Chapter 6

The Role of the Knowledge Base

This chapter deals with the use of knowledge in the process of systemic innovation. The concept of knowledge is defined here in its broadest possible sense and includes knowledge arising from a variety of sources (e.g. academic research, field practice) and of various types, including explicit and tacit knowledge. The chapter draws on the empirical findings of the case studies in order to examine questions such as: to what extent different knowledge sources are used? How are relationships brokered among different stakeholders to facilitate the exchange of knowledge? And how is knowledge accrued during the process of innovation put into action? The issue of the relative shortage of academic research in the area of VET is discussed, as it emerged in one form or another as a challenge in many of the countries participating in the study. The chapter closes with a number of policy implications arising from the findings. These include the importance of appropriate mechanisms that enable the flow of knowledge among stakeholders in the system and the potential role that academic research can have in providing a fresh, "outsider" point of view to the system's internal actors and stakeholders.

Introduction

In the model of systemic innovation in VET presented in Chapter 3, the knowledge base plays a crucial part at the centre of the process, with each stage feeding into the knowledge base, and thereby in turn providing input into each stage. Evaluation, for example, uses existing knowledge while its conclusions also expand the existing knowledge base. The concept of knowledge is defined here in its broadest possible sense and includes knowledge arising from a variety of sources (*e.g.* academic research, field practice) and of various types including explicit and tacit knowledge. One useful working definition of the term is the one proposed by Cedefop (2008) according to which knowledge is "the outcome of the assimilation of information through learning. [It] is the body of facts, principles, theories and practices that is related to a field of study or work". The term "knowledge" is therefore broader in scope compared to the related term "evidence"; as a result, it was preferred to the latter in the analytical framework of this study as it allowed the examination and analysis of bodies of information and practices that would not necessarily be considered "evidence" but that often play an important part in shaping systemic innovation and policy making in the field of VET.

A key question that arises is to what extent different knowledge sources are used – taking into account that different knowledge sources may lead to different conclusions (*e.g.* general assumptions may be proved wrong by academic research) – and how relationships are brokered among different stakeholders to facilitate the exchange of knowledge. The aim of this chapter is to examine these questions in more detail, drawing on the empirical evidence.

The role of knowledge in systemic innovation, both within VET and in education in general, can be set within the context of relevant debates, which have become increasingly prominent during the last few years (see for example OECD, 2007), regarding the use of knowledge and research in making educational policy. This rise in interest in the role of knowledge in policy making has been prompted partly by an increasingly strong focus on educational outcomes, as measured by numbers of qualifications achieved or skills and competences acquired (*e.g.* in surveys such as PISA). This orientation towards outcomes is also affected by issues related to educational expenditure, with education policy makers needing to provide robust evidence to their counterparts in finance departments when requesting funding. One could argue, in fact, that in the case of systemic innovation there exists an even greater need for an appropriate and convincing body of knowledge on which to draw, so as to best convince other stakeholders of an innovation's potential utility.

Questions that have preoccupied analysts in the field include what counts or should count as evidence, issues of capacity building, and the role

of brokerage agencies in mediating the research/policy interface. These are elaborated further in the sections that follow, as they are highly relevant in similar debates regarding the use of knowledge and evidence in systemic innovation. They draw to a large extent on OECD (2007).

The question of what counts or should count as evidence in policy making relates to the discussion in this study on the different types of knowledge used to inform the process of systemic innovation in VET and general education, from initiation to monitoring and evaluation. Even if the focus is restricted to knowledge derived from academic educational research, one finds that the existence of multiple methodological paradigms in the field – from randomised control trials to case studies and action research – results in a diverse and often fragmented knowledge base. There are also often concerns regarding the overall quality of educational research. The field of VET, in addition to suffering from a relative lack of academic research-based evidence, has to take account of many other types of knowledge, such as informal practitioner, work-based, and tacit knowledge, as shall be discussed later in this chapter. This renders the task of deciding which bodies of knowledge are appropriate to use even more difficult for stakeholders involved in VET policy making and systemic innovation.

As mentioned, many countries suffer a shortage of good quality academic research in VET, and this study has provided additional evidence for this observation. Issues of capacity building are therefore particularly pertinent, and, in fact, two of the case studies submitted for investigation deal explicitly with this issue. In addition to boosting capacity in terms of more, and better-trained, researchers, however, it is also important that other stakeholders in the system, including policy makers, teachers, and employers, are knowledgeable enough about research methodology to make sound judgments regarding the quality of a particular initiative and the potential or actual effectiveness of its outcomes. This is also one way of avoiding the "innovation fatigue" frequently experienced by practitioners in the field – if people do not have the capacity to judge the nature and quality of the knowledge that has informed an innovation, they are more likely to dismiss it as yet another new initiative.

