

Improving the quality of the supply-demand-match in vocational education and training by anticipation and ‘matching policy’

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SUMMARY

This article discusses the implications of a framework to improve matching supply and demand in VET by a policy to improve quality by using anticipation and foresight approaches. Analysis of the Austrian anticipation system identified some basic aspects such as policy. The analysis focused on two issues: the observation and measurement of matching, and foresight as a strategy for anticipation of future needs.

Keywords

Educational attainment, unemployment, mismatch indicator, forecasting, foresight, knowledge management

Introduction: ‘matching policy’ and anticipation (1)

Matching supply to demand for qualifications in vocational education and training is not only a result of the performance of VET, but also a process through which various actors in VET systems aim to bring supply in line with demand through a social system of knowledge production.

This article argues that matching needs a coherent policy framework in which the complex relationships between labour market(s) performance and VET institutions are governed collaboratively by the actors. A policy framework for matching requires analysis and evaluation of the status quo of the relationship between supply and demand, the formulation of goals and objectives, inputs, processes, outputs and outcomes of the policy process to be identified. A standard quality model of policy implementation such as the Common quality assurance framework (CQAF) can be applied to matching as it includes core dimensions of delivery (input, process, output, outcome), and the policy cycle (planning, implementation, evaluation, and review).

The paper looks at two problems which arise in this framework:

- how can the quality of matching be measured and observed?
- how can expectations of future development be brought into the process of matching policy by anticipation activities?

First, the article discusses conceptual and empirical problems of matching supply and demand, taking into account different structures of VET systems. Second, the time dimension in matching is considered by outlining different approaches of anticipation mechanisms (social systems which include the main groups interested in matching supply and demand at regional level) which take account of the timeframe of the expected impact of the VET programmes and foresight (a social process of knowledge management that goes beyond forecasting, bringing together informal knowledge and strategic plans of all those involved into the process). Third, a framework for ‘matching policy’ is developed based on the Austrian experience and the implications of quality assurance in matching policy and anticipation are discussed. It draws from an analysis of the Austrian anticipation system (Lassnigg and Markovitsch, 2004; Lassnigg, 2002), and an analysis of the quantitative dimension of matching (Lassnigg, 2003). Finally some conclusions about policy approaches are drawn.

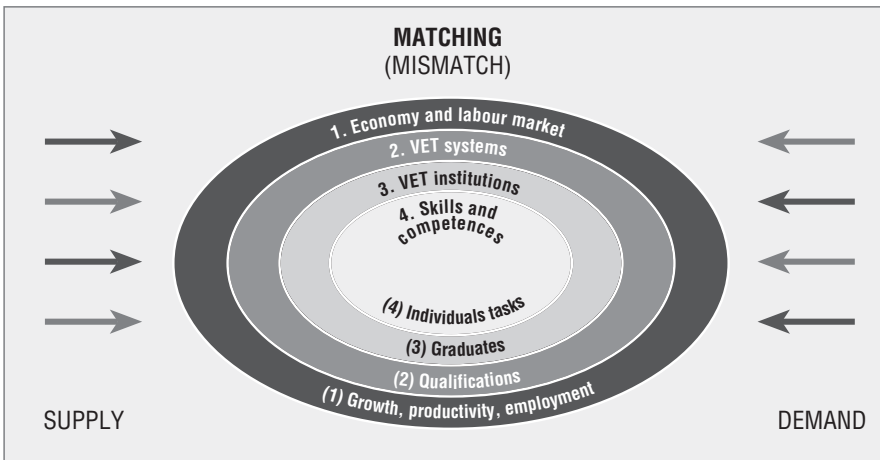
(1) The author thanks the anonymous referees and the editorial committee for their very helpful critical comments on the first draft, and Johanna Ziegler for her motivating support. Mistakes and misunderstandings clearly remain with the author.

Limitations to existing measures of supply and demand in a VET system

Matching VET supply to demand, or the responsiveness of VET systems to demand, is a policy priority ⁽²⁾. However, assessing the quality of the matching process is seldom an explicit policy priority. Some attempts are outlined below.

There are different perspectives and levels of matching supply and demand in education and training (see Figure 1) and people speaking about mismatch in supply and demand do not necessarily mean the same thing.

Figure 1: **Different perspectives on the matching of supply and demand in the labour market**



The central question is how the relationship of the supply of formal skills and qualifications in initial VET to demand can be governed (see level 2 in Figure 1). Two issues are important here, the interrelations between the levels, and the different structures of VET systems.

⁽²⁾ Several proposals have been made on this topic at European policy level (see Lassnigg, 2003). The employment guidelines have introduced the objectives of policies to develop job matching and to prevent and combat emerging bottlenecks in the labour markets; the skills and mobility action plan has proposed to develop indicators measuring skills deficits; the communication about the European area for lifelong learning has set the task of developing insight into the demand for learning from the perspectives of the different actors; in innovation policy the demand for skills in mathematics, science and technology (MST), as well as the broader skills demand for the purposes of diffusion of innovation, is at stake.

At the level of the economy and the labour market, analysis of the relation between supply of and demand for human resources concerns the performance and efficiency of the labour market. Various approaches assess labour market performance, ranging from macroeconomic concepts relating to GDP, to microlevel concepts of matching individual jobseekers to vacancies. Assessing labour market performance requires separating structural from cyclical and frictional components. Levels of structural unemployment have become increasingly important as the unemployment rate has persistently risen in many countries despite economic upturns (Employment and social affairs, 2002, p. 50). They give crude measures of mismatch between the supply and demand for skills in the economy and labour market, based on the non-accelerating inflation rate of unemployment (NAIRU), or the Beveridge curve (a measure of mismatch based on the relationship between unemployment and vacancies) ⁽³⁾. If aggregate measures are favourable, it can be assumed that matching is functioning well at all levels. However, the reverse is not necessarily true. There can be many reasons for poor labour market performance. Mismatch at the aggregate level, consequently, provides no specific conclusions for VET policy.

