

## **Early recognition system for skill trends and qualification needs**

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### **Abstract**

Germany has had a network known as ‘Early recognition system for skill trends and qualification needs’, involving a total of nine institutes, since 1998. This network applies a mixture of various methods and draws on various data sources for analysis. The aim is to recognise skills trends and qualification needs to enhance the competitiveness of the German economy and avoid mismatch of supply of, and demand for, skills. The BIBB is involved in this network. The BIBB's activities in this context are focused on observation of changing skills needs for adaptation or development of new qualifications (below university level). Different methodological approaches will be presented, as well as instruments and indicators for addressing this task, initial results, benefits and difficulties.

## 1. A (brief) overview at the early recognition system for skills needs (FreQueNz)

Training is a resource which is important in promoting innovation and maintaining competitiveness in all developed countries. Early recognition of skills developments, the identification of needs and the development of options for actions to take are therefore central requirements in any future-oriented training research strategy. Such reports can also be of importance to labour market research by making a contribution to the prevention of unemployment resulting from mismatch between the supply of, and demand for, skills.

The early recognition of skills needs is a complex task requiring research at various levels and the use of different research methods and tools such as:

- *New developments in work organisation and new skills needs first become evident at the company level.* Information on these developments is frequently much too company-specific, however, to be able to draw conclusions of any use in developing new, or adapting existing, initial and continuing vocational training profiles.
- *There is in most cases sufficient statistical information available on long-term structural development trends at the level of the labour market.* The increasing momentum of innovation, the pace of change in company governance structures and the individualisation or "Entberuflichung" of paid employment (patchwork biographies), however, make it more difficult to recognise new skills needs solely at this macro level (Baethge 1999).
- *At the international level, developments in both labour markets and companies must be followed in competing countries.*

Quantitative and qualitative research methods (statistical analyses, case studies, expert interviews, Delphi method, trend-scouting, etc.) are being used at these levels to generate findings relating to new skills needs. The combination of quantitative and qualitative methods along with empirical-analytical and application-related research approaches is assigned special importance here. In 1998, the Federal Ministry for Education and Research established a network of various research initiatives with the aim of combining diffuse research results from different areas.<sup>1</sup> The network is to encourage the transfer of results to target groups while controlling and guiding interactivity between groups of researchers and users. The target or user groups are social partners, associations, the fields of research and science, enterprises, training providers, the training economy and its institutions, the government labour administration and policy-makers.

The following projects are being carried out at present in the network:

- The *Wissenschaftszentrum Berlin* is studying skills needs in the OECD countries. For this purpose international comparative forecasts are being made of skills needs at the macro level. Secondly, institutional framework conditions relating to the process of implementing recognised skills needs at the company and social levels are also being examined.

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<sup>1</sup> cf. <http://www.frequenz.net>

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- Early recognition of skills needs for disadvantaged groups of people is the focus of a Federal Ministry of Economic Co-operation's Educational Research project. Relevant changes in the employment system also have an impact on jobs where simple activities are performed.
- What is special about a project sponsored by the Fraunhofer-Institut Arbeitswirtschaft und Organisation is that skills requirements are directly derived from actual practice in the working world, after which hypotheses are then constructed on development trends. In the second part of the project, which is being carried out by Infratest Sozialforschung, company experts are evaluating these hypotheses by means of representative surveys using interview techniques.
- The research approach adopted by the Institut für Strukturpolitik und Wirtschaftsförderung Halle-Leipzig (isw) is based on the assumption that new skills can in principle be recognised and described from when they emerge. For this reason these studies seek to identify innovative enterprises considered to be trendsetters in their sectors and then analyse their skills needs.
- The economy's networks for early recognition of qualification developments are being used by the Kuratorium der Deutschen Wirtschaft für Berufsbildung (KWB) and the Forschungsinstitut für Berufsbildung im Handwerk at the University of Cologne (FBH). First of all consultants from chambers of industry and commerce or chamber of crafts determine the skills needs of companies at the regional level, in particular the needs of small and medium-sized enterprises. Secondly experts from associations, chambers and enterprises are surveyed about skill needs in their economic sector.
- Finally, studies of the *Federal Institute for Vocational Education and Training (BIBB)* have to be mentioned. In the following I am going only into these studies in detail.