The issue of good brokerage (*i.e.* bridging the gaps among different communities and groups of stakeholders, such as policy makers, employers, teaching practitioners, and researchers) is therefore also particularly important in systemic innovation in VET – and in education more broadly. Brokering agencies, such as independent think tanks and research institutes as well as centres based within a particular organisation, such as a Ministry or a trade union, play an important role in facilitating the flow of knowledge among groups of stakeholders as well as assessing and assuring its quality. Australia, Germany, and Switzerland are examples of countries participating in this study that have formal brokering agencies – the Australian NCVER

and the German and Swiss Federal Institutes for VET (*BIBB* and *SFIVET* respectively) – funded by, but operating at arm's length of, their respective federal governments.[1] However, their roles in the process of systemic innovation, at least in the context of the case studies examined in this project, did not appear to be as central as would be anticipated. Further, brokerage agencies have an important role to play given the rather fragmented nature of educational research described above – research influenced by multiple disciplinary and research paradigms. This fragmentation is even more relevant in the context of VET, which is inherently at the interface of two different sectors and therefore a number of academic disciplines: education and the labour market. This is issue is discussed further in the section on academic research below.

The issues outlined briefly above highlight the importance of the use of knowledge in systemic innovation in VET as well as that of the effective flow and sharing of this knowledge among stakeholders. The remainder of this chapter starts by introducing the reader to the different types of knowledge used in the typology framework that will be presented in Chapter 7. The next section then addresses a number of questions relevant to the use of knowledge in VET innovations, based on the analytical framework of the study and drawing on the empirical evidence collected through the examination of the case studies. The role of academic research in VET is examined in the following section, as it was particularly important in many, if not all, cases. This section also highlights two case studies that deal specifically with improving the status and quality of VET-related research and with building capacity in the field. Finally, the last section offers a set of policy recommendations and conclusions regarding the effective use of knowledge in VET and educational innovations.

Types of knowledge used in the innovation process

Chapter 7 distinguishes between the following types of knowledge used in innovation in VET in the context of the typology framework:

- *Academic and/or research knowledge*. This includes formal knowledge produced by academic researchers within universities or independent research institutes and normally disseminated through standard academic channels, such as peer-reviewed publications. An example of a case study in which such academic knowledge played a central part is the *SKOLA* project (Germany), an initiative that drew heavily on educational and psychological research literature on self-regulated learning to implement new classroom practices. This type also includes knowledge about VET performance across and within countries (*e.g.* outcomes of programmes, numbers of people participating, progression, etc.).

- *Professional and/or practitioner knowledge*, *i.e.* knowledge developed and shared by professionals or practitioners in the VET field, such as policy makers, teachers, or teacher trainers. It would include, for example, what a VET teacher or trainer needs to know to create curricula and devise appropriate pedagogical strategies. This knowledge is often disseminated through policy papers or practitioner journals. Several cases examined in the report used such knowledge in the course of the initiative. As an example, we mention here the *Globalisation Council* (Denmark), which relied heavily throughout its work on briefing papers on specific topics prepared by government officials and practitioners in VET.
- *Administrative data and statistics*. Many countries, regions, or local authorities routinely collect information on enrolments, drop-out rates, numbers and types of qualifications completed, etc., and these data are sometimes used by external researchers or policy makers when planning or evaluating new initiatives. Several of the case studies examined made use of the knowledge generated from such databases. An example is the *Case Management* study (Switzerland), since data indicating high drop-out rates among certain groups of young people prompted the introduction of the case management model to aid their transition into VET.
- *Tacit knowledge*. All three types of knowledge so far can be defined as explicit, *i.e.* formal, codified knowledge that is also often documented. Tacit knowledge, on the other hand, has been defined as "knowledge in the head", *i.e.* knowledge that individuals have – often without being aware of it – but that has not been codified or spelled out. Tacit knowledge also covers sensory ability, such as a carpenter's ability to judge what sort of wood to use by the "feel" or the cheese maker's ability to judge when to move to the next stage of processing ingredients by the "smell." Such knowledge is sometimes used during the initiation stage of an innovation. The *Innovation Circle* (Germany) initiative is an example: the German Minister who initiated the *Circle* drew presumably to a large extent on her tacit knowledge of the strengths and challenges in the field, rather than on a body of formal or explicit evidence. Tacit knowledge is, however, also developed and used by stakeholders in all stages of the process (*e.g.* during discussions and consultations in the implementation phase). It could be argued that it is always present and influential to some degree. In that respect, the cases singled out here as making use of such knowledge are those in which the use of such knowledge to inform the process of innovation was particularly salient to the expert teams reviewing them. Tacit knowledge poses a considerable challenge for VET practitioners and researchers, as there are inherent

issues related to helping individual learners to develop it, ensuring learners have enough time within their training periods to practise, and ensuring they can apply their tacit knowledge in the workplace by being given sufficient discretion in their roles by managers to make judgements. This is one of the characteristics that make VET far different from general education; it also means that for innovation in VET to be encouraged, the tacit dimension needs to be nurtured.[2]