At VET systems level, the main perception of the relation of supply and demand is the customer-supplier-model: 'businesses and their employees need qualifications, and the purpose of education and training systems satisfy their needs' Planas et al. (2001, p. 317). The assumption is that VET systems are pushed to function according to this model.

However, these assumptions are unrealistic. VET systems are differently structured due to the types of qualifications provided (Shavit and Müller, 1998). The greater the vocational specificity, standardisation (nationwide quality standards), and stratification (separation between vocational and general education streams and the mobility between them) the more formalised the VET system. On this basis, Austria, Germany, the Netherlands and Switzerland have the most formalised systems (Shavit and Müller, op. cit).

The more formalised a VET system, the more it is expected to follow the customer-supplier-model. At systems level, models of manpower forecasting and planning are based on statistical categories which refer to the formal qualifications the education and training system provides. The principal methods

⁽³⁾ See: European Commission – DG Employment and social affairs, 2002, p. 71-72; ECB 2002, p. 15, 31-32. Estimates of the Beveridge curve normally rely on the statistical categories about supply and demand on the labour market (the demand data being notoriously problematic), with possible breakdowns by sectoral, occupational or educational categories.

⁽⁴⁾ For an example of the 'objective' approach see Wolbers, 2002. The analysis of 'work skills in Britain' is an example for a study based on the 'subjective' concept (Ashton et al., 1999). Felstead, Gallie and Green (2002), Work skills in Britain 1986-2001. (<http://www.hrm.strath.ac.uk/teaching/classes/full-time-41939/reports/Workskills.pdf>).

to measure matching at this level are based either on 'objective' concepts, comparing formal qualifications with job categories, or 'subjective' concepts based on the assessment of the qualification by the jobholder (4).

If demand for labour and skills/qualifications is static, it is relatively easy (at least in the short run) to assess labour market performance. However, a key problem of matching is that in dynamic economies, demand for skills/competences evolves through complex relationships.

Existing measures of matching often show unemployment among people with VET qualifications is lower than among those without. However, this gives limited information about the performance of VET systems or institutions. A main shortcoming is that only broad attainment levels can be used on a comparative basis.

At VET institutions level the consumer-supplier-model could apply, but is complicated because a twofold perspective of the consumer-producer-relationship arises, depending on whether the focus is on the labour market (employers as consumers), or the education market (students as consumers). The main focus of matching at this level is the successful transition of graduates into employment, a core dimension in quality assurance models in Europe (Lassnigg, 2006).

However, this too provides only limited information about matching at institution level, particularly if we take the dynamic view of an evolving and changing demand. Placement of graduates might depend on the local labour market conditions.

Planas et al. (2001) show the difference between looking at mismatch from a qualifications and consumer-supplier-model perspective compared to a skills and competences perspective. A key point is that skills and competences are traded in the labour market, rather than qualifications. Skills and competences are produced in complex ways that combine initial education and VET, experience, human resource development in enterprises, further education, different time perspectives and institutional frameworks of industrial relations which are built on qualifications.

Consequently, the role of enterprises and unpredictable environments are important to skills development. A new concept of mismatch has been developed focusing on adjustment to different kinds of imbalances (see Figure 2).

Figure 2: **Types of mismatch and adjustment**

	Cyclical imbalance (short-term)	Structural imbalance (longer term)
Skills demand growth	Type A: Adjustment of initial VET not feasible, too slow, causing future imbalance; Adjustment rather by internal labour markets, poaching, or further education and training. Policy solution: high general training as a base for adjustment of employees	Type B: Imbalance might concern general skills (e.g. language, ICT) or specific skills; Adjustment by developing VET programmes by combination of general foundation and ready-to-use skills. Policy solution: links of the different systems of skills production
Skills supply growth	Type C: Adjustment by innovation, reduction of benefits of education, new skills acquisition during entry period in labour market, increase of insecure jobs. Adjustment by work experience ambivalent, might devalue skills. Policy solution: further education and training, based on proper assessment of skills demands.	Type D: Adjustment by better educational choices of young people; Main causes of imbalances should be analysed properly. Policy solution: providing clear information about costs and benefits of education, the price mechanism through competition among providers.

Source: Planas et al., 2001, p. 358-362.

The type of mismatch considered in the consumer-supplier-model at qualifications level is similar to type B. However, where the policy solution in the consumer-supplier-model focuses on initial VET it is much broader in this extended concept about skills mismatch.

Comparative and country-specific evidence about the relationship between supply and demand in Austria

The European competitiveness report (European Commission – DG Enterprise, 2002) measures matching supply and demand by broad education levels. Employment growth at the three education and training levels low, medium and high is compared with increases in educational attainment of 15-64 year olds between 1995 and 2000. Comparing growth rates and calculating differences give a rough indication whether supply and demand are in line. Figure 3 compares the growth rates in employment and educational attainment in the late 1990s. Austrian VET includes three tracks at the medium-level: apprenticeship at the bottom, intermediate full-time VET schools, and double qualifying VET colleges which provide qualifications opening access to higher education.

The high proportion of medium-level education can be easily seen. The dynamic indicated by the length of columns 1 and 2 for each country shown in the upper part of Figure 3 is above average in Austria, Spain and Finland (growth rates of 10 to 15 % as compared to about 7 % in EU-15). A positive difference between demand growth (employment) and supply growth (educational attainment) in the third column signals demand is more dynamic than supply. A negative difference indicates oversupply. Most European countries show a positive difference, Austria and Sweden are exceptions. The low-skilled category shows falls in both demand and supply for the EU-15 (minus 3 to 5 %). Supply of low-skilled workers is falling in all countries except Denmark, but the demand for low-skilled workers shows small positive growth in five countries. Some main observations are:

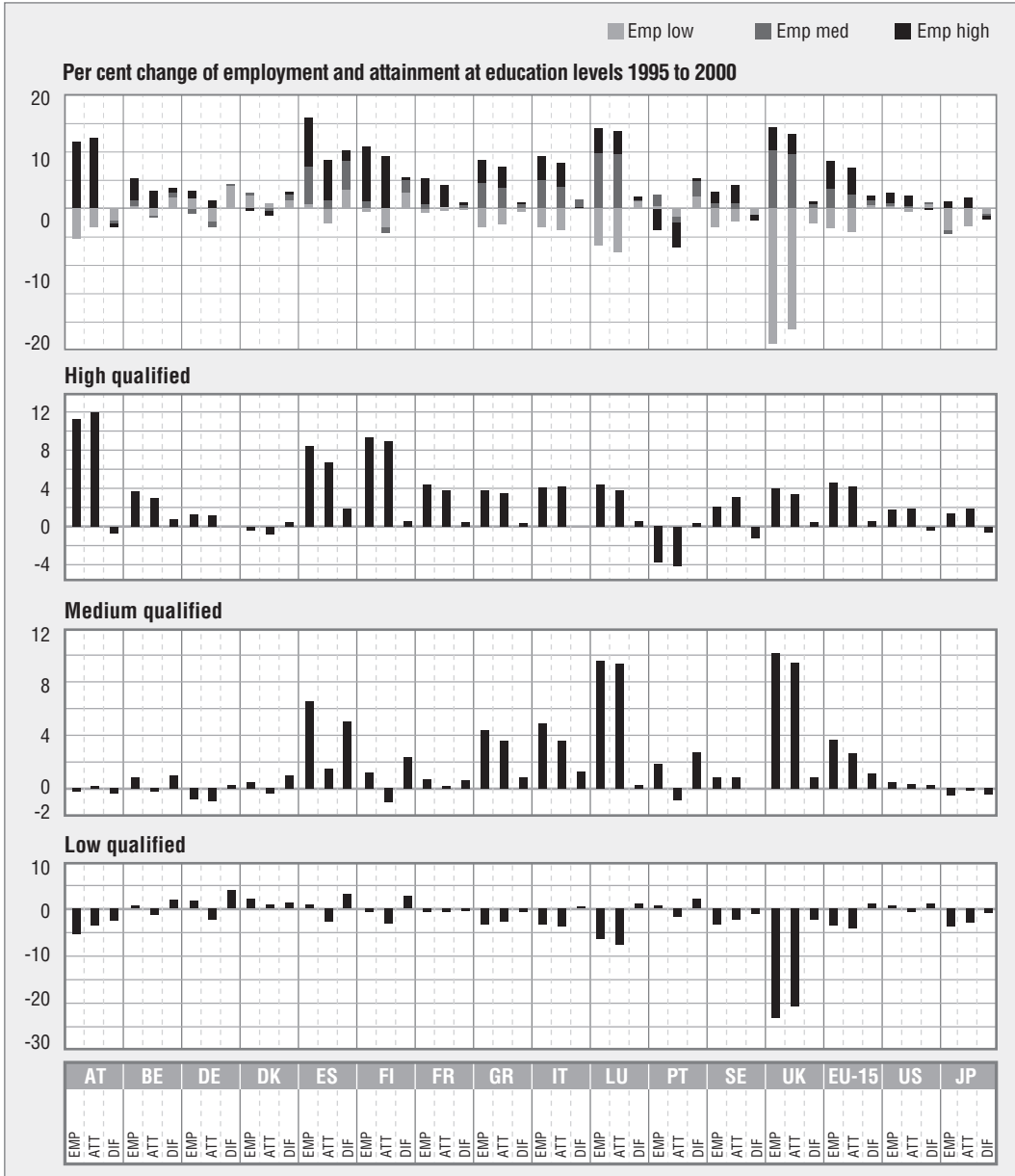
- in Austria the strongest trend is indications of a small oversupply in high qualifications. In most countries demand for high qualifications has outgrown supply;
- medium-level qualification trends are stronger in EU-15 than Austria. There seems to be an inverse relationship: the higher the stock of medium-level qualifications, the smaller the positive difference which indicates a supply shortage;
- at low levels of qualification, the Austrian pattern is similar to Sweden, Greece and Italy with an average decline of demand and supply. Austria, the UK, Sweden, and Greece have a negative difference at this level which signals oversupply of low qualifications.

Overall, Austria lies at extremes and at variance with the EU average development.

The cross-sectional pattern of supply and demand of Austrian VET was analysed for a similar period in a national study of the main streams of education and training and by broad occupational groups (Lassnigg, 2004; Lassnigg, 2002; Lassnigg, Prenner and Steiner, 1999). The results show a similar pattern:

- estimates for formal qualification levels clearly indicate upgrading of the workforce. Higher education graduates and those from the VET colleges show high growth rates, medium-level qualifications grow slowly, while the unskilled are in marked decline;
- a shift-share analysis shows that for the medium-level qualifications, apprenticeship employment is shrinking, whereas medium-level full-time VET schools are increasing. This means apprenticeship is losing importance in an expanding employment field.

Figure 3: Growth rates of employment compared to growth rates of educational attainment by levels, 1995-2000



Source: European Commission – DG Enterprise, 2002, p. 29

Another analysis based on the comparison of rates of change in certain qualification categories tried to obtain the matching pattern between the supply of qualifications and employment trends ⁽⁵⁾. That exercise projected the future supply from the education and training system and compared the results to employment indicators. This comparison comprised 10 occupational categories for each of the four levels of specialised programmes at the upper secondary or higher education level. The results indicated some structural traits of the Austrian system:

- a low level of correspondence between employment and education and training especially given the speed of change. VET and employment are diverging as changes in VET supply are slower than changes in employment;
- falling younger cohorts compared to the medium and older cohorts. Generally, positive growth rates are more frequent on the employment side, compared to the education and training supply side.

Another measure of mismatch between supply of and demand for qualifications used in the EU competitiveness report is the dissimilarity of the educational structure of the three levels between different sectors. Measures indicate an increasing mismatch for Austria between the employed and the 15 to 65 year old population overall. Unemployed people have a different educational structure than those in work. Compared to EU-15, the relative position of young people is better than the overall matching situation in 2000 in Austria. This fits the European trend. Young people entering the labour market might improve the match in countries where the overall mismatch is large, but the incentives for improvement among the young might also be weak where the situation is relatively in line.

⁽⁵⁾ The results were based on a set of indicators, which were calculated for the two periods 1991-95 (past) and 1996-2000 (projection): (1) the proportion of the estimated yearly absolute supply (flow) from education and training to the stock of employment in each specialisation (ET-supply/EMPL-stock); (2) the proportion of (a) the growth/decline of the estimated yearly supply to the stock of employment in each specialisation as compared to the overall growth/decline of employment in this specialisation (b); (3) the cross-sectional distribution of qualification levels within occupational specialisations and vice versa.

Figure 4: Summarised mismatch index in Austria, 1994–2002

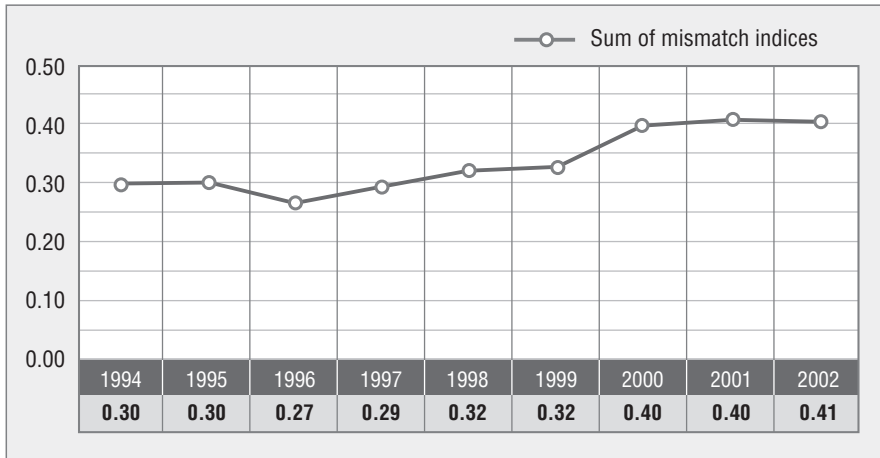
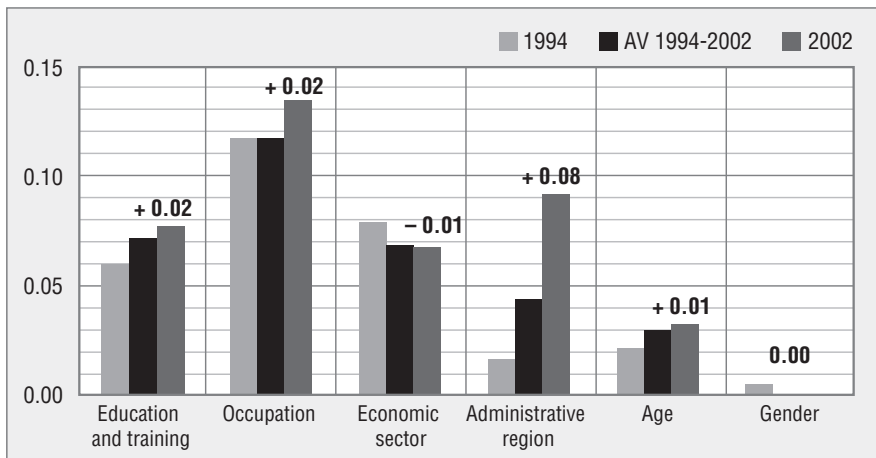


Figure 5: Mismatch indices for education, occupation, economic sectors, regions, age and gender, 1994, 2002, average 1994-2002



Source: Lassnigg and Markovitsch, 2004, p. 199-200

The mismatch indicator developed by Layard, Nickell and Jackman (1991) calculated from the variation of unemployment at the six variables ⁽⁶⁾ in Figure 4 shows an increase for Austria from 0.3 to 0.4 during the 1994-2002

⁽⁶⁾ Education, occupation, economic sectors, regions, age, and gender. The mismatch indicator is a measure of variation calculated from the unemployment rates in the categories of the variables (u_i) and the overall rate (u) (Layard, Nickell and Jackman, 1991, p. 310): $MM = 0.5 * var(u_i / u) = \log(u / u_{min})$.

period. The variation of unemployment rates is biggest for occupational groups, medium for the educational streams and economic sectors, and lowest for regions, age and gender. Mismatch has strongly increased for regions, increased for education, occupation and age, and slightly decreased for economic sectors (Figure 5). For the same period, however, the Beveridge curve, (used as a measure for mismatch based on the relationship between unemployment and vacancies) did not indicate an increase in structural unemployment.

In sum, existing research about matching supply and demand for skills and competences on the labour market gives at best a general picture about past trends and the current situation. Methods of measuring mismatch are rudimentary. They give some indications about structural problems on the labour market, but the contribution of the VET system is far from sufficiently covered by them.

The timeframe of matching: anticipation and foresight

Foresight as a type of policy-making

VET systems provide qualifications for an increasingly unpredictable future. Perceptions differ on timeframes for both demand and supply. Students want qualifications for a medium or longer term perspective. Employers need human resources according to a demand which can change quickly. VET systems have to deal with this problem. However, timeframes to provide qualifications are seldom given. To some extent there is a relationship between the expected timeframe of the use of qualifications and the degree of formalisation of the system. Qualifications planned to provide the full skill range for a certain occupation or profession are expected to last longer, not least because of the large investment necessary to provide the 'right' qualification.

Foresight is a method of knowledge production and policy-making to relate the present to the future systematically. It combines information about trends and forecasting with the strategic plans of key actors, and their structures of communication and networking.

Foresight includes three basic elements, the time horizon, knowledge, and shaping. The further into the future, the more the shaping influences events at the expense of knowledge and information and the more results are determined by the assumptions made. Rather than be shaped by the assumptions (7), it is better to consider the shaping mechanisms explicitly, by involving

(7) This point seems to be strongly related to the complexity of the forecasting methods. The more I try to be realistic, the more complex gets the model, and the less transparent becomes the relationship between real inputs and assumptions. Simple methodologies might be more apart from reality, however, the factors which produce the results are more transparent.

the actors to try to understand how VET system development might be deliberately shaped.

In education and training, the relation of supply and demand is very much shaped by the past. The qualification structure of the workforce has been built up over three decades, partly using structures from earlier periods. The relationship of supply and demand changes slowly through the annual supply from initial education and training. Short-term changes come from continuing education and training, but for them to be substantial, considerable resources are required. It is also difficult to provide incentives for policy action, for long-term improvement with few visible results in the short run.

Key issues shaping the relationship between supply and demand are reasonable time horizons for using qualifications, and a reasonable combination of skills needed in the short and long term. Developing long-term skills and establishing a good relationship between initial and continuing education are key to improving the relationship between supply and demand and are central to the foresight approach.

Foresight is based on the following elements (Keenan et al., 2003, p. 6, p. 11):

- structured anticipation and projections of long-term developments and needs;
- an examination of a wide range of factors, using an interdisciplinary approach, pooling and sharing of expertise;
- formal techniques, based on eliciting expertise, structuring the approach, summarising information and the outcomes generated;
- interactive and participative methods of exploratory debate, analysis and study, involving a wide variety of stakeholders;
- forging new social networks, equally, if not more, important than formal reports and action points;
- systematic networks and channels of communication between different actors;
- products beyond scenarios and plans. A guiding strategic vision with a shared sense of commitment is crucial;
- explicit recognition and explanation of the implications for present day decisions and actions;
- long-term orientation (generally a period of 10 years, but with the objective to inform current decisions).

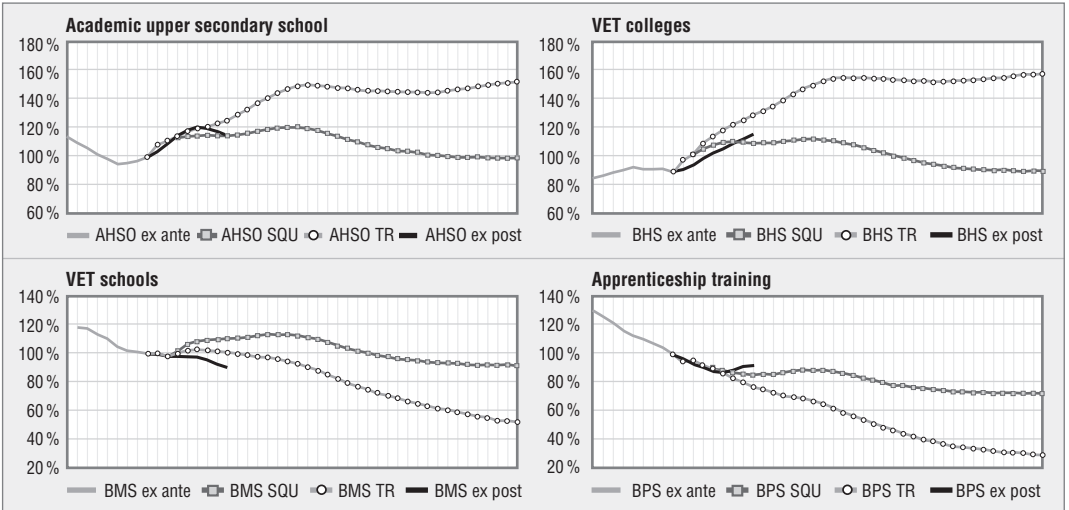
In sum, foresight combines applying formal procedures with actors, to promote a system that supports the communication of results and their integration with decision-making procedures.

Medium- and longer-term projections of supply in Austrian VET

Assuming the basic structure of the VET system is stable, supply can be more easily projected than demand, considering changing patterns of educational choice. A key question for the future is how the long-term demographic downturn in the number of young people will be absorbed by the education and training system.

The educational infrastructure has been developed for age cohorts markedly larger than those expected in the future. To obtain some idea of the scope of possible development, two extreme scenarios were calculated some years ago. The first is a status quo scenario applying the transition rates of the last year before the projection (1983) to the demographic forecast. The second is a trend scenario applying the linear increase in the change of transition rates between 1983 and 1993 to the demographic forecast. Figure 6 compares the result of those scenarios to current student numbers. It shows how it fits between the extreme scenarios, and how behaviour on choosing education and training options changed in the 1990s as compared to the 1980s.

Figure 6: Long-term projections of student numbers at upper secondary level, 1985-2030, relative, 1993 = 100 %



Source: equi-IHS

Despite the demographic downturn, the trend scenario forecasts considerable growth in the upper level schools and the continued decline of apprenticeship training. The status quo scenario gives an increase at upper secondary level until 2005-10, followed by a long-term decrease by 20 %.

Current figures show the choices of students about which course to follow to be very different from the continuation of the 1980s trend. Only the technical and professional colleges follow closely the trend scenario. Technical and vocational schools fall even more strongly than predicted by the trend scenario. The two remaining streams show marked differences. The upper secondary academic stream followed the trend scenario for some years before declining in the second half of the 1990s. Apprenticeship training has broadly followed the status quo scenario.

Developments in choices about education and training are largely in line with demand projections from the labour market. The biggest challenge is the rising demand from young people for places in VET colleges. The apprenticeship system needs more or less to hold the status quo.

Those projections indicate possible futures, which influence the shape of VET, and VET policy (such as the pattern of supply of qualifications, or resource allocation), which might, in turn, be influenced by policies. Anticipation, social systems including the main groups interested in matching supply and demand at regional level, might give a basis for respective policy decisions.

Forecasting, anticipation and issues of application

In traditional forecasting of skills demand, the reasoning is that the economy (or demand side) will need a certain quantity of certain kinds of empirically classified skill profiles, over certain time period. In this 'objective observation', the main tasks are the development of skill descriptors and a methodology based on observation and forecasting. This oversimplified view is a starting point for many exercises in the 'early identification' of skill needs.

How forecasts are used is also an issue and involves the institutional frameworks. Stability and change, and its dynamic over time, is a major concern. In an institutional interpretation, skill profiles provide an institutional structure that guides and simplifies matching processes and relates the different actors (social partners, education and training providers) to employment, and to education and training systems. However, the stabilising function of those structures is limited by economic and social change. Consequently, institutional structures need to provide stability and yet be adaptable to change. Over the last two or three decades, a mismatch between existing structures and new developments has emerged. A strong trend to abandon structures and replace them with 'the market' has developed. More recently, debate has fo-

cused on the need to build new structures founded on new kinds of descriptors, for example competences ⁽⁸⁾.

Anticipation in the foresight paradigm means placing forecasting procedures in a framework that includes the institutional structures that coordinate supply and demand ⁽⁹⁾. In an anticipation framework, results of forecasting are part of a communication and knowledge generating process with objectives to:

- combine formal knowledge from forecasts with informal knowledge from other sources;
- use the results as an element of institution building by incorporating them into the structures and using them to guide adaptation.

Systematic combination of forecasting results with informal knowledge from others involved is a precondition for diffusing the results. Examining the action plans of actors generates new knowledge. Communication among actors about solutions should relate to existing institutional structures which, in turn, might be adapted as a result ⁽¹⁰⁾.

Anticipation procedures should not only aim to detect specific skill needs, but also address the institutional framework for the construction of skills, as well as broader issues affecting skill supply and demand (such as demographics, gender, economic and innovation policy, or regional development).

A specific and more far-reaching question concerning the qualitative nature of skill needs is the relationship between emerging processes that change skill needs compared to policies that change them. A great deal of research has followed Finegold and Soskice (1998) who showed that, overall, a high skill trajectory only emerges if appropriate policies towards innovation are followed. Following this argument, and taking into account the results on the broad range of economic returns from education, the notion of 'objective skill needs' becomes more relative, since skill needs are also conditional on policy decisions.

⁽⁸⁾ See the OECD project on the definition and selection of competences: Rychen and Salganik, 2003; see also OECD-Executive summary: <http://www.pisa.oecd.org/dataoecd/47/61/35070367.pdf> (12.12.2005); more recently the European Union is developing a European qualifications framework (EQF) which also tries to define common descriptors for competences which might function as signals on the education and labour markets (Internet: http://europa.eu.int/comm/education/policies/2010/consultations_en.html (12.12.2005).

⁽⁹⁾ This question might be understood as an answer to the question about the difference between the manpower planning approach and the new concept of 'early identification' which Cedefop, Psacharopoulos (2005, p. 32) asked rhetorically in his sceptical comment to these issues.

⁽¹⁰⁾ Lindley (2002, p. 135) has pointed to the problems of communicating the results of forecasting to broader user communities, and of using them for elaborating a process of reflective practice.

Anticipation system and quality of matching

A framework of ‘matching policy’

There are at least two broad approaches to matching VET supply and demand for qualifications in initial VET. First, broader supply profiles to absorb change by increasing flexibility of individuals and enterprises (the flexibility approach). Second, the specific supply profiles linked to demand (the specificity approach).

The first approach avoids the problem of visible mismatch but makes the quality of matching difficult to judge. The latter solution poses the problem of adaptation to changing demands. In reality, most systems mix flexibility and specificity. Whatever the approach, the main dimensions of matching practice are discussed below.

Production and dissemination of information and knowledge

This includes how mismatches are detected (informally, formally), the time perspective and approaches involved (short-, mid- or long-term; reactive, proactive). It also includes the areas of mismatches to be improved and how information is communicated. The study of the Austrian anticipation system shows that mainly informal information is used to take decisions about changes in supply.

Action responding to perceived mismatches

The types of action taken to improve matching include new strategies to make the process more flexible and broad, or as appropriate more specific, and more up to date. The actions involved individuals, enterprises, education sector, policy and public sector, research having implicit or explicit responsibilities in matching practices can be renewed as well as how and what information is disseminated between them. In the Austrian anticipation system, the issue of broadening profiles was discussed, but it proved difficult to change the traditional path of specificity. Consequently, action in response to mismatches focused on updating profiles and processes in teaching practice, and the choice of programmes by students. The changes have to be made against the background of little formal information about matching.

Relationships between initial VET and continuing VET with respect to matching.

Often IVET is considered to be supply-oriented and CVET demand-oriented. Therefore, in terms of matching, IVET is seen as providing for more general and long-term tasks, and CVET more specific and adaptation tasks. Consequently matching in IVET would be more strongly driven by anticipation and foresight of longer-term trends, and matching in CVET more by short-term labour market demand and supply. A policy aim to improve matching would be co-

ordinating IVET and CVET. However, more recently, strategies of lifelong learning have blurred these sectors. Both are expected to respond to demand, and consider the general and specific aspects of longer-term trends. In the Austrian system, this division is present to some extent. However, there is no systematic coordination of the sectors, and belief that CVET will take over specialised training, relieving IVET from specialisation is rather low.

The Austrian anticipation system

Analysis of the Austrian anticipation system focused on four aspects:

- communication structure among the main actors;
- practice and state of the art of forecasting;
- cases of regional and sectoral anticipation practice;
- instruments available to measure matching.

Analysis of the communication structure (Henkel and Markowitsch, 2005) shows the flow of information and knowledge among the main actors is processed in different parts of the IVET and CVET system. Different patterns were observed, but all have strongly emphasised informal knowledge. Different actors have the main role in the communications process in different sectors. In terms of structure, inclusiveness, openness, and adaptability, communication in the apprenticeship and polytechnic were the most developed. CVET focused on adaptability. The anticipation system in VET schools is less developed, with a low level of openness and adaptability.

The anticipation system is built mainly on informal knowledge, because formal forecasting does not exist on a regular basis (Markowitsch et al., 2005; Lassnigg, 2002). Informal practices of anticipation are established in several areas of Austrian VET. Three cases were analysed more specifically (Steiner, 2005): apprenticeship and full-time VET schooling as sectoral cases, and labour market training in an Austrian province as a regional case. The analysis showed that a comprehensive perspective is missing. Sectoral cases focus on their internal structure without reference to overall developments. Here the differences in the perspective on matching comes through, as the anticipation procedures are situated at the level of institutions which compete against one another. Procedures at the system level are missing so far.

Regular measurement of the supply and demand match is missing. A systematic analysis of matching indicators and their application to the Austrian situation as illustrated above was made for the first time in the study.

An innovative regional approach for anticipation

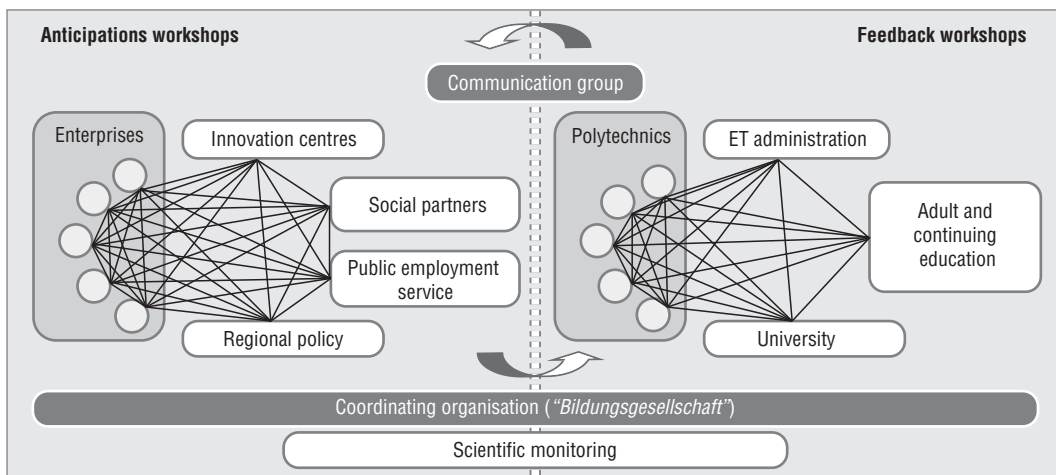
A specific anticipation approach was developed in Lower Austria, near Vienna, stemming from an initiative to coordinate the polytechnic sector at regional level.

It began in 2000 with regional projections of supply and demand, and a scenario project to identify the main factors of educational development as perceived by the main regional actors. After testing the acceptance and interest of the regional actors, the project was set up, aiming to:

- develop a qualitative mechanism of anticipation of skill needs in addition to forecasts;
- create a regional ‘think tank’ of actors from employment innovation systems;
- analyse relevant issues in a framework combining research and practice;
- provide feedback to the polytechnics and regional education and training system.

A structure was set up (summarised in Figure 7). Key enterprises were selected and the model discussed with participants. The core activities were ‘anticipation workshops’ on selected topics with employment/innovation actors held twice a year, followed by ‘feedback workshops’ with the education and training actors. Preparation and monitoring of the process was done by the coordinating organisation with scientific advisers. Members were connected by an Internet platform giving access to results and room for discussion and exchange.

Figure 7: **Structure of Lower Austria anticipation project**



About 60 people from the indicated sectors were selected (two thirds strategic enterprises from different sectors and of mixed size representing about 5 % of employees of the region). Six anticipation workshops took place on ICT skill demands, cooperation between enterprises and education and training institutions, key qualifications, lifelong learning, R&D and innovation, specialised

professional competence. Problem definitions and solutions from the point of view of the different actors were developed.

Participants appreciated the results, and exchanges of experience and a process of community building is underway. The feedback workshops with the education and training providers were set up after consolidating the anticipation workshops. Building trust is a main issue. A concern of the education providers was to develop forecasting of demand for skills and competences. Discussion of R&D and innovation has uncovered basic information problems among the different actors, and brought many proposals for improvement, for example to set up an information base about research topics of institutions in the region.

The project can be seen as a step to building a learning region, by first figuring out aggregate needs of the economy from education and training provision. This must consider what the different actors can do by themselves, and their expectations from education and training institutions and policy-makers. Working to improve R&D and innovation structures in the region is envisaged as a first project. Thus the project moves towards developing a local network for action learning among diverse actors, the type of learning region approached by the Cedra project (Nyhan, 2005).

Conclusions

Current strategies are too crude to observe the quality of matching in specialised VET systems. General statements can be made about the quality of matching in Austria. A quality strategy to improve the quality of matching requires operational objectives for the different sectors of VET. The level of aspired matching between supply and demand, and the timeframe are key aspects in setting those objectives. For example, does a programme aim to immediate productivity in certain workplaces, or is an extended period of learning expected? Which elements of a programme should be lasting, which will need updating after a short period? The formulation of objectives of this kind provide benchmarks to assess progress.

A more general outcome of formulating objectives would be to decide the level of aggregation or specialisation to analyse the matching quality. Attainment levels are too crude to assess the matching quality of VET, however, the expectation of a one-to-one relationship between a programme and a job category – the famous 'pilot analogy' formulated by Mark Blaug – is unrealistic. Specifying an expected match somewhere in between would make the aims of VET and decisions to invest in a certain degree of VET specialisation clearer than they are now. Objectives of VET programmes should be more clearly specified, e.g. in terms of the aspired level of matching between qualifications and jobs, and of the expected timeframe of usability.

Anticipation of future needs has been formulated in the paradigm of foresight, defined as a social process of knowledge management combining recognition with shaping and decision-making. This task goes beyond mere forecasting. Bringing the informal knowledge of actors, and their strategic plans into the process is an essential part of anticipation. The following ingredients are needed to build an anticipation system:

- knowledge about the status-quo of matching;
- foresight about supply, demand, and matching;
- a comprehensive system to share knowledge among all key actors including deliberation about objectives and their measurement;
- monitoring mechanisms along the quality cycle;
- inclusive communication flows in the system.

Experiences in Austria have been used as examples for steps towards a more comprehensive anticipation system.

The future match between the supply of skills from education and training is strongly influenced by the demographic trend towards an ageing population. The skills supply from initial VET is affected in terms of quantity and enrolment in different programmes. The relationship between inflows into the system and outflows from the labour market as people retire, and the replacement rate need more analysis, considering the sectoral and occupational changes of employment.

Concerning VET in the short run, the overall impact on the labour market performance will be – at least potentially – greater from CVET than from IVET, because inflow to the labour market from IVET is limited to one age cohort per year. CVET potentially, depending on participation rates, may have a broader immediate impact on the flows and transactions on the labour market. IVET serves for the renewal of the human resources stock gradually and year by year. If an ongoing structural mismatch occurs, that will lead to substantial problems in the medium and longer term. The increasing dynamic of changing demand, in combination with the ageing of the population, leads to a double squeeze on the renewal of skills and competences.

Anticipation should be an essential part of matching policy. Bringing matching and anticipation into the quality cycle means we can ask two questions. How can the improvement of matching be part of the quality cycle? What role can anticipation play?

Quality in terms of policy-making requires the steering and decision-making mechanisms to be assessed to identify the preconditions to improve matching practice. Analysis of anticipation practice has shown how different actors relate to one another. A quality strategy to improve matching first requires setting up a communication system among the actors that produces and circulates the necessary knowledge to assess the status quo. Second, actors from

the employment sector must have the opportunity to bring informal knowledge and action plans into the process. Third, use of the results of the foresight procedure in decision making must be guaranteed. Fourth, a regular process monitoring the relationship between supply and demand must be set in place.

In addition, matching might be specified as an objective along the whole quality cycle. At each stage, appropriate measures should be developed (input: acquisition and production of information; process: availability and distribution of information; output: responsiveness of VET supply to demand; outcome: adaptation and innovation of VET supply). There are several processes of anticipation activities at different levels and in different areas of VET systems, similar to the Austrian case. Those activities should be identified, interlinked, and provided with the necessary knowledge and resources.

A final message concerns the complexity of the matching problem. We have discussed the different perspectives, from the aggregate macro-economic to the individual skills level, and the co-production of skills in the different systems of education and training, including enterprises. Those different perspectives are to a large extent separate from each other in today's education and training systems, and in policy-making. A main cause for this separation is often based on historical institutional structures. Anticipation and foresight, and developing a proper understanding of the interrelations of supply and demand across the levels and subsystems among actors through the building of an anticipation system, with the help of formal knowledge, might contribute to an integration of those often fragmented VET structures. Concerning the two approaches to the matching problem, the flexibility approach and the specificity approach, the difference concerning the matching problem might be smaller than it may at first seem.

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