In addition to the empirical results, especially the methodical perspective is of importance in all these projects: what techniques, tools and indicators hold out the greatest promise of success in obtaining information on trends relating to new activities and future skills needs?

## 2. Projects at the Federal Institute for Vocational Training for the Early Recognition of Skills Requirements

One of the key area of the Federal Institute for Vocational Education and Training (*Bundesinstitut für Berufsbildung* - BIBB) is the adaptation of initial and continuing vocational training profiles or qualifications to new developments or creation of new qualifications.<sup>2</sup> In order to meet this task, the following steps are necessary (Alex 1999, p. 7):

- First of all, ongoing monitoring of occupational structures and skills trends is necessary. For this reason efforts are focused on monitoring new work activities (below tertiary level) which have already established themselves to a certain degree. Early recognition thus relates to a performed development which is, however, not yet sufficiently perceived

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<sup>2</sup> Training profiles or qualifications represent a complex bundle of knowledge, skills and competencies at the intermediate level in the German vocational education and training system with which the requirements of various jobs can be dealt with within one area of activity. Like professions, these also have a social function, as they support social integration at enterprises and the attainment of social status (cf. Reuling 1998).

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as such. New occupations have emerged that are recognised on the labour market but there is not yet formal initial and continuing vocational training programs.<sup>3</sup>

- The second step involves a dialogue with experts on the basis of the information gained in the first step. The way in which this dialogue is organised depends on the degree of organisation of the nature of the representation for the respective sector. Establishing qualification needs as new clusters of skills requires a certain "number" of cases to be observed and the possibility to communicate these in tangible terms. It must be "widely known" that a sufficient living can be earned through the establishment and performance of certain business or work processes served by these new clusters of skills (eg. financial services). Another example would be certain types of work which are no longer carried out on a voluntary basis, but which are increasingly being performed, rather, as occupational work (eg. in the nursing care area). When well-organised association structures are involved, new qualifications arise either by reforming parts of an existing qualification (including the complete restructuring of a training profile) or the combination of parts of different qualifications.
- A third step is necessary if an underlying organisation is lacking and thus neither an initiator nor a moderator is available to systematically steer and observe the formation of the occupation. Such a situation is frequently to be found in the area of "new industries", but also in the area of personal services. An organisation then has to be created to observe an entire technical field, gather and evaluate information, systematically select and survey key persons and exchange information with a group of experts in order to accelerate and co-ordinate this process.

The activities of the BIBB aimed at early recognition of skills trends and qualification needs include:

- Regular company surveys within the framework of the Referenz-Betriebs-System,
- Analyses of job advertisements and follow-up surveys of companies running these ads,
- Surveys of VET providers, the award of a VET innovation prize and the analysis of VET programs on offer,
- Survey of experts working in the field of company change processes,
- Observation of fields of activity falling outside the domain of the Vocational Training Act (Berufsbildungsgesetz).

### **3. Regular surveys of companies within the framework of the *Referenz-Betriebs-System***

The *Referenz-Betriebs-System* (RBS) was established back in 1995, comprising 2000 companies, some of which provide, and others which do not provide, training. They are located throughout Germany in a representative manner. These companies have declared their willingness to make themselves available for two to three surveys each year regarding current topics in the area of initial and continuing vocational training. The *Referenz-Betriebs-System*

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<sup>3</sup> New training profiles are not introduced in the Dual System until it appears that there will be a sufficient number of company training places available.

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is also used to recognise new skills needs at an early stage (HALL 2001). Indicators used here include:

- New fields of activities/skills requirements,
- Problems finding people for positions,
- Deficits in skills on the part of staff.

The companies are surveyed on nine fields of activities which have come about through product and process innovation. One assumption is that new fields of work like these will change skills requirements for employees in the future. The results of the survey carried out in the year 2000 indicate among other things that:

- 75% of companies identify at least one new field of work (this figure was only 50% in 1995).
- New types of work have arisen especially in conjunction with new information technologies (56%), new products/services (52%), modern technologies/materials (45%), marketing/sales strategies (40%) and quality assurance (37%).
- New fields of work are highly correlated with the increasing size of companies.
- New skills needs for new fields of work are primarily met by means of continuing vocational training, and secondly through in-house training of junior staff.
- Almost all the companies stated that they had problems finding someone for at least one of the vacant positions as a result of insufficient skills.
- A quarter of all companies stated that they had problems staffing all positions.
- They cited both qualitative reasons (technical deficits and/or insufficient key skills) and quantitative reasons (too few competitors for an open position) for this.
- Every fifth company cited deficits in skills among its technical staff in the year 2000. This especially involved skills above and beyond the borderlines of specific occupations, information technology skills and key skills.

What contribution does this instrument make to early recognition of skills needs? One advantage is definitely that changes at companies are subject to regular observation and that these changes are measured in quantitative terms. While these indicators especially show when there are new fields of work, changes in skills requirements and problems resulting therefrom, however, they do not show in any more precise manner *what* impact *which* technical and organisational innovations are expected to have on company skills requirements and how companies will react to these.

For this reason the refinement of indicators is above all aimed at identifying new activity and skills profiles in companies and training strategies relating to these, with the next task being to recognise problems associated with the implementation of these strategies. The written survey methods, however, are definitely subject to constraints when it comes to making a discriminating analysis of skills needs.

#### **4. Analyses of job advertisements and follow-up surveys of advertisers**

Current skills requirements in the labour market are accurately reflected by job advertisements. By surveying the particular fields of job advertisements new skills

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requirements can be identified both in a horizontal manner across different fields of work or occupations (bandwidth analysis) and for individual sectors as well (Bott/Hall/Schade 2000). Analysis conducted by the BIBB is based on a representative selection of job advertisements in daily and weekly newspapers, technical journals and online media. Twenty-five thousand job advertisements were recorded (at the regional and national levels) in 1999, including the complete text for 10% of these. They are analysed quantitatively and qualitatively with the aid of content-analysis procedures. Additional information on the position, the person ultimately hired for the position and the importance of certain skills are also gathered for selected sectors and occupational fields in a written follow-up survey of the advertiser. Two hundred and fifty enterprises in the IT sector were surveyed in one pilot study.

The following indicators are used in analysing job advertisements:

- New names for activities,
- New occupational activities, new skills requirements.

Indicators used in the follow-up surveys include:

- Comparison: desired skills (in the job advertisement) with the profile of the applicant who has been hired,
- Skills deficits of applicants who are not hired.

What is found to be "new" is then operationalised by comparing the name of the activity in the job advertisement with the activity and occupational classification in the official statistics. Analyses have shown that new titles of activities occur especially in the IT area, financial services and the health area or indices were to be found for new skills requirements in these fields. An additional finding is that *new* profiles are often composed of individual sub-profiles which are already known from other fields of work.

A more precise analysis of the IT field indicates that there are "new" fields of activity in more and more company divisions for IT specialists. A need for "new" occupations is to be seen in the area of IT security, knowledge management and multimedia. It moreover appears that the activities relating to occupational titles which are already known in the IT area tend to vary greatly. Nevertheless an autonomous profile has been observed on the basis of technical and key skills requirements in the four occupational classifications of "systems analyst", "software developer", "network expert" and "distribution expert".

Turning to the follow-up survey of the advertisers it appears that companies have had major difficulties finding people for job vacancies.

- There were fewer than ten applications for two-thirds of the job advertisements.
- In addition to specific occupational know-how, applicants especially lacked social and personal skills.
- According to information provided by companies, there was already a training program for the majority of vacant positions.
- A degree from a university or polytechnic was explicitly required in 45% of the advertisements.

The companies also emphasised, however, that it was not the university/polytechnic degree which counted *per se*, but rather the know-how which had been acquired. This meant that persons graduating in new IT qualifications in the Dual System also had good chances of establishing themselves in an occupation.

The advantage of analysing job advertisements is probably to be found above all in the unlimited access to representative data. At the same time this is associated with a flood of information, which does not exactly ease the processing, analysis and interpretation of the data. Just like in the case of the *Referenz-Betriebs-System*, the information is still too inexact to be able to assess the importance of new fields of activity and their impact on skills requirements any more precisely. In order to receive more background information, the data needs to be supplemented in the future with surveys on specific vocational fields including through follow-up surveys of companies looking for manpower and expert interviews.

## **5. Survey of training providers and award of a continuing vocational training prize**

Providers offering continuing vocational training (CVT) provide important indications of skills trends in the nature of their CVT programs (Brüggemann/Hall/Schade 2000). Although new skills are frequently initially provided by suppliers of new investment goods or services or in-house training measures, these are either too specialised and/or too specific to the company or they are not supposed to be made public for competitive reasons. But as these spread to different companies and as demand increases for such new skills in the labour market, training providers begin to offer continuing vocational training which may subsequently achieve a certain permanence in the market. The following can serve as indicators:

"Innovative" measures of

- new skills/fields of occupational activity,
- new combinations of traditional profiles or
- new target groups.

This is because innovative CVT measures generally make use of existing trends in employment systems.

Two questions needed to be answered in designing the survey instrument:

- (1) How do providers offering CVT identify innovative developments at enterprises and how do they transform these into measures? and
- (2) How can as many CVT institutions as possible be encouraged to disclose their innovative measures?

As the preliminary sample showed that "innovative" measures could be effectively mapped by means of "descriptions" drawn up by providers of CVT programs, no standardised tools were used. A CVT innovation contest was publicised in order to attract as many providers as possible. Participants were given a set of criteria according to which they were invited to:

- describe the training measures in precise terms (content, target group, learning goals, etc.),
- illustrate of the innovative nature of their measures,

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- state how needs were determined and
- describe what response the measure had met with in the market.

This methodical approach proved to be useful on the whole. Interest in the contest was satisfactory even if there were some reservations on the part of companies regarding the disclosure of their own innovative concepts for competitive reasons. The descriptions of their innovative measure were generally stringent and informative. The measures, as a comparison with the distribution of job advertisements shows, focused on the IT field. Beyond this they were evenly distributed in other areas of work. The total of 203 concepts for measures were then subjected to a qualitative analysis. Almost two-thirds of the participants refer to specialised content in their "innovative" measures in which the enlargement of training profiles by additional specialised content was at the top of the list. One-third of the measures related to fostering of *key skills*. On the whole the contest proved to be a useful approach to surveying providers offering CVT. In the future the contest is to be designed to have more effective public-relations impact and to be more target group-specific in order to increase the number of participants.

### 6. Survey of experts on company change processes

This study method is used to avoid two structural problems which underlie the concepts presented in the foregoing approaches (Dietzen 2001). First of all the percentage of standardised CVT measures on offer are declining. Company and target group-specific consulting services by external and internal experts who offer programs on organisational development, training or coaching are increasingly in demand. This expert knowledge needs to be used to analyse trends in skills. Secondly enterprises also have difficulties recognising and stating what their skills needs are. Thus it makes little sense to rely solely on information provided by enterprises. External company consultants support enterprises in articulating their skills needs and can therefore constitute an important source of information.

This project, which is still in the start-up phase, is based on the following hypotheses:

- External consultants and internal company experts who perform important tasks in company skills development and change processes have privileged access to early recognition of new skills needs.
- Observation of changes in work and enterprises at an early stage can indicate new skills trends to a certain degree.
- The analysis of consulting jobs can uncover relevant changes in company work and skills requirements.

In addition to the expert knowledge of consultants and people involved in company changes, this project also seeks to identify how in-house training concepts come about and are refined in more detail. It is planned to carry out written surveys of enterprises, expert interviews supported by scripts and to perform company case studies.

## 7. Observation of fields of activity outside the scope of the Vocational Training Act (*Berufsbildungsgesetz*)

There is a great scarcity of systematically processed information for many occupations in the area of personal services. First of all these occupations are under represented in official statistics. Secondly they do not have any established association structures. Personal services involve a typical innovative area of growth in which new skills and occupational patterns tend to go unobserved without any standards to set out the boundaries of the occupation. To be able to recognise such developments at an early stage, the entire sector of personal services and important neighbouring areas of specialty need to be observed.

How new occupational profiles come about has been reconstructed by the BIBB by analysing eight case studies (Meifort 1999). The areas studied were health, the social field, training, education, sports and leisure. The profiles examined in these fields were at different stages of occupational development. A four-stage model of indicators was developed on the basis of the case studies. Changes in the area of personal services which are of relevance to employment and skills development are to be monitored over the long term with this model using empirically valid methods. These four stages are:

Stage 1: General social development trends (trend research),

Stage 2: (Inter-) disciplinary and international developments,

Stage 3: Specific technical and occupational development trends

Stage 4: Round-table talks with key persons/experts

It appears that certain sources of information are *particularly* relevant to long-term observation for each of the four stages:

- General societal developments (stage 1) are the point of departure and the first indication of structural change and new skills. Trend and milieu research, which among other things performs target group analysis for the advertising industry, can be used for the field of personal services. To check the validity of the statements on trends which are collected, analyses can be conducted to determine how representative these are such as, eg. the evaluation of topical focal points in publications or a hit-list of topics of books sold. Trends can also be observed by evaluating reports by public institutions and research studies. One important result from the case study was that information of relevance to skills can in-principle be recognised at an earlier stage and followed in a more targeted manner than has been common thus far in developing new training profiles.
- In particular, empirical studies, international reporting systems (eg. CEDEFOP) and the (regional) daily press have proven useful in assessing interdisciplinary and international evaluations of current innovative trends (stage 2). One important early indicator can also be the analysis of reporting systems of public institutions which award resources for innovative training measures. An analysis of trends in the field of laws and regulations also provide an important indication. This step allows hypotheses to be formed regarding new trends in the area of personal services and neighbouring fields.
- The importance of trends involving skills needs (stage 3) can be assessed very effectively by analysing initial and continuing vocational training programs (topics, possible number of participants) and by analysing topics selected by significant technical journals and focal points of sales by publishers of trade literature. Representative analyses can also be carried out by assessing job advertisements. Jobs for such new activities in the field of

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personal services are frequently offered first in the local press. The evaluation of official and "semi-official" agreements can also serve in part as a tool with which to evaluate skills needs.

- The implementation of the results from the early recognition process in the training policy decision-making process represents the final phase in the development of training profiles or qualifications. The case studies show that actors in the area of training policy take up the issue of qualifications at a relatively late stage, which is to say not until the "public" has already perceived the process of "becoming an occupation" (the institutionalisation of occupational profiles). For this reason round-table talks with key persons and experts in the respective field also take place during this fourth round to help make decisions and to evaluate the results obtained at the preceding stages.

This four-stage model is an analytical model and not a procedural model. Due to political pressure for action to be taken, work in the first three stages can usually take place pretty much at the same time in order to make results flow quickly into the training-policy decision-making process. Whether this model for the early recognition of skill trends and qualification needs can be implemented in practice or not cannot be definitively answered yet. On the one hand indicators need to be set out in more discriminating, detailed terms, while the suitability of indicators and tools need to be subjected to further trial. On the other hand the model also needs to be applied to other areas of growth in order to test its robustness.

## 8. Conclusion

It is still too early to assess the benefits and usefulness of the approaches towards early recognition of skill trends and qualification needs presented here. For one thing, the results have not yet been systematically compiled on all the projects in the network. This interaction between findings at the various levels is essential to assessing both individual approaches and the program in its entirety, however. The second reason is that the BIBB approaches presented here are above all aimed at observing trends in skill needs. An approach going one step further than this would be to understand early recognition in terms of a longer-term process through which improved communications structures can be created between actors and institutions, companies and associations. At present the exchange of experience on developments in the area of skills needs and the consequences of these developments for vocational training is the sole domain of the social partners and experts hired by them. New developments, on the other hand, often occur outside of these established structures. These are aimed at making occupational borderlines more flexible and helping to overcome segmentation between initial vocational training, further vocational training and the tertiary area, and separation of the various actors involved.

There are voices supporting the establishment of "occupational expert groups" in Germany at present, although the social partners are to continue to have the right to take the initiative themselves. Developments in skills needs and the consequences of these developments for the structure of the vocational training system could be examined and discussed at an earlier stage with the aid of this expanded expert system, with the results of this examination and discussion then serving as input for decision-makers. Occupational expert groups would be one important element in an early recognition system like this aimed at bridging existing gaps in the system. This also qualifies the importance of research in the process of early recognition. Its function is to identify developments in the field of practice and then make information on these developments available to the actors involved. Not everything which is

researched, however, is perceived and accepted as "needs" by the actors involved, however. Research is thus only one part of the overall process of early recognition of future skills needs and qualifications.

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