The empirical evidence: the use of knowledge in the case studies

This section focuses on the role and use of the knowledge base throughout the innovation process, namely the initiation, implementation, monitoring, and evaluation stages, drawing on the empirical evidence provided by the analysis of the case studies. In contrast to the approach taken in earlier chapters, the focus here is not on each stage separately, but rather on overall questions related to the use of knowledge that may be pertinent to one or more phases in the process. Specifically, questions of interest include the following:

- What type(s) of knowledge is (are) used? Do different types tend to be used in different types of innovations?
- How does knowledge flow within the system and among stakeholders? Who produces the knowledge, and how does that affect the perception of the innovation on the part of the other stakeholders?
- How is knowledge actually used during the innovation process and what impact does it have on decisions made or actions taken?

The remainder of this chapter discusses each of these issues in turn.

Types of knowledge

One important issue that relates directly to the typology of innovation processes discussed in the next chapter concerns the types of knowledge that are drawn on, as well as whether different types of processes tend to use different types of knowledge. The analysis in Chapter 8 suggests no clear pattern regarding the types of knowledge used. At the same time, it is evident that a wide range of sources was drawn upon, including frequent use of tacit knowledge. The relative dearth of rigorous academic research in the area (see below) also makes it more likely that other forms of knowledge, including tacit knowledge, will be drawn upon during a systemic innovation process. It is possible that this type of knowledge may play a particularly important role in the VET field – as opposed to other education sub-sectors – because of VET's intrinsic complexity from being at the interface of education and the labour market. At the same time, this very complexity makes it even more

important that rigorous, independent research evidence be used when initiating, implementing, and evaluating a systemic innovation in the area.

Another factor affecting the choice of knowledge sources is the nature and quality of the knowledge base already existing in the system, as this will of course have an impact on all stakeholders' expectations. Specifically, systems that have already built up a good knowledge base, for example in the form of comprehensive longitudinal databases or a strong pool of academic researchers in the field, will have different expectations regarding the use of these sources in an innovation process, compared to systems in which such knowledge bases are non-existent or in embryonic stages. One would expect that VET systems that have been in place for a long time and are generally regarded as well-functioning and prestigious would be more likely to draw on such high quality formal types of knowledge, and this has certainly been the case in some of the countries participating in this study (*e.g.* Australia, Switzerland). However, it is also possible that such "traditional" systems rely to a large extent on informal knowledge that exists within the system, and the fact that they generally function well acts as a disincentive for codifying or formalising this knowledge – Denmark provides an example of the latter.

The frequent lack of systematically codified formal knowledge – academic or other – has sometimes led to the generation of new knowledge during the course of an innovation. An interesting example of this is the *National Vocational Qualifications Framework* (Hungary), which included a "job analysis" component: an analysis of tasks, skills, and competences for nearly five hundred different occupations and trades. Despite the shortcomings of this particular approach – not least of which was the sheer amount of information generated – it resulted in a new body of formalised professional knowledge. Other cases that included the commission of new surveys, studies, or papers to gather knowledge and evidence specifically for the purposes of the initiative include the *Case Management* study (Switzerland), the *Innovation Circle* (Germany), and the *Globalisation Council* (Denmark).

The fact that international knowledge was hardly used to inform the process in most of the cases examined is another interesting finding. With the exception of the *Technical Baccalaureate Reform* (Mexico), which drew explicitly on international studies and statistics, there appears to have been few systematic attempts to learn from international experiences. The *Globalisation Council* (Denmark) and the *Innovation Circle* (Germany) have some input from international experts and papers, but these did not appear to have had a major influence on the process. There are two possible reasons for this absence of international exchange of ideas and knowledge. Firstly, the relatively little formal knowledge apparently available in most countries, both of substantive areas related to VET and of the process of systemic innovation, would make it difficult to identify and use such knowledge. Secondly, and

perhaps more importantly, the crucial role that cultural, political, and social factors play in the process of innovation makes it difficult to draw conclusions and adopt ideas from international or comparative studies. The Mexican experience is interesting in this respect: following an earlier negative experience of drawing too heavily on international comparisons and policy initiatives, the *Technical Baccalaureate Reform* ensured that any ideas that came from such sources were adapted to the Mexican context. For example, international curricula and norms in relation to different professions were surveyed by the Mexican Secretariat for Public Education (SEP) and academics from local institutions, such as the UNAM (Universidad Nacional Autónoma de México) and UPN (Universidad Pedagógica Nacional), at the time of designing the new curricular structure for the Technical Baccalaureate and the new points of entry into the labour market that it should provide. This adaptation to the national/local context has led to a successful implementation and could form an important policy lesson for other countries or regions.

One general conclusion that can be drawn regarding the use of different knowledge sources in different types of initiatives is that larger-scale, top-down initiatives tend to draw on multiple types of knowledge in a more or less systematic way. Obvious examples are the *Globalisation Council* (Denmark) and the *Flexible Learning Framework* (Australia). Although this finding may not be surprising in itself, it does provide validation for the constructs used in the analytical and typological frameworks of this study, and confirms our hypothesis regarding the crucial and central role of knowledge in systemic innovation.

Communication and flow of knowledge among stakeholders

The question of how to ensure an adequate and sufficient flow of information among different groups of stakeholders during the process of systemic innovation is another area of interest. There are also questions concerning who is considered qualified and reliable enough to provide the information. In this section, we examine how some of these questions were addressed in practice in some of the cases studied, as well as their policy implications.

An important factor when discussing the flow of information and communication among stakeholders is the degree of reliance on collaboration and shared decision-making, as well as the amount of trust between different groups, such as employers, trade unions, and government representatives. In countries such as Denmark or Germany, we observed a high level of commitment to collaboration, which bore implications for the ways knowledge and expertise were communicated among groups as well as for their impact on decisions taken.

More specifically, the Danish VET system is based in large measure on the sharing of informal professional knowledge. The knowledge base of the innovations observed is predominantly built from the accumulated

knowledge and expertise of the professional agents involved in the system: the social partners, the government representatives, and the professionals on the ground, in the schools and colleges. Moreover, this knowledge was quite informal: it was mainly not codified and often did not take documentary or published form. It was largely based on the experiences of the individuals concerned and was the product of active and open discussion, in various forms, which led to common understanding and strong consensus. In Germany there was a similar degree of commitment to collaboration and consensual decisions, complicated further by the federal structure of the country's governance system.[3] Such federal systems naturally present challenges for the effective flow of information, and similar gaps in inter-state communication and sharing of expertise were also observed in the cases of Switzerland (*e.g. Case Management*) and Australia (*e.g. Raising the Status of VET*) (for a fuller discussion of this, see the section entitled, "Barriers to Systemic Innovation in VET" , Chapter 4).

A related question concerns the extent to which particular groups of stakeholders tend to use specific types of knowledge during the innovation process, particularly as it has implications for the need for good brokerage. It was found that, for example, policy makers use on the whole professional, policy-related knowledge and administrative statistics disseminated through, policy papers with conversely little use of knowledge on teaching and learning shared by teachers in the field. Similarly, there is often a gap in the flow of knowledge between teachers and academic researchers, with the former not always being aware of or using academic research that may be useful to their teaching practice. From that point of view, the *SKOLA* (Germany) study provides an interesting example of how these two communities – teachers and researchers – can bring their respective knowledge bases together through collaboration. This is particularly interesting not just because it provided an opportunity for knowledge generated through academic research to be actually used by practitioners in the classroom, but also because tacit or professional knowledge shared by teachers was fed back into the research community and was given the opportunity to be codified. SKOLA is therefore a useful and rather atypical model of how these two groups – researchers and practitioners – can share knowledge and expertise that normally stays within the boundaries of their respective communities.

The commitment to including a large number of stakeholders in the generation and use of knowledge during an initiative may also prove problematic if not adequately managed. A case in point is that of the *National Vocational Qualifications Framework* (Hungary), which involved at the stage of "job analysis" 9 395 experts who produced 8 080 validation documents. The term "expert" referred here to all stakeholders involved in the process, including representatives of trades (builders, plumbers, turners). Although this commitment to inclusion is to be applauded, it was clear neither to what extent, in a

relatively short time, this enormous number of experts could receive adequate training to be involved in a standardised process of defining the contents of qualifications, nor how the results of a process involving such a large number of experts and expert groups were systematised for comparability – although some efforts were made towards this end.

A final point to be made regarding the role of stakeholders in the use of knowledge concerns the impact of ideology and/or bias, especially as VET is a politically charged area of public policy at the interface of education and the labour market. This may be particularly salient in systems with a long history and tradition, such as the German, Danish, or Swiss ones, and where the views of different stakeholder groups are more likely to be long-established and entrenched, and therefore potentially biased by political ideologies or interests. The *Innovation Circle* (Germany) provided one example of how to address this issue through the appointment of senior-level officials in a personal capacity rather than as representatives of their respective groups. However, it is not clear to what extent this approach was successful in eliminating all problems of bias in the use of knowledge, as issues of lack of transparency in the use of evidence coming from certain groups were voiced during the study visit. Another way of dealing with the issue is to make use where possible of academic knowledge produced by researchers who are generally external to the system itself. This is therefore one important role that academic research can play in the process of innovation and taken up again in the section below.

How knowledge is used in systemic innovations

Ensuring that a wide knowledge base is taken into account as well as having in place sufficient mechanisms for it to flow through the system and among different stakeholder groups are both crucial elements in the process of systemic innovation. However, it is also essential that any knowledge accrued be utilised adequately throughout the process and inform any actions taken or decisions made.

A good example of adequate knowledge utilisation has been the *Flexible Learning Framework* (Australia). In both the design and implementation of the framework there was extensive use of tacit and informal knowledge of stakeholders at all levels. This included the use of reviewers from industry, education, students, trainers, and teachers, as well as multimedia program and platform developers. In addition, formal professional knowledge was used in the creation of reports, the evaluation and development of the framework, and intentional capacity-building through funding research and innovation initiatives in this area. A particular strength of the framework was the attention paid to identifying and supporting individual leaders and champions who could be used as effective sources for knowledge transfer, raising awareness and aiding implementation at the field level. The initiative also includes

a rigorous monitoring and evaluation component, the results of which are used continually to refine and guide the development of the projects.[4]

The way knowledge generated through a new initiative and lessons learnt through monitoring and evaluation are applied to scale-ups or fed back into other initiatives is crucial, particularly for establishing credibility among all stakeholders as well as for addressing or helping to prevent "innovation fatigue". It is unfortunate that many of the cases examined in this study had been recently implemented and therefore had no completed evaluations, which would have allowed us to investigate in depth how findings are fed back. However, this lack of completed evaluations in the submitted case studies may be an indication that countries perceive this stage of the process as being of low importance. Given how crucial the knowledge generated by carefully planned evaluations can be in the process of innovation, it is surprising that the selection of case studies did not include more with this phase completed. Chapter 5 provides a more detailed discussion of the importance of the monitoring and evaluation stage in systemic innovation.

An example of how the process of using evaluation findings to inform scaled-up initiatives could be improved is the *National Vocational Qualifications Framework* (Hungary). This was implemented first on a small scale in 16 regional VET centres before being rolled-out at national level. However, primarily due to time constraints imposed by the European Commission timeframe, the outcomes of the small-scale implementation were not evaluated formally, and the information generated informally by the regional centres was not fully utilised in the scaling-up process.

Another instance in which there were doubts regarding the extent to which the gathered evidence actually guided the decision-making process was the *Technical Baccalaureate Reform* (Mexico). In this case, this seems to have been partly due to a widespread belief among all stakeholders at the time that reform was necessary and that any change would improve the situation. However, it was also a result of the Mexican policy-making system, which has traditionally relied more on historical legacies than on evidence – although the role of evidence is becoming increasingly important. This is therefore another example of how contextual factors can influence the process of innovation. It is also important to highlight that while knowledge, and research in particular, was gathered from different sources during the innovation process and is claimed to be gaining increasing importance in policy making, government officials and researchers alike reported that historical legacies still explain a good part of the shape of the secondary VET system in Mexico and in other OECD countries. One example is the diversity of delivery institutions providing training for the same qualification, as this situation lacks a clear rationale and presents a cost of reduced transparency for users.

Academic research in VET and its links with innovation

In this section we address separately the issue of academic research – and the relative shortage of it – in the area of VET, as it emerged in one form or another as a challenge in many, if not all, of the countries participating in the study. We know that this is also the case in other OECD countries, such as the United Kingdom. It is also of interest that two of the case studies submitted as interesting examples of systemic innovation in VET deal specifically with the strengthening of rigorous academic research and building capacity in the field; these are the *National Centre for Vocational Education Research* (NCVER) (Australia) and the *Leading Houses* (Switzerland). Background information on these two initiatives is provided in Boxes 6.1 and 6.2.

A distinction that is relevant to the discussion in this chapter is the one drawn by Burns and Schuller (2007) between research used to produce evidence-informed policy and which is oriented to informing action, and purely scientific, "blue sky" research, oriented to developing theory and testing hypotheses (although these are not mutually exclusive categories). