, approach to employees, forms of employment, remuneration etc.) . . . .
. . . .
8. changes in work content (in particular jobs) . . . .
9. broader use of computer technology . . . .
10. expansion of services provided . . . .
11. gradual elimination of dividing lines between professions (requirements of versatility, multi-skilled approach)
12. changes in the ways work is organised . . . .
13. increasing the volume of activities contracted out (higher specialisation of certain services – state which activities will be particularly concerned)
. . . .
14. other changes – please, specify: . . . .
15. no changes

29. Have there been recently (1–2 years) any considerable changes in the jobs and work content in your company that were caused by certain developments or activities? Please, refer back to the alternatives in question 25. What has been the effect of these changes?
. . . .
. . . .
. . . .

30. What are the characteristics of a flexible company in your branch of business?
. . . .
. . . .
. . . .

31. What do you consider to be important for "flexibility and mobility of labour"

. . . .
. . . .
. . . .

32. How do your employees respond to the requirements associated with flexibility and mobility? Are they able to meet these requirements? Specify problems in this respect:

. . . .
. . . .
. . . .

33. Which of the following <u>skills</u> are inadequately represented in your company (relates to 3a), b)) to the extent that further development of your company or its existence may be at risk? (assess the degree of risk by grades in this scale)

1	very high level of risk
2	certain risk
3	no risk

level of risk

a) management skills	....
b) finance	....
c) sales skills	....
d) marketing	....
e) creativity	....
f) manual skills	....
g) language skills	....
h) technical skills	....
i) PC skills	....
j) strategic planning	....
k) communication	....
l) work with people (with employees, other labour force)	....
m) specific professional knowledge	....
n) broad professional base	....
o) other (please, specify)	....

....
....

To answer the following questions try to rise above the current situation and problems:

34. Reflect on the future of your company in approximately five years' time:

. . . .
. . . .
. . . .

35. How do you see the development in your branch (sector) in approximately five years' time:

. . . .
. . . .
. . . .

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FORECASTING METHODOLOGY FOR QUALIFICATION AND TRAINING NEEDS: The case of the hotel and catering sector in Burgundy, France

André Giffard

Christine Guégnard

INTRODUCTION

In the case of the prospective approach used for the Leonardo da Vinci Program, the objective of the OREF is threefold: first, upgrade the methodologies presently used in the analysis of the qualitative and quantitative evolutions of the professions, as well as the possible links between the two scopes; second, position the region of Burgundy in relation to the national changes that are being observed; third, develop decision support indicators and provide recommendations for public training policies.

1. From national forecasts to a regional application

■ 1.1 National predictive models reactivated

The Ministry of Employment is carrying out an employment projection per profession to the year 2010. Two models are used: the HERMES model and the FLIP-FLAP model[113]. The national quantitative pre-visions for cooks and waiters (model FLIP-FLAP) are:

	1990–2000	2000–2010
cooks	+ 25 %	+ 21 %
waiters	+ 7 %	+ 2 %

In Burgundy, cooks and waiters hold 2 jobs out of 3 in the hotel and catering sector. The evolution of the work force in the industry reflects pretty well the evolution of the work force in these two professions. The progress of the work force in the hotel and catering sector between 1990–2000 is +24 % for France, and +14 % for Burgundy. We can observe that the progression of the work force in the industry on the regional level was not as pronounced as on the national level. Consequently, mechanically applying the national projections for 2000–2010 to Burgundy would be a wild gesture. We can only infer a possible increase in the job volume between 2000–2010, but we cannot identify precisely the number of individuals involved. The creation of other indicators at the regional level is required.

The Ministry of Education asked the BIPE to put their models – DIVA, GESPER and CALIFE – back in operation[114]. The first results will be published at the end of the year 2001.

■ 1.2 A regional methodology

The quantitative national forecasts do not question the regional contract of professional objectives (COP), the contract of prospective studies (CEP), and the quantitative and qualitative sectorial approaches. Let us remember that, "*the jobs and qualifications prospective is designed to explore the conditions of coherence between the transformations in the employment structure and the evolutions of the training system. It confronts two dynamics partially autonomous but necessarily interdependent.*" Relying on different working assumptions is a first step:
- ■ first, a quantitative forecast of the businesses' expectations,
- ■ second, to gather demographic projections about the work force,
- ■ third, scenarios that anticipate the quantitative adjustments between job offers and demands for employment or between training offers and demands for training.

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[113] See Fact Sheet in annex.
[114] *See "Forecasting Education and Training Needs in Transition Economies"*; 1999; pp. 60–62

But it is also important to identify how students end their training or enter the labour force, and determine the realities of the working conditions or the system of remuneration in order to identify possible failures (for example, the failure for a profession to retain young workers) and take remedial action. To this effect, a methodology has been established that is made up of three points: resort to chronological series to grasp the general trends and differentiate situational factors from structural factors, conduct qualitative surveys, and reach a diagnosis shared by the different partners.

Our prospective approach has been developed along two main lines. The first is to identify the recent qualitative evolutions that have been taking place to highlight the factors of evolution at work in the sector, the present hiring and training policies, and the expected skills and qualifications. The second is to validate and develop further the diagnosis in a working group consisting of public authorities, trade union and OREF representatives. This step takes account of past quantitative evolutions through chronological analyses of supply, demand in the labour market, and the trainees' professional track records, in order to understand the relationship between training and employment.

The Regional Employment and Training Observatory in Burgundy

The reality of the relationship between training and employment is a complex phenomenon, so no single institution, national or local, can master this problem alone, whether through analysis or action. Thus, it is absolutely necessary to create an inter-institutional working group in order to build the necessary conditions of shared understanding or even concerted action.

Created in 1989, OREF is an inter-institutional network in Burgundy. Its aims are to organise the available information concerning training and employment, scattered throughout the various institutions, in order to make easier the action of regional and local policy-making bodies (decideurs), especially underlining the insufficiencies with regard to the initial and continuing training offer.

It's a Network of different regional institutions involved in training and employment fields with four topics: initial and vocational training, the local approach, the integration of trainees, and the evolution of qualifications.

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2. A qualitative approach: regional survey involving firm managers

The purpose of analysing the interviews of firm managers is twofold: on the one hand, to highlight the factors of evolution for the professions in the sector, the job characteristics (particularly the most sensitive jobs), the different management approaches (hiring policies for young people, women, apprenticeships, etc.), and training policies; on the other hand, to situate Burgundy in relation to the national changes that are being observed.

It is necessary to be familiar with the present hiring and training policies, to identify the expected skill and qualification profiles, to target the technical or organisational changes in the work, and essentially to assess the training needs.

Conducting the survey

The survey was carried out through telephone conversations with a panel of employers based in Côte-d'Or (Burgundian department) in October and November 2000. Firm managers were offered the choice either to be immediately interviewed or to make an appointment for some future time. Only one refused to be interviewed. The completion rate reached nearly 98 % by telephone and each interview lasted about 15 minutes.

Different hotels were identified to set up a panel, taking into consideration the characteristics of the companies in the hotel/restaurant industry, particularly in relation to the dependent labour force, which is in greater number in traditional restaurants than in hotels with restaurants:
- 2 cafés;
- 20 traditional restaurants, including 2 fast-food restaurants;
- 21 hotels with restaurants, including 2 major chains;
- 3 hotels with no restaurant;
- 2 travel agencies.

Difficulties

With respect to the hiring of permanent personnel, most managers did not give many details, talking about "*seasonal employees*"[115], "*extra-hand workers in varying number, often in summer time*", without giving any precise figures.

In so far as their awareness of the diplomas is concerned, several small firm managers confessed that they do not care about diplomas but rather about skills and competencies. Many respondents manifested lack of awareness of educational of qualifications of their personnel. We are faced with the same inaccuracies about the short-term forecast for new hiring: either the employer pretends to be aware of the professional diplomas and mentions the CAP in Cooking (vocational training certificate), or he hires a person without requiring any special diploma or educational status.

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[115] Quotes of the interviewees appear „*in italic*".

Sometimes it is difficult to qualify the job with precision based on the employers' statements (some talk of apprentices as cooks and not cook assistants; employees in institutional food services can work both as cooks and waiters, etc.). Small company managers may in certain cases underline the flexibility of their employees (e. g., dishwasher and night watchman, waiter and accountant), as is the case for the manager of a fast-food restaurant who hires employees of institutional food services as cooks and waiters[116].

As for their perceptions of changes in the hotel and catering sector or the professions, most managers will not spontaneously address the issue, hence the point of suggesting different items, with the risk inherent in making suggestions. It is interesting to note that, in October 2000, in France, professionals in the hotel-catering industry demonstrated in favour of a reduced VAT, and several managers addressed the issue more or less vehemently in relation to sectorial changes. This survey was also carried out as legislation on the 35-hour working week was taking shape, which induced many remarks about working conditions.

Number of firms and permanent staff

	Coffee shop	Restaurant	Hotel restaurant	Hotel	Tourism
NACE Code	*55.4*	*55.30*	*55.11*	*55.12*	*63.30*
Number of firms	*2*	*20*	*21*	*3*	*2*
Permanent staff					
1 employee	1		1		
2		1		1	
3	1	5	4		
4		2	1		1
5		1			1
6			2	1	
7		4		1	
8		2	1		
9		1			
10		1	1		
11			2		
12		1	1		
13			1		
16			2		
19			1		
21			2		
28			1		
30		1			
48		1			
55			1		

The analysis of the detailed findings is broken down into four sections: personnel and jobs, the employers' perceptions of the labour market, the continuous training policy, and the perception of the trends in the sector.

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[116] This case suggests that the questionnaire should probably be modified since, in its current form, it does not take into account these double functions.

■ 2.1 Personnel, jobs

Nearly 70 % of the employers targeted by the survey employ fewer than ten permanent employees. Permanent staff consists mainly of women (53 %) and a significant number of young people (nearly one-third of the work force is 25 and under). The employment structure shows that jobs related to dining room service prevail (35 %), mainly waiters in restaurants, followed by jobs as cooks (33 %).

Several small firm managers underlined the flexibility of their permanent employees (a café waiter in a restaurant; a floor-waiter in the dining room; 1 dishwasher who turns into a night watchman; 3 receptionists, including an accountant; 1 restaurant waiter who is responsible for the laundry and accountability, etc.). Another employer in institutional food services hires employees in institutional food services as waiters + cooks. One hotel and one hotel-restaurant signal that they resort to subcontracting with the notification – "*room service subcontracted*".

By and large, managers declared that 70 % of their staff has been trained in the professions of the hotel-catering industry. This figure seems exaggerated in view of the vague knowledge employers have of the exact diplomas of their employees. Some small firm managers said they did not care, "*the skill of the person comes first, I do not care about their diplomas*" or they just stated that "*CAP-BEP prevail in the hotel and catering industry*"; others prefer to hire people who do not belong to the sector because "*they work more*"; large firm managers even had difficulties remembering the educational history of each of their employees and simply declared "*20 % of the work force*" or "*50 % have a diploma in hotel and catering*". Nearly 15 % of the interviewees (3 restaurant managers and 4 hotel-restaurant managers) are not familiar with the diplomas and the training of their employees, or give vague information. Fast-food restaurants hire many students with "*many promotions from within: employees begin as housemen and are soon promoted to group supervisors*". Employers hire both graduates from the sector and people with no connection to the sector.

Workers according to employers (number)

	Coffee shop	Restaurant	Hotel restaurant	Hotel	Tourism
Number of firms	2	20	21	3	2
Number of permanent staff	4	183	271	16	9
Number of temporary workers		32	64	7	
Number of women		93	146	11	8
Number of young people	1	69	87	2	3
Number of apprenticeships		21	35		
Total number	**4**	**215**	**335**	**23**	**9**

Workers according to employers (mean)

	Coffee shop	Restaurant	Hotel restaurant	Hotel	Tourism
Permanent average number	2	9	13	5	4
Non-permanent average number		2	3	2	
Percentage of women		51 %	54 %	80 %	89 %
Percentage of young people	25 %	38 %	32 %	20 %	33 %
Percentage of apprenticeships		11 %	13 %		

Number of permanent workers according to employers

	Coffee shop	Restaurant		Hotel restaurant		Hotel	Tourism
Kitchen		78	43 %	82	30 %		
Dining room/counter	3	93	50 %	79	29 %		
Reception				41	15 %	5	
Floor				41	15 %	8	
Management		9	5 %	12	4 %	2	
Other	1	3	2 %	16	6 %	1	9
Total number	**4**	**183**	**100 %**	**271**	**100 %**	**16**	**9**

Description of permanent professions according to employers

	ISCO Code	Coffee shop	Restaurant	Hotel restaurant	Hotel	Tourism
Kitchen hand	512		15	33		
Washer-up	512		10	7		
Cook	512		17	27		
Kitchen foreman	512		15	15		
Waiter in a restaurant	512		32	51		
Wine waiter	122		2	6		
Head waiter	512		6	14		
Restaurant employee	512		3	4		
Team member	512		24			
Collective restaurant employee: (waiter + cook)	512		44			
Coffee shop employee	512		1	2		
Bartender	512	3		2		
Floor-waiter	713			37	8	
Housekeeper	512			4		
Hotel clerk	913		1	33	2	
(night) watchman	913			5	2	
Reception foreman	122			3	1	
Freelancer, Director	122	1	4	10	2	
Foreman team	512		5			
Restaurant, maintenance leader	122		1	3		
Tourism agent	413					9
Cleaning lady	913		1	3		
Keep worker	913			1		
Administrator, accountant	410		1	9	1	
Marketing man	522		1	2		
Total number		**4**	**183**	**271**	**16**	**9**

Level of education for permanent workers according to employers

	Coffee shop	Restaurant	Hotel restaurant	Hotel	Tourism	Total	
Diploma in hotel-catering	1	100	222	5	8	336	70 %
Diploma outside hotel-catering	2	37	7	1		47	10 %
No diploma	1	42	42	10	1	96	20 %
Total	**4**	**179**	**271**	**16**	**9**	**479**	**100 %**

Description of non-permanent professions according to employers

	ISCO code	Coffee shop	Restaurant	Hotel restaurant	Hotel	Tourism
Kitchen hand + Washer-up	512		2 + 1	6 + 1		
Cook	512		2	8		
Kitchen foreman	512			2		
Waiter in restaurant	512		16	24		
Head waiter	512			1		
Catering employee + Team member	512		10 + 1	2		
Coffee shop employee	512			1		
Floor-waiter	713			13	3	
Hotel clerk	122			5	2	
Reception foreman	122			1	1	
Keep worker	913				1	
Total			**32**	**64**	**7**	

■ 2.2 The employers' perception of the labour market

New hiring

More than half of the managers interviewed (26 out of 48) declared that they have hired permanent employees in the last 6 months, which represents nearly 20 % of the actual permanent personnel. In two fast-food service companies a high turnover led to large number of housemen or employees in institutional food services being hired (8 people in 1 week), most of the time students with no training in the hotel and catering sector.

It is difficult to assess the number of seasonal jobs, which is why it seemed more interesting to know whether more non-permanent employees were hired compared with last year. Overall, managers said they hire the same number of employees, i. e. seasonal employees in summer time or extra-hand workers, "*the same people as the previous years*"; 7 employers hired more non-permanent employees this year than last year.

Forecast of new hiring

The forecast of new hiring for next year shows an increase in non-permanent employees: 29 employers are considering hiring non-permanent staff and 20 employers expect to hire permanent staff. Only 1 employer (a 9-person restaurant) is thinking of cutting back its work force next year – to 1 cook position.

Altogether 18 managers indicated that they are going to hire apprentices; these were usually employers used to such a practice: "*each year, we hire two apprentices*" (a 7-person firm). Contracts of qualification (temporary employment contracts for young people) are hardly ever mentioned, and were so by only two restaurants for the purpose of dining-room service (including 1 wine steward).

Hiring difficulties

Two-thirds of the managers interviewed have difficulties hiring permanent staff, and one-third finds it difficult hiring non-permanent staff. They believe these difficulties are mainly owing to "*unsatisfactory work arrangements*", "*non-incentive salaries*", and "*a problem of motivation*".

■ Travel agencies: do not have difficulties recruiting; one found employees easily and the other found an employee through the ANPE (national employment agency) within one month.

■ Restaurants: *"the situation has been deteriorating for 5–6 years, this profession is not valued"; "people do not want to do this difficult job anymore", "it is difficult to find people who stay", "it's been one year since I have put an ad for a job offer through the ANPE and still nothing..."*.

■ Hotel-restaurants: "*It is easier to find non-permanent personnel*", "*they definitely want to make money*".

– Have you hired permanent workers in the past 6 months?

	Coffee shop	Restaurant	Hotel restaurant	Hotel	Tourism
Number of firms	***2***	***20***	***21***	***3***	***2***
Affirmative answers	1	8	14	1	2
Kitchen		20	10		
Dining room/counter	1	21	12		
Reception			14		
Floor			5	2	
Management			3		
Other					3
Total numbers	**1**	**41**	**46**	**2**	**3**

– Have you hired more non-permanent workers than last year?

	Coffee shop	Restaurant	Hotel restaurant	Hotel	Tourism
Number of firms	*2*	*20*	*21*	*3*	*2*
Affirmative answers		4	2	1	
Kitchen		1	2		
Dining room/counter		23			
Reception					
Floor			4	1	
Management					
Total number		**24**	**6**	**1**	

– Will you hire permanent workers next year?

	Coffee shop	Restaurant	Hotel restaurant	Hotel	Tourism
Number of firms	*2*	*20*	*21*	*3*	*2*
Affirmative answers		9	10	1	
Kitchen		25	6		
Dining room/counter		24	6		
Reception			3	1	
Floor			1		
Management					
Total number		**49**	**16**	**1**	
Don't know	1	2	3		

– Will you hire non-permanent workers next year?

	Coffee shop	Restaurant	Hotel restaurant	Hotel	Tourism
Number of firms	*2*	*20*	*21*	*3*	*2*
Affirmative answers		11	17	1	
Kitchen		2	20		
Dining room/counter		24	20		
Reception			3	1	
Floor			10		
Management					
Total number		**26**	**53**	**1**	
Don't know	1	2	2	1	

– Do you plan to reduce the number of staff in the following year?

	Coffee shop	Restaurant	Hotel restaurant	Hotel	Tourism
Number of firms	*2*	*20*	*21*	*3*	*2*
Affirmative answers		1			
Kitchen		1			
Dining room/counter					
Reception					
Floor					
Management					

– Do you plan to recruit an apprentice?

	Coffee shop	Restaurant	Hotel restaurant	Hotel	Tourism
Number of firms	*2*	*20*	*21*	*3*	*2*
Affirmative answers		6	12		
Kitchen		5	11		
Dining room/counter		2	8		
Reception					
Floor					
Management					
Total number		**7**	**19**		

– Do you plan to recruit a young worker under a "qualification contract"?

	Coffee shop	Restaurant	Hotel restaurant	Hotel	Tourism
Number of firms	*2*	*20*	*21*	*3*	*2*
Affirmative answers		1	1		
Kitchen					
Dining room/counter		1	1		
Reception					
Floor					
Management					

– Do you find it difficult recruiting permanent workers?

	Coffee shop	Restaurant	Hotel restaurant	Hotel	Tourism
Number of firms	*2*	*20*	*21*	*3*	*2*
Affirmative answers	1	14	15	2	
Kitchen		10	12		
Dining room/counter	1	11	12		
Reception			6		
Floor			3	2	
Management					

– Do you find it difficult recruiting non-permanent workers?

	Coffee shop	Restaurant	Hotel restaurant	Hotel	Tourism
Number of firms	*2*	*20*	*21*	*3*	*2*
Affirmative answers		4	12	1	
Kitchen		3	10		
Dining room/counter		3	10		
Reception			4		
Floor				1	
Management					

■ 2.3 The training policy

It may be noticed that few employers provide continuous training: about 50 people received training recently, which represents 10 % of the permanent work force. This applies to 17 restaurants, of which two-thirds are companies with more than 10 employees. Most of these training activities are carried out with regard to the legal financing obligation for firms[117].

One-third of employers declared that they have recently provided training to their employees, in most cases to adapt to changes in techniques (mentioned 11 times); sometimes, training is considered as an investment (mentioned 5 times). A restaurant manager (with 12 permanent employees) explains: "*Turnover is important and training activities are costly; that is why we provide training only to those employees who stay at least one year in the company*".

There are three reasons that explain why employees are not provided training: it is difficult to find a substitute, there is insufficient time, and the fact that training is pointless: "*employees learn on the job*", "*useless for the activity of my restaurant*". At times some state that "*employees do not express the need to go on training*", "*employees do not want to go on training*". It is also important to note that some managers declared that they do train their staff: "*housemen receive in-house training*", or "*training is provided by the company through a videotape on site*".

Description of the training activities:
■ Travel agencies: training in sales engineering, 1 to 3 days (legal financing obligation);
■ Fast-food restaurants: training in management, 15 days to 1 month, 3–4 days, legal financing obligation and other funding sources;

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[117] This 1971 Law applies to French companies and requires employers to finance training under the so-called legal financing obligation. Companies are not required to provide training to their employees, they can pay the total of their mandatory contribution to the Treasury or designated agencies certified by law. Presently, the minimal amount for this contribution is:
  – 0.25 % of the gross payroll for companies under 10 employees;
  – 1.5 % of the gross payroll for companies with 10 employees and more.

■ Traditional restaurants: training in cooking, bakery or services, 1 week (legal financing obligation), training as wine steward for one year (Fongecif);

■ Hotel-restaurants: management staff is trained by the company for 2 to 3 days; for waiters training on-the-job or training periods in Lyon in hygiene and bakery (legal financing obligation, agency collecting training funds).

– **Have you recently provided training to your permanent staff?**

	Coffee shop	Restaurant	Hotel restaurant	Hotel	Tourism
Number of firms	*2*	*20*	*21*	*3*	*2*
Affirmative answers		7	8		2
Kitchen		4	4		
Dining room/counter		2			
Reception		x	2		
Floor		x			
Management		16	15		
Other – '*computer*'			1		6
Total number		22	22		6

– **If YES, why did you provide training?**

	Coffee shop	Restaurant	Hotel restaurant	Hotel	Tourism	Total
Number of firms	*2*	*20*	*21*	*3*	*2*	*48*
To adapt to technical developments		4	6		1	11
To improve the production quality		1				1
To develop multi-competence			1		1	2
To develop loyalty among workers						
To reward workers		2				2
Training is investment		3	2			5
To make staff go			1			1

– **If NO, why don't you provide training courses for your staff?**

	Coffee shop	Restaurant	Hotel restaurant	Hotel	Tourism	Total
Number of firms	*2*	*20*	*21*	*3*	*2*	*48*
No time		3	8	1		12
Difficult to back-fill while training	1	9	6	1		17
Work disorganisation		3	1			4
No promotion						
Continuing training prices too high		1	2			3
Lack of information on programmes		3				3
Training not delivered in the region						
Programmes not adjusted to companies						
Training made by employer		1	1	2		4
Training is not in demand by workers		4	2			6
Not necessary, not useful	1	2	2			5

■ 2.4 Perception of new trends in the industry

Generally, employers do not spontaneously mention one or several changes in the professions or in the hotel and catering sector (except the VAT, as it is presently a much talked about issue). Eight managers do not see any evolution in the hotel and catering industry, and fifteen managers do not perceive any future evolution in the professions linked to hotels and catering. When it comes to the different professions, opinions differ: some foresee no evolution whatsoever, others predict a slight evolution, and a very few mention significant evolution.

The prevailing idea is that these changes will not lead to a radical transformation of the professions: "*We provide traditional food service to workers, and that does not change a lot*", "*We specialise in gourmet cuisine which does not evolve fundamentally*". The challenge will be more to adapt to new requirements, specifically from customers, and to new standards (hygiene and food safety). The transformations that are most often mentioned by the employers are closely linked to the demands and expectations of the customers, who become more demanding regarding prices, quality and services: "*the customer is always right*", "*take-away (caterer)*", "*more modern, attractive, high quality cuisine*", "*gourmet cuisine*", "*vegetarian cuisine*"...

The only aspect involving new skills is the introduction of new technologies, especially computing (the internet), which has an impact on travel agencies and on employees working at reception who must be multi-skilled, "*mastering foreign languages, computing and fax*". Finally, other transformations were also mentioned, namely those related to the working conditions for the employees working as cooks (working hours).

– Which main trends in the sector?

	Coffee shop	Restaurant	Hotel restaurant	Hotel	Tourism	Total
Number of firms	*2*	*20*	*21*	*3*	*2*	*48*
No evolution	1	4	3			8
Clients requirements		10	7	1	1	19
Types of clients, customers		2	2			4
New services offered to clients	1	2	2			5
The market						
Managerial technology						
Technology in kitchen activities		2	1			3
Product marketing						
Length of stay			4	1		5
Human resources management		1	2			3
Job transformations						
How to sell one's image and skills			1			1
Extended supply						
Increased multi-skilling					1	1
Better work organisation		1				1
Increased recourse to sub-contractors						
Hazard analysis control critical point		8	10			18
Internet			1			1
Difficulty to find workers		2	1			3
Time work		2	1	1		4
Decrease of tax		6	2			8

– Which professions are likely to undergo evolution in the future? Why?

	No evolution	Intermediate evolution	Important evolution	Causes of the evolution
Cafés				
– counter/ room	1	1		*New services: pool, cocktail list...*
– management	1			
Restaurant	8	1		
– kitchen		4	3	*Caterer and take-away; technical conservation; working conditions; presentation; preparation; lighter, more modern cuisine; demanding customers*
– dining room	1	2	2	*Demanding customers for quality, prices and services; working conditions*
– management		1		*Anticipate status on labour, hygiene measures*
Hotel-restaurant	5	3		*Requirements of the customers; foreign customers; new technologies (internet, intranet); foreign languages, computers and fax proficiency,*
– kitchen	5	5	2	*Democratisation and demands of the customers (gourmet cuisine, vegetarian cuisine, firms dinners); in search of well-finished preparations, novelties, hygiene and food safety-oriented, work schedule*
– dining room	4	4		*Service based on communication with the customers; decoration*
– rooms	4	2		
– reception	2	6	1	*Multi-skilling, transient customers, not necessarily trained in the hotel and catering industry, internet*
– management	3	2		
Hotel	1			
– reception			2	*Computer science, 25 % of the arrangements are made through the internet, multi-skilling, customers on the rise, foreign languages, computers and fax proficiency*
– rooms				
– management				
Tourism		2		*Increased workload, sales system, computer science, internet: risk to have fewer customers and to notice that arrangements are made directly from home. Based on the trend observed in the USA, customers search for information on the internet but go to the travel agency to arrange reservations.*

■ 2.5 Elements of synthesis

The major trends identified in the national Contract of Prospective Studies (CEP) are not invalidated by the regional survey. The findings of the regional survey more sharply raise the problems identified in the national CEP in 1995: the demands and "moods" of the customers (*see* Lifestyles...), the problems of hygiene and food safety (European standards), the development of computer science (internet, intranet), working strains. Few employers provide continuous training as is underlined in the CEP, but new in-house training procedures provided by the employer or through videotape are appearing.

This regional survey, involving 48 companies in the hotel and catering sector, makes it possible to position the industry in relation to the national trend:

■ Employment growth and hiring difficulties can be observed at the regional level.

■ The awareness, by the employers interviewed, of the educational background of their employees is not accurate. This probably underlines the gap that exists between the declarations of the national trade union representatives on the relation of qualification/training and the reality in the field in a provincial region. Can this explain the minor use of continuing training?

■ A survey directly involving the employers is instructive for acquiring knowledge of evolution in the number of newly hired and for awareness of the recruitment requirements in the restaurants (traditional, chains, institutional food services); on the other hand, if we seek to identify new trends in the professions, firm managers generally represent a rather poor resource. It is necessary to seek contacts with resource personalities at the regional as well as the national level. However, it should be useful to question their degree of representation.

■ When conducting the survey the theme of double competency emerged, specifically for small companies, even though no question addressed the issue. This finding means that this is an intrinsic feature of the industry. However, the variety of situations we encountered does not make it possible to draw final conclusions. It would be necessary to draw a more precise picture of the real status of the changes through a quantitative survey.

3. Towards a shared diagnosis

Through one-day talks, OREF presented to different regional actors the elements of synthesis and the questioning carried out on the basis of the analyses of the quantitative and qualitative evolutions and the professional track records of students trained in the hotel and catering industry. This meeting between partners had two objectives: first, to analyse the transformations observed in training, employment and qualifications by sharing information and viewpoints; second, to indicate to the different actors potential scenarios, future constraints or opportunities, and to help them make informed choices. Prior to this meeting, a first meeting, more technically oriented, had been held with a national representative of the trade union (Fafih).

3.1 Preliminary meeting with the trade union representative

Before the one-day talks with all the regional actors, a first meeting was held that focused on sharing methods between the union representative and the members of OREF. Subsequently, two difficulties were raised. First, concerning the quantitative data: In the case of the estimates of the trade union at the national level, some confusion about the flow of trained students and the flow of school leavers led the professionals to overestimate by nearly a half the number of qualified personnel entering the labour market in Burgundy each year. OREF insisted on differentiating the indicators "flow of trained students" and "flow of outgoing trainees": a portion of the young people in their final year of vocational training continue their studies and another portion leave the educational system to enter the work force. Consequently, once adjusted for the sole category of cooks, the number of school-leavers falls from 789 to 450.

The second difficulty resides in the partiality of the vision of the professionals in the sector who tend to consider that a close relationship must be established between the flows of trained students and their own needs. However, as many national and regional studies pointed out, the hotel-restaurant sector is far from hiring all the young people who have graduated as cooks. Today, many other activities (institutional food services, health agencies, services catering to individuals, etc.) seek this kind of work force and account for nearly half of the newly hired among cooks. This constant trend is accompanied by a total lack of control over the vocational choices of trained students. This finding confirms the major risks inherent to an adequation-based approach, which tends to match in a mechanical manner the flow of trained students with the only labour force participants in the profession, and which disregards, *inter alia*, the evolution of individual behaviour. Likewise, it is important to keep in mind that hotels and restaurants are still a host sector for young people; however, when observing the flows in and out of the companies, the difficulties that the industry faces to retain in a sustainable manner young people in their positions stand out even more.

3.2 One-day talks with key regional actors

Presentation by OREF of the economic sector and the professions to a panel of trade union representatives, Regional Council representatives and state officials.

In addition to the above-mentioned qualitative survey, information of a different nature was also communicated in this working session. Following the presentation of this collection of information, OREF came up with seven findings and questions that were submitted to the partners for resolution. The partners included Regional Council representatives, state officials (Department of Labour), professionals from the hotel and catering industry, and members of OREF Bourgogne[118].

Finding 1
Figures do not reveal a real disinterest of young people towards these professions, as can be proven by the rising enrolment in this field (1000 to 1500 trained students) and the demand among young people to pursue this training. This finding is supported by the fact that about 1000 young people in training have been entering the labour force for 15 years[119]. Are there any signs pointing to a change in this trend?

Outcome of the consultation
There is a general consensus on the different training specialities that must be taken into account and on the number of young people involved. There is no lack of interest of young people towards the professions in the hotel and catering sector.

Finding 2
For companies with 10 employees and more, two-thirds of the employers declared recruiting their employees for unskilled jobs[120]. Barely 10 % of former apprentices are hired by the company in which they have pursued their apprenticeships (the lowest rate of employment, as the national average is 24 %[121]). One-third of the students graduating from a *lycee professionnel* (professional high school) are hired not as "employees" but as apprentices[122]. What conclusion can we draw about

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[118] February 5, 2001 in Rully. The morning session focused on the presentations of surveys on employment and training in order to share information with our partners representing the State, the Regional Council, and OREF, as well as national, regional and departmental trade union representatives. In the afternoon, other professionals from the sector, managers of training institutions and hospitality structures, were invited to the discussion.
[119] *See* the appended charts 1, 2, 3.
[120] *See* the appended chart 1.
[121] *See* the appended chart 4.
[122] *See* the appended charts 5, 6.

the hiring modalities of the hotel-restaurant for employees? How to reduce the wide gap that exists between the image young trainees have of the profession at the beginning of their training and the reality they face subsequently in their day-to-day occupational activity?

Outcome of the consultation

With respect to unskilled jobs, there is a total misunderstanding of the statistics produced, although they have been established on the basis of the employers' declarations.

The answer of some professionals to the low rate of employment for the apprentices by the apprenticeship company can be explained by the tradition of mobility between firms to enhance skills. According to one professional: "*It is well known in the sector that at the end of his apprenticeship an apprentice must go around if he wants to get thorough training. It would be a shame if this habit, this tradition, was lost.*" However, this explanation does not seem to apply to all the participants: the national official talks about hidden reasons that should be clarified, the importance of the personality of the boss, and the working conditions. On this point, the rate of contract breaches for apprenticeship contracts (one-third of the total) is meaningful. A training administrator confirms: "*Let's talk about the very high rate of contract breaches and the rate of contract rescission by apprentices, which reaches 30 to 50 % in certain sections. This is proof that the profession cannot keep this young work force, and the number of incidents in the workplace is clearly on the rise; young people want to be respected, to be taken into consideration, and to communicate in their work. I am not sure that the personnel management style in the companies, and in particular in the small companies, has changed much with time. Some progress should be made in this area.*"

On the contrary, no analysis was provided to explain the role of apprenticeship after graduation from the **lycee professionnel**.

As for the gap between the image the young trainee has of the profession and the real working conditions he faces when carrying out his duties, no immediate answer was provided. However, the working conditions issue, which was up to now considered to be taboo, has been addressed in the present discussions on the reduction of work time. The point is not to attract more young people but to avoid too numerous departures from the industry.

"*We have a real problem with the debate on the 35-hour working week. We are waiting until we know what contract the profession will be able to offer to people interested in these professions. More than other industries, our sector is relying on the status quo until we can rely on a social contract and people are able to find their place. The difficulties always existed but they are more acute today*" (national trade union representative).

Finding 3

Many young people and even adults find themselves unemployed after professional training[123]. How can we account for this situation, which is moreover paradoxical in view of the difficulties firm managers say they have recruiting a work force?

Outcome of the consultation

Employers show a total lack of understanding concerning this situation of unemployment. However, some elements were provided to account for this situation: according to the Department of Labour, half the job seekers prefer to exercise their professions in industries other than hotels and restaurants; for example, in community groups (school cafeterias, old people's homes, hospitals).

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[123] *See* the appended charts 5, 6, 7

Finding 4

In the future, hotels and restaurants should continue to constitute a host and job-creating sector for young people. The young people who are still working in this industry (four to five years after the end of their training) can accede rather easily to skilled positions. In other words, the professional track records show the existence of a core group of individuals who put into practice, in their profession, what they have learned while in training. How could this core group be extended so as to reduce the volatility or the flight away from this industry which is being observed?

Outcome of the consultation

Trade unions are aware of the fact that the hotel and catering sector is still a host and job-creating sector for the young. However, according to the Department of Labour, the problem of how to develop loyalty among employees in this industry is still to be solved. At the end of the day, the trade union representative raised an issue open for future debate: "*There is a requirement to work towards a lower loss of professionals, meaning developing courses of professionalisation, horizontal professional itineraries, setting guidelines, identifying the itineraries so that young people, on their way to becoming future cooks and waiters all their lives, can have itineraries where they have a choice, to choose a direction through new and attractive experiences liable to enrich their professional lives.*"

Finding 5

It may be noticed that few employers provide continuous training (it corroborates the trend observed in the national Contract of Prospective Studies in 1995). Three explanations are put forward by the firm managers interviewed: it is difficult to find a substitute, insufficient time, and also the fact that training is pointless. Which reason prevails and, on the contrary, which is the least important? What changes and what factors of change could be contemplated?

Outcome of the consultation

No response to these questions.

Finding 6

Several small firm managers underlined the flexibility of their permanent employees, their double competency (floor-waiter + waiter, waiter + accountant). Will double competency be required more often by small companies, and will it benefit larger companies?

Outcome of the consultation

Only one answer was given by the national trade union representative: "*Multi-skilling remains a requirement in firms, but there are other ways to deal with it. People that are liable to carry out different tasks must show first-class capacity in a basic profession in the hotel and catering industry, such as cook, waiter... and skills in other fields. This can lead to multi-skilling in auxiliary activities.*"

Finding 7

From a prospective point of view, the key idea is that future changes will not lead to a radical transformation of the professions ("*traditional or gourmet cuisine do not change fundamentally*"), although certain changes can be noticed: the requirement to adapt to new demands, especially from the customers ("*more modern cuisine, more attractive, of high quality; gourmet or vegetarian cuisine; take-away*"), to new standards (hygiene and food safety), to working conditions (for cooks, the work schedule). Nevertheless, several observations point to the emergence of new skills induced by the development of computing:

the use of the internet by the employees working at the reception desk requires "*mastering foreign languages, computing and the fax*". Is this list of major factors of evolution (new demands from the customers, the internet) thorough? What new knowledge and know-how will it be necessary to acquire? What other elements must be added to the training contents presently provided?

Outcome of the consultation

The national trade union representative talked about the future trends: "*The future is the service in the dining room, the distribution, and the future of the factor of growth for restaurants is the importance of the behavioural aspect [...] The future will be more and more distribution-oriented and will turn away from production. In the future, young people will have to be prepared to be more frequently employed in customer services and not in the production of meals. [...] As far as tourism is concerned, we are in a context of international competition. Out of 10 positions, 4 are found in the dining-room service, 3 in the kitchen, 2 at the reception plus one more. For the dining room we need people who behave normally and possess certain technical skills. There is no new profession in itself...*"

By way of conclusion to these one-day talks between trade unions, the Regional Council, the State, and OREF Bourgogne, it was determined to implement a contract of professional objectives (COP). This framework will include not only the hotel and catering sector but also the tourism industry. "*Ten years from now, the number of employers operating in the tourism industry will have doubled, the consequences are huge. In the second version of a future contract of objectives, we must work towards a more horizontal approach, and we will work even better if the scope of tourism is extended[124], because when you look at the positions of cooks in the hotel and catering industry, the exclusive training as cooks in fact, graduates in this area do not all work in the hotel and catering industry; it involves a much larger environment that must be taken into account. So that when we say that apprenticeship could be the answer to all the needs of the hotel and catering industry, it is true from a quantitative point of view, but facts prove differently*" (national trade union representative).

These different analyses highlight the fact that training problems and professional integration and recruitment problems cannot be dealt with irrespectively of staff management policies (like the high turnover in hotels and restaurants), or of the tensions that can exist on the labour market. "*The point is to work with professionals to draw a number of reliable conclusions on the employment situation in the industry and then to find ways of improvement in terms of better itineraries, better training, better tutoring, etc. (responsibility of the Regional Council). One paradoxical aspect: many young people enter the industry, few stay, the qualifications do not meet the requirements in terms of employment. The only way we will be able to find ways of improvement to progress in the medium term while integrating the prospective aspect is on the basis of a reliable diagnosis, which is what a contract of objectives is for*." These comments by the regional Council representative, project manager of the contract of objectives, sum up the status of the reflection at the end of the talks between the regional actors.

The analysis of the transformations in training, employment and qualifications in the hotel and catering sector with the public authorities, the trade union and OREF is presently underway.

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[124] In 2000, 75 million tourists came to France. Based on forecasts, 100 million are expected in 2010.

■ CONCLUSION

Our prospective approach combines elements of a quantitative analysis based on statistics on training, employment, professional integration of trainees, and a qualitative analysis based on surveys in the field, involving firm managers. These investigations conducted with professionals make it possible to clarify, complete and validate findings where statistics are available. Through this approach, we realise that searching for a perfect match between the number of students leaving the training system and the qualification requirements is a myth: assessing the firms needs is difficult (*see* A Qualitative Approach), graduates from the education system are not the only jobseekers on the market; training can lead to different kinds of jobs, in different industries; a position can be staffed by people with different backgrounds; the demand by individuals (youth or adults) for special training or a profession can also change depending on the social representations and the economic requirements. The mechanical and quantitative relations between requirements and qualifications must give way to a new approach, which seeks adjustment points between those two components.

Likewise, through this approach, it is evident that a unique indicator cannot summarise the complexity of a given situation. Indicators are only means, questioning instruments designed to concentrate the active reflection of regional actors. The use of different sources of information, by matching or confronting them, offers a better understanding of the situation in real facts, in order to reveal the local hiring practices of employers, to identify certain kinds of dis-equilibrium between the structure of the professions and the training. The prospective approach must be based on a shared diagnosis of the existing resources and a confrontation of the viewpoints of different actors.

■ ANNEX

Fact Sheet
The macroeconomic models: job opportunity patterns (in France for 2000/2010)

The HERMES model
This model can provide a medium-term scenario (business, investment, employment forecasts), to a rather disaggregated level in terms of sectors: energy, intermediate products, consumer goods, construction work, transportation and telecommunications, and other commercially traded services and non-market services. This is a neo-Keynesian model whose structure resembles the structures of other French macroeconomic models routinely used (MOSAIQUE of OFCE, AMADEUS of the INSEE – National Institute of Statistics and Economic Studies). It characterises itself through the fact that it considers energy as distinct from the other capital components ("putty-clay"-like production function involving three factors: energy, capital, work). The HERMES model (Harmonised Econometric Research for Modelling Economic Systems) was an initiative of the Commission of the European Communities in the early 1980s. The French part was developed by a team from the laboratory ERASME of the Central school. This macroeconomic model was linked to a job opportunity pattern per profession – the FLIP-FLAP model.

The FLIP-FLAP model
The FLIP-FLAP model (Flux interprofessionnels par Familles d'Activité Professionnelle – Inter-professional flows per occupational activity family) makes it possible to plan the employment demand per profession according to the occupational families classification of the Ministry of Employment. This classification, which results from matching the job and socio-professional categories families (JAC) of the INSEE with the operational directory for the professions (ROME) of the ANPE (the national employment agency), identifies, at the most aggregated level, 22 occupational areas (OA) and 84 occupational activity families (OAF) and, at the most disaggregated level, 222 occupational families. FLIP-FLAP was developed on the basis of the jobs series resulting from the Employment surveys conducted in the 1983–2000 period, and on the data of the national income accounting. Each equation entails a connection between employment in an OA or an OAF in the year x, employment in this same category in x-1, the growth of the sector in which the profession prevails, and the time trend that captures the implications of the technological advances.

Tables and graphs

Table 1. Number of trainees in the hotel and catering fields (recent years)

	1984 – 1985		1989 – 1990		1994 – 1995		1999 – 2000	
	Apprentice	Lycee	Apprentice	Lycee	Apprentice	Lycee	Apprentice	Lycee
Level V								
CAP	535	235	608	211	408	116	479	63
BEP		151		429	169	447	282	360
MC				13		28	33	27
Level IV								
BP			21		23		21	
BT, BTn		47		44		87		65
Bac Pro				67	7	107	17	119
Level III								
BTS				23		24	5	88
Total	**535**	**433**	**629**	**787**	**607**	**809**	**837**	**722**

Source: *Rectorat*

Table 2. Flow of school-leavers

	1985	1990	1995	1999
Total	813	1070	805	962

Source: IVA, IPA, *Rectorat*

Table 3. Candidatures for training in a lycee

	BEP	Bac Pro	BTS
1997			
Places	363	116	72
Candidatures	575	225	540
1998			
Places	378	120	72
Candidatures	647	240	494
1999			
Places	366	120	72
Candidatures	587	209	555
2000			
Places	384	120	72
Candidatures	532	204	532

Source: *SAIO, Rectorat*

Graph 1. Flow of hiring in firms with 10 employees and over
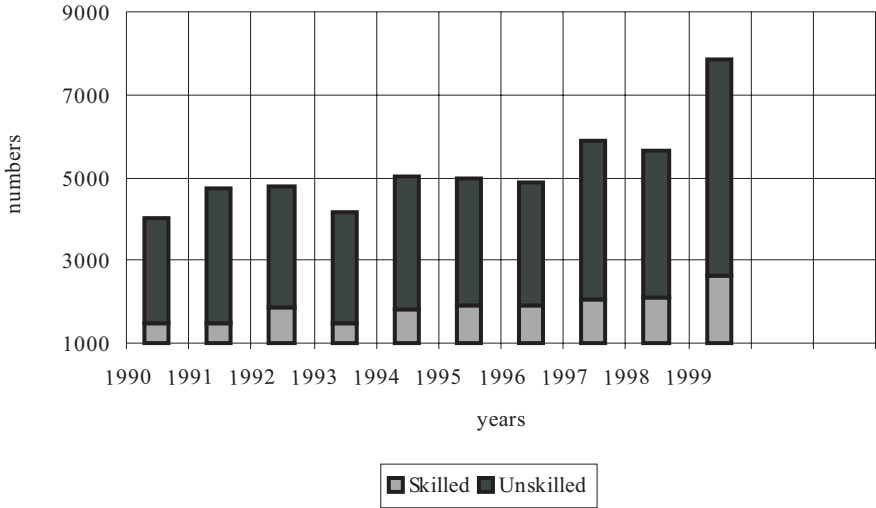
Sources: Emmo, Dmmo, *Drtefp*

Table 4. The situation of apprentices in February 1999 (CAP and MC)

	Rate of employment		Employment in firm of apprenticeship	
	1994	1999	1994	1999
Hotel catering	41 %	46 %	7 %	8 %
Food	46 %	64 %	8 %	17 %
Car repair	32 %	54 %	16 %	17 %
Construction	56 %	53 %	24 %	33 %
Trade	32 %	43 %	10 %	11 %
Hairdressing	24 %	43 %	20 %	21 %
Altogether	*38 %*	*55 %*	*16 %*	*23 %*

Table 5. Professional stuation after the lycee (in %)

	1984	1986	1988	1990	1992	1994	1999	2000	2000 All lyceens
Employment	**51**	**45**	**50**	**55**	**45**	**33**	**33**	**42**	**43**
Apprenticeship	3	9	4	6	8	3	13	27	24
Contract of qualification	–	2	4	3	7	8	7	3	4
Subvided employment	3	5	11	7	6	1	4	1	5
Unemployment	31	31	22	15	19	34	37	27	20
Service, inactivity	12	8	9	14	15	21	6	–	4
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: IVA, *Rectorat*

Table 6. Professional situation after an apprenticeship (in %)

	1987	1988	1989	1990	1992	1993	1994	1999	1999 All apprentices
Employment	**46**	**49**	**46**	**49**	**50**	**41**	**34**	**43**	**51**
Contract of qualification	3	2	3	5	2	–	3	3	8
Subvided employment	11	9	10	4	6	3	6	6	3
Unemployment	23	23	23	16	14	23	39	41	31
Service, inactivity	17	17	18	26	28	33	18	7	7
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: IPA, *Rectorat*

Table 7. Professional situation after adult training of Afpa (in %)

	1989	1990	1991	1992	1996	1999	1999 All trainees
Employment	58	48	47	42	49	42	63

Source: *Afpa*

Localisation des salariés du secteur hôtels et restaurants
15 815 salariés

Poids de chaque zone dans l'effectif régional
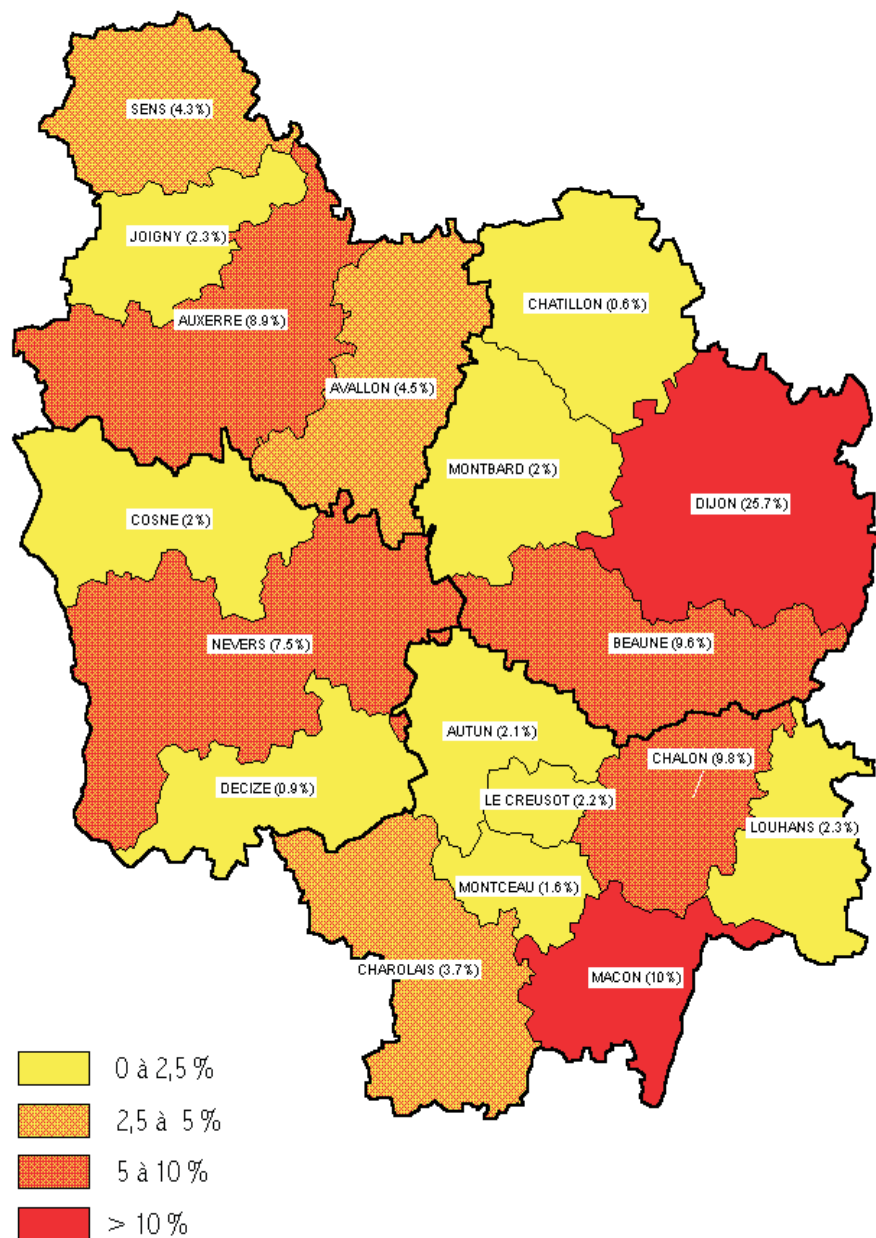
SENS (4.3 %)

JOIGNY (2.3 %)

AUXERRE (8.9 %)

AVALLON (4.5 %)

CHATILLON (0.6 %)

MONTBARD (2 %)

DIJON (25.7 %)

COSNE (2 %)

NEVERS (7.5 %)

BEAUNE (9.6 %)

AUTUN (2.1 %)

CHALON (9.8 %)

DECIZE (0.9 %)

LE CREUSOT (2.2 %)

LOUHANS (2.3 %)

MONTCEAU (1.6 %)

CHAROLAIS (3.7 %)

MACON (10 %)

0 à 2,5 %
2,5 à 5 %
5 à 10 %
> 10 %

DRTEFP/SEPES/janvier 2001

Source : ASSEDIC (31/12/1999)

ANALYSIS AND FORECASTING OF THE TRAINING NEEDS IN THE SECTOR OF TOURISM
Podravje region – Slovenia

Mateja Karničnik
Dušanka Lužar
Suzana Geržina

■ BACKGROUND

eim, Human Resource Development Fund (HRDF) is the partner institution that links local, regional, and national partners in the human resource development area. The main role of HRDF is to stimulate investments in HR on the regional/local level, to promote economic and social development and to design a culture of lifelong learning.

Faster economic development requires **new, contemporary skills**. Training of human resources is crucial for the development of the Podravje region and its transition to a modern, competitive economy. Modern knowledge and skills, and the constant improvement of the technological process assure a strengthening of the market position. Designing training programmes, adapted to a **company's needs**, requires knowledge of the **company's requirements**, and the employers' **needs in the labour force** with respect to **regional development strategy and regional prospective sectors**.

Human Resource Development research in the Podravje region, which has been implemented by HRDF since 1997, is a basis for designing a complete human resource development strategy and co-financing the training strategy in Podravje.

The research methodology was developed by HRDF during the period of 1997 to 2000, and was constantly improved by HRDF experts and through co-operation in the project "*Regular Forecasting of the Training Needs*", Leonardo da Vinci programme.

As HRDF has been implementing the training needs analysis annually since 1997, we gradually incorporated the results of the joint project activities into the research, so that we introduced the components of qualitative methodology with the use of in-depth interviews, discussions, and qualitative questionnaires in the 1999 analysis. In the survey for the year 2000 we finally introduced the sector approach according to common methodology.

Within the project we also studied the structure of different databases and put a special focus on the Employment Service of Slovenia database, which is related to training needs and employment / unemployment. Owing to the differences in the sample, the required data and the referred time period, we were not able to fully combine HRDF and ESS databases, but we are able to use data as a secondary source of the information. We also could not obtain all necessary data from the Statistical Biro of the Republic of Slovenia, since they do not present all the information for the regional level (national level only). Nevertheless, when performing the research we used all available resources and data.

One of the project goals is comparative HRD analysis of the selected economic sector in partner countries. According to defined prospective sectors in each partner country, sector **tourism** was selected. As countries involved in the project do not have the same definition for the selected sector, we agreed that the tourism sector, for the purpose of the survey, includes the following type of activities:
■ hotels and catering
■ traditional craftsmanship and sales
■ tourist agencies
■ animation activities
■ sport tourism
■ spa tourism
■ information network

The research enables the systematic organisation of information on HRD as a basis for designing a common and comprehensive strategy on training in tourism, and annual training plans of HRDF and training institutions.

1. Aims and Goals

The aims of research are to ascertain:

- the state the tourism sector, especially in HRD
- development possibilities in the tourism sector in Slovenia, the Podravje region, with respect to development potential and trends in Slovenia and in Europe
- the development orientation and plans of companies according to the sector's development possibilities, especially HRD

With the following goals:

- designing a forecasting of HRD and adequate measures for HRD in tourism
- designing a complete HRD strategy and HRDF annual plans to stimulate investments in HR
- designing and implementing the HRDF co-financing strategy for HRD projects and tailor-made training programmes.

2. Research Methodology

The applied methodology was developed by HRDF, and improved by HRDF experts and through co-operation in the project "Regular Forecasting of the Training Needs", Leonardo da Vinci programme. This methodology enables a data comparison of the tourism sector in selected regions of countries that are partners in the project.

The research consists of:

- **Analysis of the state of the tourism sector**
- **Ascertaining development possibilities and forecasting future sector development**
- **Designing measures for the implementation of the development orientation**

The Analysis is divided to quantitative and qualitative parts:

Quantitative analysis consists of primary and secondary data analysis.

Primary data were collected in selected companies from a designed sample through designed questionnaires. The personal examination method used in that part of the analysis was based on open and closed questions. As we did not want to restrict company representatives in their responses, open questions prevailed. In the data collection process, students participated who were trained for carrying out interviews.

Secondary data were collected from official publications (Statistical Biro of the Republic of Slovenia, Chamber of Economy and Trade data, Trade Chamber data) and other official sources.

Collected data from both sources were analysed through the method of statistical and quantitative analysis. Final remarks were made through a synthesis of the results of interviews and official data by using the computer programmes SPSS for Windows, Access and Excel.

Qualitative analysis adopted a research method based on structured personal interviews of representatives from different institutions and managers from selected companies. The interviews were oriented around sector development, and labour market and human resource development impacts on the sector's regional development.

3. Designing the Sample for Research

Companies were selected from the database of the HRDF partner institutions (Chamber of Economy and Trade, Trade Chamber) according to the following criteria:

- Companies that employ five and more employees, Chamber of Economy and Trade members
- Companies in the trade area, members of the Trade Chamber, regardless of the number of employees
- Equable geographic dispersion of companies in the Podravje region.

With respect to the above-mentioned criteria, 83 companies from the tourism sector of Podravje were included in the research. Five representatives from leading institutions and companies in tourism development were involved, too.

4. Obstacles and Constraints

During the research it was discovered that the tourism sector was impossible to define in unique terms. Eurostat designed an artificial definition named HoReCa/Ta (Hotels, Restaurants, Cafes/Travel agents). HoReCa/Ta includes companies that offer accommodation, and food and tourist agencies (tourist mediators and travelling organisers) that operate mostly for tourists, though some of them may also offer their services to other inhabitants. Unfortunately, companies that operate for the purpose of tourism only are excluded and are classified among other activities (e. g.: agencies for promotion, casinos, real estate agencies in the tourism area, some transport companies).[125]

In Slovenia, data on Hotels and Restaurants relating to the HoReCa sector are often used without regard to the contribution of travel agencies, duty free shops, the re-purchase of foreign currency, cash and cheques from gambling. This fact and the different methods of data collecting prevented a direct data comparison. For the purpose of this, research data on representatives of travel agencies and other supporters are involved in our research as a part of the HoReCa sector.

One of the major obstacles was a limited sample. In Slovenia, as well as in the Podravje region, representatives of travel agencies and other supporters are involved in our research as a part of the HoReCa sector who mostly operate in small and medium sized companies. There is a negligible number of large companies in this area.

In addition, the lack of preparedness for co-operation in the analysis, and the lack of time among the companies also influenced the research.

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[125] Sectional Strategic Directions and Development Programmes in Tourism Summary; Dr. Tanja Mihalič, October, 1999;

■ THE STATE OF THE TOURISM SECTOR AND ITS DEVELOPMENT POSSIBILITIES

1. The State of the Tourism Sector in Slovenia and Its Development Possibilities

According to data on the Analysis of Economic Effects of Slovene Tourism[126], tourism represents 9.1 % of GDP, and taking into account multiplicative effects, it represents 16.3 %. In 1998, tourism employed 35,032 employees, and with regard to employment multiplication (1.5), Slovene tourism employed 52,550 employees or 6.4 % of total employment.

With regard to the qualitative research on the competitiveness of Slovene tourism and the opinion of foreign experts, the **strength** of Slovene tourism is its **natural**, **cultural** and **social attractiveness**, which should be valorised by the integral tourist product. This comparative advantage of Slovene tourism should increase its competitiveness.[127]

Unfortunately, the main **weakness** of Slovene tourism is in its **competitiveness**, especially in production and marketing. Experts give special attention to the inefficiency and underdevelopment of tourist products, which has resulted in an unfavourable relation between high prices and low quality. Furthermore, in marketing, some problems were exposed concerning the **image of Slovenia** (its nearness to the Balkans, political instability) and underdeveloped tourist market segmentation (target market, market niches instead of mass marketing). Marketing based on product differentiation requires developed and differentiated products.

The lack of efficiency in the production and marketing of tourist products signifies that Slovene tourism is faced with the **threat** of losing the bonuses of its comparative advantages. Finally, this has resulted in decreasing the value added. More governmental support for the systematic development of tourism is needed.

There are many **opportunities** in Slovene tourism; unfortunately many of the themes are only potential. Tourism can be a **developmental alternative**, and become an important sector in the Slovene economy. A trend towards an increasing demand in tourism and a new way of holidaying and making excursions has been observed. Slovene tourist opportunities are found in short excursions, frequent holidays during the year, and congress tourism.

A restructuring of the Slovene tourism strategy, and clear goals are required. Such a strategy should be incorporated into the Slovene economic strategy, and should contribute to better collaboration among all factors, public and private in the tourism sector on the one hand, and more ambitious goals and conditions for developing Slovene tourist companies into international ones on the other; these are matters that should be settled. More attention should be devoted to foreign excursion tourism.

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[126] Analysis on Economic Effects of Slovene Tourism, International Institute of Tourism, 1999;
[127] Sectional Strategic Directions and Development Programmes in Tourism Summary; Dr. Tanja Mihalič, October, 1999;

The results of the research from 1999 show that the masses of people who use the tourism market are explicitly non-homogeneous and have diverse needs. The modern tourist has limited time and wants to have active holidays, so special attention should be devoted to satisfying individual customer needs. Accompanied activities and innovation in tourism as an element of comparative advantage should be taken into account

In the information age, people are more and more oriented towards people, traditional cultural values, communications, and changing ideas. Tourists are more and more aware of ecology and avoid places that are polluted. Ecological and cultural awareness is rising and will be a motive in tourism in the third millennium.

The crucial elements for tourism development are:[128]

- Market, demand and supply
- Place, activities
- Accessibility (transport, communication, information)
- Services
- Human Resources
- Promotion

2. The State of the Tourism Sector in the Podravje Region and Its Development Possibilities

Slovene independency, and war crises near the Slovene border have had some influence on tourism, too. Transit tourism, which was the most important part of tourism in Podravje in the past, has significantly decreased and had an influence on disorganisation in that sector.

Globally, Slovenia, as well as the Podravje region, is with its natural resources at an advantage for tourism and extensive employment. Despite this, a lack of connections, bad recognition, or a lack of identity and an unclear image are the basic problems of tourism in Slovenia and the Podravje region.

Development trends in tourism in the Podravje region are:

- Winter/sport tourism
- Recreation tourism
- Thermal/spa tourism
- Promoting business/economic life (congress tourism)
- Active role of accommodation services

Among the weaknesses of tourism in the Podravje region, mention should be made of: an insufficient infrastructure, non-existent regionalism, a lack of attention to tourism development in local communities, a lack of co-operation between the public and private sector, University and tourism companies, and bad co-ordination on the local level.

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[128] Resolution on Strategic Aims in Tourism Development in the Republic of Slovenia, Programme of Activities and Measures for its Development, Official Gazette of the Republic of Slovenia, No. 7/1995;

In the Podravje region, the tourism offer is dispersed in area into particular cities and tourism points. Therefore, one of the major tasks of the tourism companies and co-ordinators is to connect those offering tourism, and to design a comprehensive offer that could meet demanding customer needs.

The natural resources and the diversified offer in tourism make it possible to design "a la carte" products for the improvement of marketing in tourism services. It is necessary to find a market niche in order to make a profit from the tourism advantages. The whole infrastructure and environment should stimulate faster development and lead to the implementation of development goals in order to keep abreast of world tourism competitiveness.

STRENGTHS	WEAKNESSES
■ Positive impact of globalisation ■ Access to new markets and potential customers ■ Strengthening of business ties ■ Mutual linkage and connections ■ Geographic position	■ Closing or restructuring Duty Free shops resulted in a lack of income, increasing unemployment and the retraining of the employed ■ Low capacity of the economy to adapt to new legal requirements
OPPORTUNITIES	**THREATS**
■ Access to EU Structural Funds ■ Acceleration of tourism development in rural areas ■ Building and strengthening identity	■ Brain drain ■ Lack of connections between offers in tourism ■ Low adaptability to new market requirements

There is lack of inland investments in Slovene tourism. The closeness and unclear definition of the Slovene market results in a lack of foreign capital for investments. The significance of investment and conditions differ from the technological and industrial sectors. Investments in tourism are long-term investments with a low profit, which in the long term bring greater effects.

According to tourism development trends, human resource development will be based on foreign languages and communication skills, knowledge of the specificity and marketing of the tourism offers, including culture, and knowledge of information technology. In addition to existing employment, tourism needs young, flexible workers that are willing to acquire new, modern skills and knowledge.

■ THE STATE AND DEVELOPMENT PLANS OF COMPANIES IN THE TOURISM SECTOR

1. General Data

A total of 83 companies operating in the tourism sector in the Podravje region were included in this research; 35 % of them operate in the area of catering. The structure of the companies is shown in Graph 1.

Graph 1: Structure of Companies in the Tourism Sector in Podravje in 2000, According to Activities
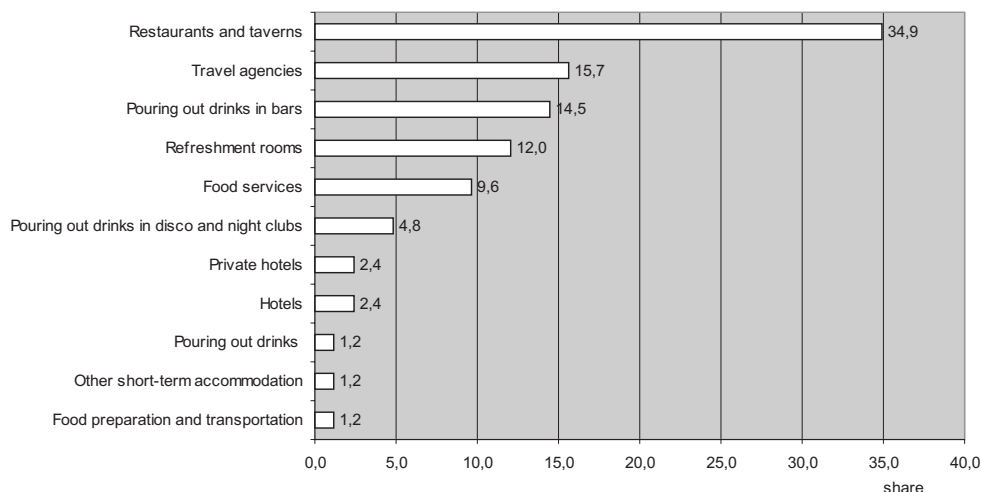
Source: Data collected for this research, Human Resource Development Fund, Maribor, December 2000;

The majority of companies operating in the tourism sector are small (**93 %** of the observed companies); **71 %** of companies have sole proprietors, and 28 % are limited companies (ltd). Only 11 % of companies have income over 100 million SIT (470,000 EURO), and 43 % of them have income of 5 million SIT (24,000 EURO).

2. Human Resource Development in the Tourism Sector

A total of **80 %** of employees are skilled workers. Women prevailed (**66 %** of total employment). The majority of employees **(54 %)** are aged **26** to **35**.

Table 1: Structure of Employed, according to Age, Sex, Level of Education and Employment Form

Educational Level	Age					Sex		Employment form		Total
	15–25	26–35	36–45	46–55	Over 56	M	Ž	Defined periods	Permanent job	
Unskilled workers	4	5	6	1	0	3	13	9	7	**16**
Trained workers	7	11	8	1	1	10	18	8	20	**28**
Skilled workers	21	101	31	14	2	61	108	32	137	**169**
Secondary school	25	75	30	13	2	48	97	21	124	**145**
Higher proffesional schools	1	11	6	3	0	7	14	3	18	**21**
University	1	5	3	1	0	2	8	0	10	**10**
Master's Degree	0	1	0	0	0	0	1	0	1	**1**
Ph. D.	0	0	0	0	0	0	0	0	0	**0**
TOTAL	59	209	84	33	5	131	259	73	317	**390**

Source: Data collected for this research, Human Resource Development Fund, Maribor, December 2000;

In the observed companies, non-defined period employment absolutely prevailed (81 %). It must be stressed that the observed companies are mostly small and their employment structure is different than in large and medium sized companies.

Less than one-fourth of tourism companies have **apprentices** in the following occupations: waiter, cook, tourism technician, and salesman in tourist agency.

In 2001, one-fifth of companies decided to employ **probationers** in the following occupations: waiter, cook, tourism technician and persons with graduation from a post-secondary school of tourism.

Only five companies – large and medium sized – that wanted to have well skilled employees granted **scholarships** in the year 2000.

3. Training Needs Analysis

Human resources are one of the most important factors and are of strategic importance for company development. Therefore investments in human resource development (knowledge, skills) are strategic. Companies are aware of the importance of human potential, and design an employee's career through continuous training. It is important to know a company's needs and requirements for new skills already in the phase of the design and development of new training programmes (to meet company needs). Only flexible training programmes can meet a company's needs successfully and provide concrete results in practise. The training provider's main task is to develop and offer such training programmes on the market.

There are substantial needs in the tourism sector for permanent training. An employee's knowledge and skills should be continuously renewed and improved to be more competitive. Well-trained and educated employees are an important factor in a company's subsistence and development, and human resource development should be a part of company's strategic plan.

In catering, cuisine is developing very quickly. Therefore employees should be continuously trained. Knowledge of cooking and nutrition trends is becoming more and more important for tourism, i. e. training in healthy nutrition (preparing foods against cardiovascular illnesses).

■ 3.1 Training Needs in Management

It is important to be aware of the training needs in management for designing and developing adequate training programmes.

Management should be more oriented towards the promotion and creation of business relations, and communication with business partners and their employees. More attention should be devoted to understanding market philosophy, and recognising concrete market processes and trends. In middle management, knowledge of working processes and organisation is needed.

Knowledge of at least one foreign language is crucial for breaking through into foreign markets and conducting business efficiently. The requirement of knowledge of English and German represents 21 % of total training needs in management, followed by computer skills (18 %) and communication skills (14 %).

Graph 2: Training Needs in Management in the Tourism Sector
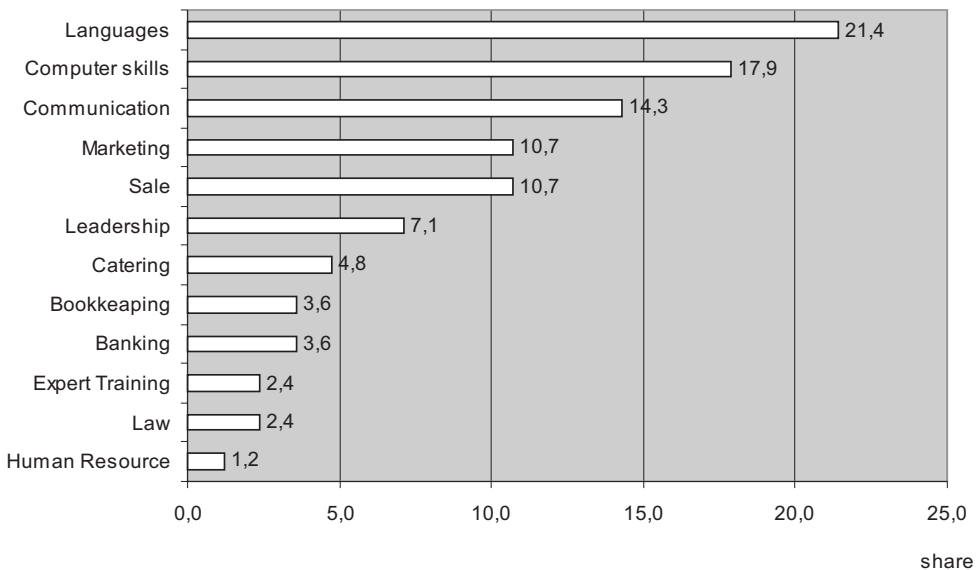
Source: Data collected for this research, Human Resource Development Fund, Maribor, December 2000;

By observing training needs it was discovered that there exist some sector skills regardless of the occupation, and some specific skills typical for some occupations. In the next table, training needs according to occupation are presented.

Table 2: Training Needs in Management According to Occupation

OCCUPATION	TRAINING NEEDS
Director/Manager	■ Foreign language (German – 7, English – 4, Italian – 2,) ■ Computer skills (Excel 3, Word 4, Windows 4) ■ Communication (3) ■ Leadership (3) ■ Marketing skills (3) ■ Human Resource Management (1) ■ Expert training in catering (1) ■ Financial skills (1)
Marketing Manager	■ Sales promotion (6) ■ Solving conflict situations (Customer complaints – 6)
Tourist Agency Manager in a small company	■ Marketing skills (5) ■ Solving conflict situations (Customer complaints – 3) ■ Financial skills (2) ■ Sales of foreign tourism arrangements (1)
Advertising Manager in a small company	■ Computer skills (Corel Draw, Excel) (2) ■ Air ticket sales (1) ■ Management rhetoric (1)
Managerial Assistant	■ Foreign language (German – 2, English – 1, Italian – 1) ■ Computer skills (Windows, Excel) (2)
Hotel Manager	■ Organisational skills (1)
Waiting Manager	■ Modern access to services/waiting (2) ■ Foreign language (English – 1) ■ Decoration, arrangements (1) ■ Organisational skills (1)

Source: Data collected for this research, Human Resource Development Fund, Maribor, December 2000;

■ 3.2   Training Needs of Other Employees

In addition to well-trained managers, the support of all employees is necessary for business success. Therefore, the knowledge and skills of all employees are crucial for the subsistence of a company. In the tourism sector, the need for **catering skills prevails (30 %)**, especially food preparation and modern access to services/waiting. These are followed by **foreign languages skills (28 %)**, computer and IT skills, and communication skills.

Graph 3: Training Needs of Other Employees in the Tourism Sector
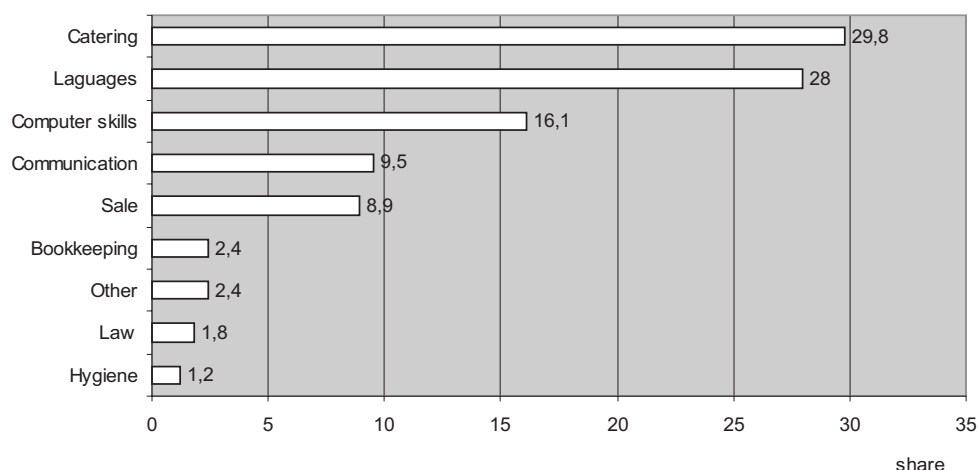
Source: Data collected for this research, Human Resource Development Fund, Maribor, December 2000;

Training needs are related to occupation. **Cooks** need skills in food preparation and garnishing, while waiters should be trained in **foreign languages** (especially in German), modern access to services/waiting, and communication.

Training needs of travel agents are oriented towards computer skills, accounting and sales techniques. In Table 3, training needs are presented in greater detail.

Table 3: Training Needs of Other Employees According to Occupation

OCCUPATION	TRAINING NEEDS
Cook	■ Food preparation (international cuisine, festival and seasonal food preparation – 10), ■ Garnishing (6) ■ Hygiene minimums (2)
Waiter	■ Foreign language (German – 17, English – 6, Italian – 6) ■ Modern access to services/waiting (13) ■ Communication with customers (11) ■ Decoration of place (10) ■ Mixing drinks and wine knowledge (8) ■ Computer skills (Excel, Word, computer programs for accounting/case, stocks), (5)
Barman	■ Mixing drinks (1)
Accountant	■ Bookkeeping, accounting (2)
Travel Agent	■ Computer skills (basic skills, Outlook), (18) ■ Accounting – basic skills, (15) ■ Sale techniques, (15) ■ Foreign language (English – 4, German – 3), ■ Customer care – communication (4)
Tourist Guide	■ Knowledge on law (3) ■ Communication (2)
Receptionist	■ Foreign language (English – 4, German – 4, Italian – 4) ■ Computer skills (Excel), (4)

Source: Data collected for this research, Human Resource Development Fund, Maribor, December 2000;

■ 3.3 Knowledge Gaps that Threaten the Development of the Company

In the research we observed gaps in knowledge/skills that threaten the existence of companies today, and will threaten their existence in the future. Companies graded the threat on a scale from 1 to 5, where 1 represents a significant threat and 5 no threat to the existence of the company.
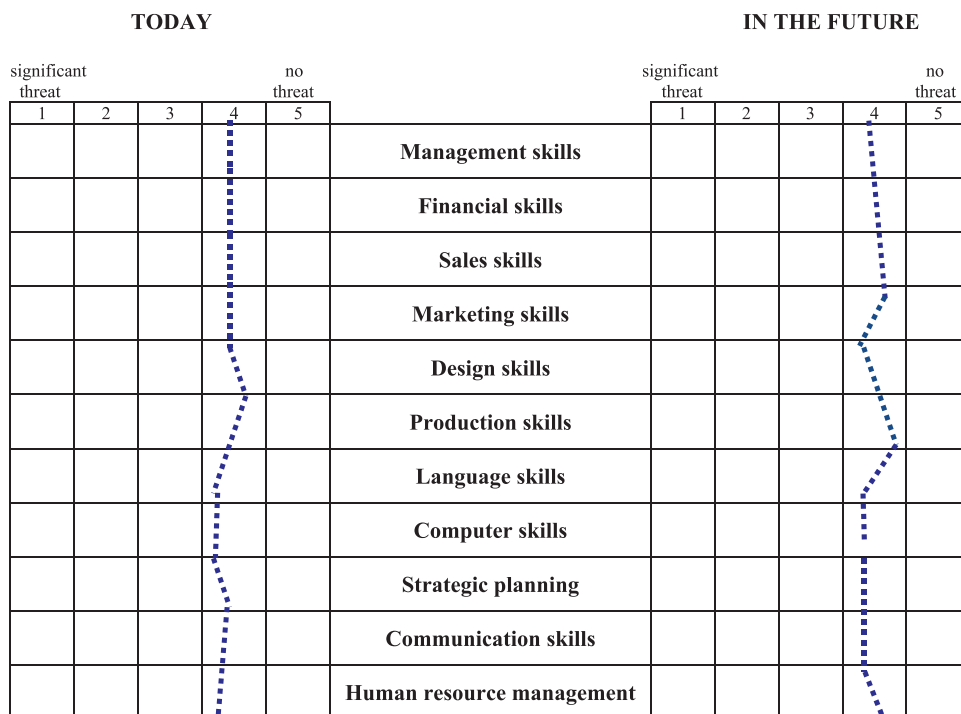
	TODAY						IN THE FUTURE				
significant threat				no threat			significant threat				no threat
1	2	3	4	5			1	2	3	4	5
					Management skills						
					Financial skills						
					Sales skills						
					Marketing skills						
					Design skills						
					Production skills						
					Language skills						
					Computer skills						
					Strategic planning						
					Communication skills						
					Human resource management						

Source: Data gathered for Training Needs Analysis, Human Resource Development Fund, Maribor, December 2000;

The semantic differential shows that, in the opinion of companies, a lack of the **stated knowledge/skills will not essentially threat their existence**, either today or in the future.

When examining the knowledge/skills curve that estimates the threat to the existence of a company today, we found that there is no essential difference between different answers, but estimations for the future look more optimistic. However, when observing estimations on the separate knowledge/skill standard, the declination showed the biggest deviation at **communication skills**, **foreign languages**, **human resource management** and **sales skills**. Estimations from companies for the mentioned skills range between 1 and 5.

In spite of the optimistic forecast made by companies, they are considering how the possible lack of knowledge and skills may be overcome. Companies had a multiple choice in answering this question. In the case of a lack of knowledge the majority of companies would **increase the training delivered by external training providers (almost** 59 %) and **in-company training** (nearly 27 %).

Although companies are aware of the importance of additional education and training, and of the incorporation of the lifelong learning trend into the development strategy of the company, the opinion of **one-fourth of the companies on not needing additional education and training** is a serious concern. Therefore organisations with competence for education and training should pay more attention to raising awareness among companies and individuals about the necessity of acquiring the additional knowledge that is becoming the key factor in the competitive advantage in the era of faster technological development.

Graph 4: How could companies deal with a lack of knowledge/skills?
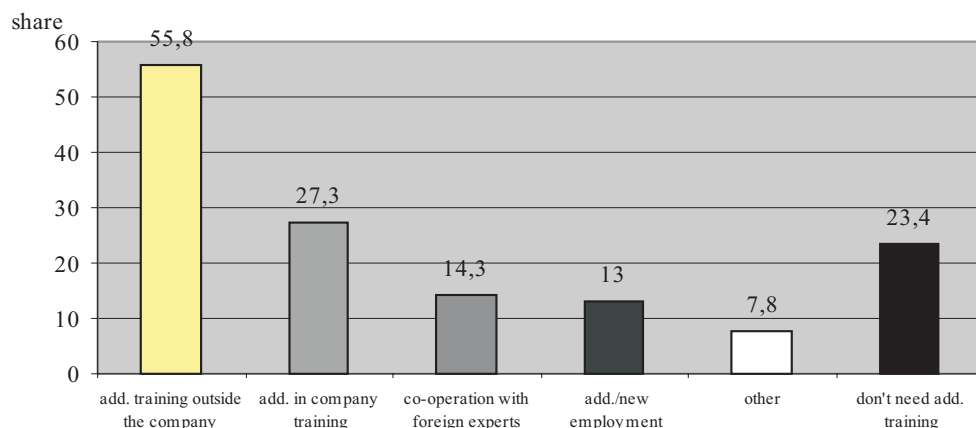
Source: Data gathered for Training needs analysis, Human Resource Development Fund, Maribor, December 2000;

■ 3.4 Educational and Training Programmes

Companies also pointed out one of the defects of the school system. Within the school system the specialisation of individuals is not possible, and gained knowledge is too general and fails to satisfy a company's needs for specific and oriented skills/knowledge. The specific and applicable knowledge/skills that companies need are in the following areas:

■ Catering (cooking - food preparation, service - knowledge of and preparation of drinks)
■ Customer accommodation
■ Marketing (hotel management, direct management)
■ Organisation and management.

Employees from 32 observed companies participated in educational and training programmes. Managers were trained in the fields of:

■ Kitchen management and the preparation of different kinds of food (almost 25 %)
■ Communication (12 %)
■ Service (nearly 10 %)
■ Wine offering (8 %)

Other employees participated in the educational and training programmes in the following fields:

■ Preparation of different kinds of food (salads, game, sweets) (28,5 %)
■ Service (20 %)
■ Legally obliged training (sanitary minimums (20 %), safety at work (14 %))

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When analysing data on the **duration of educational/training** programmes, we discovered that companies prefer shorter training (**less than one week**), as a good 73 % of employees attended educational/training programmes that were shorter than one week.

Employers direct employees into educational/training with the purpose of gaining proper knowledge/skills, and through this, a highly qualified working force. And it is especially pleasing to discover that more than 54 % of the companies think that training is an investment for the future. This shows a slow but persistent rise in the awareness of the necessity of additional skills in companies. On **average** employers in the tourism sector **devote** 7 % of resources in the employee's wage for training.

To **assure the greater adaptation of educational/training programmes** to the actual demand and needs of employers, the observed companies **pointed out the importance of co-operation between companies and competent institutions** through **designing and implementing programmes**. In the opinion of 73 % of the companies, co-operation is essential for influencing the suitability and efficiency of employee training.

With the purpose of assuring the quality and suitability of the educational/training programmes, companies are willing, through the design and implementation of programmes, to actively co-operate with **local/national experts (43 %) and external organisations (nearly 35)**. Only a smaller percentage of companies is willing to co-operate in training needs analysis (17 %), which is a particular concern since this type of research represents the basis for the preparation of quality educational/training programmes.

Graph 5: How are companies prepared to co-operate in designing and delivering educational and training programmes?
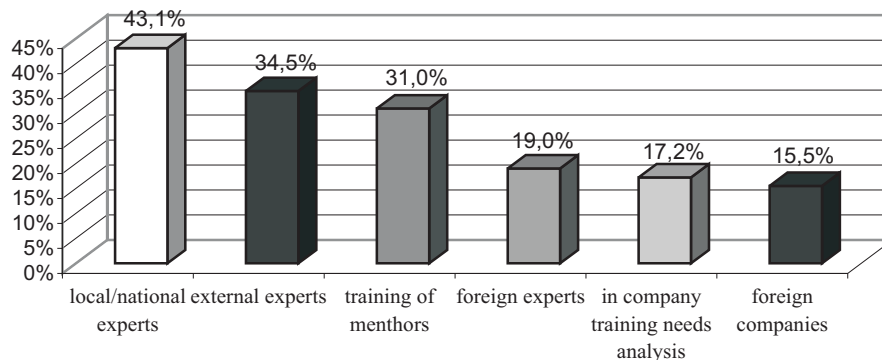
Source: Data gathered for Training Needs Analysis, Human Resource Development Fund, Maribor, December 2000;

Companies feel that the linkage with the educational/training institutions is a necessity, but it is not done frequently. The linkage between companies and training institutions is based only on performing the practical part of the training programme in the company. Only few companies from the tourism sector allow teachers to have an insight into business. Otherwise they see the role of the school system in linking educational/training institutions with business and the development of staff with knowledge and skills corresponding to the company's needs.

■ 3.5 Obstacles to Human Resource Development

In the area of human resource development companies come across different factors that are largely affecting decision making on the participation of employees in educational and training programmes. These factors stem from a company's environment or from the internal factors of the company itself.

The observed companies had a multiple choice when responding. Most often companies quoted the following **obstacles in the environment** (outside the company): **high costs of educational and training programmes** (74 %), **locational distance** of programmes (programmes are delivered outside the region – around 43 %), and at the same time companies mentioned that **programmes are not adjusted to the needs** of the companies/individuals (nearly 31 %).

Costs still represent the biggest obstacle in the process of human resource development in the company. Analysis results showed that a big share of the companies believe programmes are not adjusted to the needs of the companies or participants. This is an alarming fact and represents an appeal to the competent institutions in the field of education/training to find a link with the companies and adjust training programmes to their needs. On the other hand, companies are not ready to co-operate in the research that represents a basis for planning and designing tailor-made training programmes.

The demand for education/training is also affected by **obstacles** that exist **within the company** itself. Although the majority of them think that there **are no obstacles to education/training** within the company (45 %), simultaneously a good one-third think that **employees are not able to participate in education/training during their working time** because of the nature of the work process. They also believe that they have no resources for education/training (25 %).

Companies see a possibility of **overcoming these obstacles** through the **co-financing of training programmes** (70 %), which are delivered in the local area (around 41 %), out of working hours and adjusted to the needs of companies and participants (around 38 %). A company's proposals on how to overcome the obstacles are a source of important information for education/training providers, and for other institutions, as they provide a starting-point for:

- designing and implementing programmes corresponding to the demands and expectations of companies/participants;
- designing and implementing various activities related to the stimulation of demand for different forms of development;
- developing and designing a system of financial support for companies when participating in educational/training programmes;
- stimulating programme implementation in the local environment.

4. Development Directions of the Companies

Companies estimate globalisation and access to the European Union positively, as they represent possibilities for faster development of the sector, although they also bring about many weaknesses and threats.

Most of the Slovene companies have already succeeded in overcoming the economic crises that arose as a result of independence in 1991. They have started to conquer new markets successfully, to develop new products, and to undertake the struggle for customers amidst world competition.

At the turn of the millennium, companies are more and more aware of the irrepressible spread of globalisation, access to the European Union, new circumstances in the field of competition, and the need for world excellence and a new economy. The latter means faster development of new products and technologies. Companies that want to be successful in the new economic circumstances are forced to use one or more approaches to increase their competitive advantages. The ability to create strategic advantages with the continuous improvement of products, services and production processes is the central element of market success. But knowledge is certainly one of the factors that enable the creation of competitive advantages.

The power of ideas, knowledge and information forms the foundation of the new economy and the drive behind progress, where creation of a favourable development climate and state aid is very important, especialy for small companies.

■ 4.1   Planned Employment in the Years 2001 and 2002

The observed companies plan 47 new employment positions in the year 2001 (60 % for the defined period), and 18 in the year 2002 (67 % for the defined period). Companies will mainly employ waiters and cooks.

Table 4: Planned employment by form of employment and profession

profession	Number of planned employment's			
	By the end 2001		By the end 2002	
	def. per.	permanent	def. per.	permanent
Chief waiter	0	1	0	0
Sales commercialist	1	0	0	0
Cook	4	5	4	0
Cooking assistant	1	0	0	0
Drinks mixer (bartender)	1	0	0	0
Waiter	18	10	6	2
Travel organiser	1	1	1	3
Pastry chef	1	0	0	0
Chambermaid	0	1	0	0
Marketing consultant	0	0	1	0
Protector	1	0	0	0
Delivery van driver	0	1	0	1
Total	**28**	**19**	**12**	**6**

Source: Data gathered for Training Needs Analysis, Human Resource Development Fund, Maribor, December 2000;

Companies will not declare redundant workers to any great extent in the period between 2001 and 2002. Only one company out of those observed is planning to lay off workers in that period because of restructuring.

■ 4.2 Skills Expected from the Future Employees by Employers

When planning new employment positions, companies already define the criteria for the recruitment of the most suitable candidate, and think about the knowledge and skills expected from the future employees. Specifically, there is a structural discrepancy on the labour market, where the availability of labour is in inverse proportion to the labour demand. And employers even sharpen the competitive struggle, in which only those with proper education, knowledge and skills can be successful.

Employers in the tourism sector expect the following knowledge/skills from the new employees: at least one **foreign language** (basic or high-level English or German) and **communication skills**. Of course, training/skills needs vary with regard to the profession that employees have.

Graph 6: Knowledge/skills expected from new employees by employers
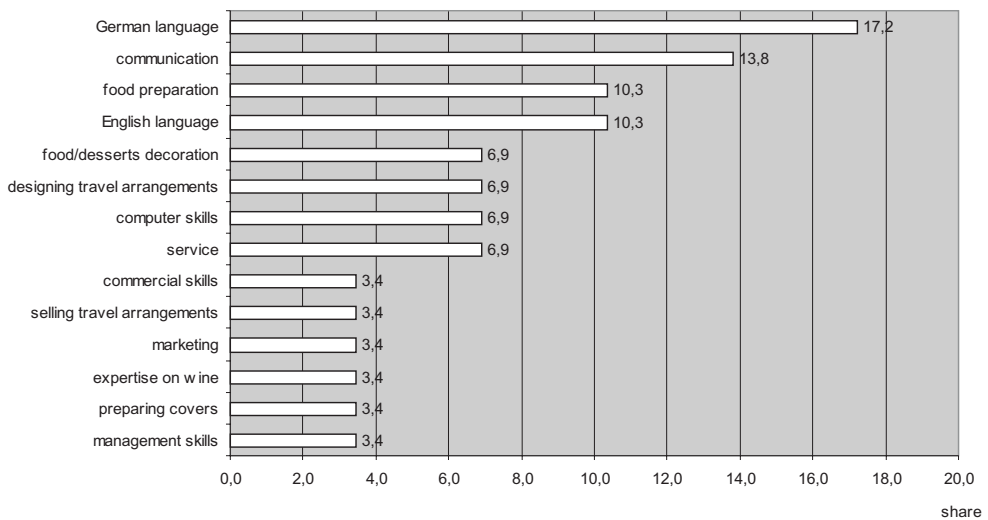
When observing knowledge/skills that are expected by employers from a single professional group of new employees we reached similar findings; specifically, that some knowledge/skills are common and some are specific and related to the profession. Knowledge/skills expected by employers from future employees are presented in Table 5.

Table 5: Knowledge/skills expected by employers from future employees sorted by professional groups

Profession	Expected knowledge/skills
Cook	cooking various sorts of food; international cuisine; Hungarian cuisine; pizza baking; fast-food cooking; Slovene cuisine
Pastry chef	preparation and decoration of pastry/sweets
Chief waiter	management skills; internal communication; communication with customers; foreign language
Waiter	Foreign language (English or German), modern approach to service, communication with customers
Travel organiser/agent	designing and organising travel; computer skills; communication with customers
Marketing consultant	foreign language (English, German); solving conflict situations (customer complaints)
Chambermaid	basic German language skills

Source: Data gathered for Training Needs Analysis, Human Resource Development Fund, Maribor, December 2000;

■ 4.3 Introducing Quality Standards

During the past ten years in Slovenia, quality has also experienced a boom and became one of the most important functions of production and the business system. Assuring quality products with the lowest costs and adjustments to the quick changes on the market is one of the most important viewpoints of a company's success.

More then 800 companies in Slovenia have a business certificate on ISO 9000 quality standards. There is an observable trend towards an integrated organisational business transformation in companies, which is why the number of certificate holders is increasing rather quickly. In terms of the international organisation for ISO quality measures, Slovenia is above the European average, according to the number of granted certificates. And in the following years, a further 50 to 100 companies annually should receive such a certificate.

Data analysis showed that in the next five years almost **10 % of the companies** will introduce **standards** from the ISO group.

A company's decision on introducing novelties is necessarily linked with the acquisition of proper knowledge/skills. One of the most important among these is surely **knowledge of the standard itself**, both on the management level and on the level of other employees.

In addition to good knowledge of the standards by management (director), the need for knowledge of **business operations** and active knowledge of at least one **foreign language** (English or German) are also expressed.

■ 4.4 Introducing New Technologies

With faster economic and social develpoment changes have become inevitable, and knowledge/skills have become the basis for successful technological development. With the search for new technologies to improve the quality of a certain product, service or process, the formation of new knowledge/skills is directly stimulated and motivated.

The innovation of a company is in any case one of the key factors behind a competitive advantage, as better products or services attract customers to the market, expand the market and give the advantage of being the first on the market. But in order to achieve this, in addition to capital, we also need human resources.

The data analysis of the tourism sector shows that only a smaller number of companies (8 %) will introduce technological innovations that are related to **information technology** (computerised business operations, computerised data processing) and to **new technology in kitchen and service work** (cooking for the fast preparation of food, international cuisine, mixing drinks, new approaches to services).

Management, especially **directors**, need **organisation skills**, **management** and **computer skills**, which include general computer skills as well as the computerised running of accounts and stocks. On the other hand, **chiefs of service** need **communication**, **human psychology** and **knowledge of food and wine offering**.

By analysing data on the **needs of other employees** when introducing new technologies, we determined that **cooks** need skills related to cooking various sorts of **food**, **waiters** need skills on the **computerised running of accounts**, whilst the needs of **travel organisers** are linked to **general computer skills**.

Also, small companies should certainly pay attention to re-establishing innovative culture and spreading the use of new technologies, especially information technology, if they want to improve their competitive advantages and survive in a more and more advanced market.

◼ 4.5 Introducing New Products/Services

It is a well-known fact in the world that innovations are not only an important factor for maintaining competitive advantages but also stimulate development and the acquisition of new knowledge/skills.

Almost one-fifth of the companies in the sector of catering and services will introduce new products/services in the next five years. Novelties in the culinary area relate to new sorts of food (typical Slovene dishes, food for people suffering from cardiovascular problems, fish dishes, fast food, pastry/sweets and other sorts of food, wine tasting) and to the services of recreation centres, excursion tourism, and fishing and accomodation facilities.

When introducing new products/services **management** (directors) needs knowledge/skills of how to **market new products/services, communication with customers**, and the **use of modern information technology**. The required knowledge/skills of other employees are directly linked to the introduction of the new product/service, and related to strong knowledge of the new product/service. Thus **cooks** require knowledge of the **preparation of new dishes**, and **waiters** should master **wine offering** and mixing drinks.

◼ 4.6 Entering New Markets

Due to the geographic smallness of Slovenia, Slovene companies are necessarily bound to enter new markets. Selection of a single market is influenced not only by the distance, largeness and cultural differences but also by business conditions. Assessment of market strengths, weaknesses, opportunities and threats is the best basis for the creation of targets and a strategy in which companies define the way of exploiting the possibilities and advantages of single markets, and also how to overcome obstacles and weaknesses for the sucessful appearance on the selected target market.

It is a well-known fact that small companies have difficulties when penetrating new markets without any additional financial help or stimulation. In spite of this, nearly 10 % of the observed companies decided to enter new markets. The most frequently chosen market is the market of former Yugoslavia, as it is the nearest of the best known, followed by the European Union market.

When observing knowledge/skills needed for the successful entry into new markets, we found that alongside management (directors, chiefs) other employees also (waiters, delivery van drivers) need **foreign language skills**, either in one of the world languages (English, German) or in the language of the country of the selected market. In addition to this, **management** also needs knowledge/skills in **sales and communication** (winning new customers, human psychology, etc.).

■ DISCUSSION WITH SECTOR REPRESENTATIVES

During the implementation of the survey, HRDF already talked with the representatives of the tourism sector and regional actors, and their views, observations and statements are already included in the report on analysis and forecasting.

After completion of the survey, HRDF presented the findings and results of the survey to the representatives of the tourism sector, schools, training institutions and the employment service. **HRDF also drafted proposals for development measures:**

1. **To develop a "voucher system" for education and training in the region.**
   As companies indicated that too expensive training programmes represent the obstacle to training participation, the development of the "voucher system" was proposed. In this way, employed and unemployed people would have access to quality training programmes to their best advantage.

2. **To encourage development of the distance learning system.**
   The location and time of the delivery of training programmes is in many cases seen as an obstacle for participants. Therefore new approaches to training with the use of information technology should be encouraged. In this way, more people could have access to different training programmes for gaining job oriented knowledge and skills.

3. **To encourage development of IT skills.**
   During the survey it was shown that knowledge in the field of information technology is very important for the development of the companies/organisations. Therefore development of IT skills should be encouraged.

4. **To encourage communication skills.**
   Survey results pointed out that modern communication skills are crucial for the existence and development of companies/organisations. Not only communication within the company (internal communication), but also communication with clients, guests, business partners and other (external communication) is very important. Communication programmes for different kinds of jobs and levels should therefore be encouraged.

During the discussion **participants** pointed out the following **issues:**

a) Although there is a great demand for waiters, entry into the secondary school for catering and tourism for this profession is decreasing owing to the fact that employers mostly employ waiters not trained for that job.
b) Secondary School for Catering and Tourism (SSCT) is already experiencing good co-operation with companies in the tourism sector in the form of additional training for employees (continuous training and development).
c) SSCT also notes a lack of communication skills (especially among waitresses) and interpersonal skills in the tourism sector companies.
d) There are many possibilities for open and distance learning (e-learning).

The present **representatives** of the tourism sector, schools, etc. agreed with the proposals given by HRDF and also added some:

■ Secondary School for Catering and Tourism (SSCT) should use the opportunities for distance learning and co-operate with training providers in the region,
■ The system for continuous improvement (training & development) in the field of tourism should be re-established,
■ Secondary School for Catering and Tourism (SSCT) should network with other vocational and training institutions abroad,
■ Information on available EU programmes and grants is needed.

■ EXPERIENCES WITH DATA COLLECTION AND PROPOSALS FOR POSSIBLE IMPROVEMENT

Data collection is a very important part of the process of the survey on training needs analysis and forecasting on the regional level. Only quality and systematically gathered data represent a good starting-point for the implementation of the analysis of collected data (primary and secondary), where the survey facilitates a quality professional basis for designing the strategy and planning of priority programmes, and programmes in the field of human resource development.

The difficulties we faced during the survey implementation were mainly found in the comparability of collected data, which are also not up-dated. Various institutions in Slovenia are collecting data from the field of economic and social development, such as:

■ Statistical Office of the Republic of Slovenia (demographic data, general data on companies/enterprises and employment, data on income tax, etc.),

■ Agency of the Republic of Slovenia for Payments (some financial data and data on employment for the economy and non-economy, etc.),

■ Employment Service of Slovenia (data on employed and unemployed persons, etc.),

■ Chamber of Commerce and Industry of the Republic of Slovenia (data on companies, their employees, etc.),

■ Since 6 March 1995 also the Trade Chamber of Slovenia (with its network of local units which doesn't really correspond to the new local regulation of Slovenia) has been collecting data on natural and legal persons, trades and similar activities,

■ other institutions.

Data comes from various sources and is not directly comparable.

In the Statistical Yearbook, published by the Statistical Office of the Republic of Slovenia, data is presented with a delay of one or more years, and at the same time does not include specific data on the regional level:

■ on companies by size and by activities,
■ GDP by activities,
■ GDP by size of the companies,
■ employees according to educational level and by activities,
■ number of students that finished school in the current year through educational courses/programmes,
■ number of students registered by courses/programmes in the current year.

Data that is already available and refers to the whole Slovenia should be presented on a regional level, too, in order to be comparable with the national average and between the regions in Slovenia.

For gathering the data, the Employment Service of Slovenia uses questionnaire LP-ZAP, which is filled in by employers at the end of the year and forecasts needs for new employees in the following year. With this questionnaire only data on companies, organisations and sole proprietors with 10 and more employees is collected. However, data from the LP-ZAP does not assure an effective mechanism for ascertaining education and training needs. From the ESS analysis it is possible to recognise future employment by formal vocational or professional education, which is only one of the factors for successful employment. But it is not possible to understand employment by jobs and the basic and additional knowledge / skills needed to get a specific job.

One important obstacle is also the time difference between the collection of data and the publication of data from the LP-ZAP survey, which are available no earlier than in the middle of the year for the current year. However, the Human Resource Development Fund would need this data at the end of the year for the following year in order to design its annual working plan and human resource development strategy.

Therefore it would be reasonable to harmonise the activities of ESS and the efforts of HRDF, who developed the methodology on analysing and forecasting training needs on the regional level, and enables a quality, unified and comparable analysis of needs and trends in the field of employment and education/training.

It should be stressed that also data on employed and unemployed persons is:
■ coming from various sources,
■ processed and analysed in different ways,
■ refers to different times/terms.

Data on employed and unemployed persons from ESS annual reports represents the number of employed and unemployed on the last day of the month and the last day of the year, while data on those employed in companies are derived from the balance sheets collected by the Agency for Payments, and show the average number of employees by working hours.

Another difficulty refers to the Standard classification of occupations. Specifically, we established that:

■ more occupations have the same code, which prevents the exact statistical processing of data, for example:
2142.07 – construction engineer for high constructions
2142.07 – engineer for low constructions
2142.07 – engineer for hydroconstruction
2142.07 – leading investment person

■ some occupation descriptions are inadequate and joined for more occupations; for example, the above-mentioned occupationes are joined under the code 2142 – construction engineer, where from the stated description it is not possible to understand what the person with the specific occupation should do,

■ some occupations are not even included in the Standard clasification of occupations (mainly those in the field of marketing).

HRDF believes that closer co-operation and connection of social partners is necessary in order to enable effective and adjusted designing of common strategy and development measures in the field of human resource development.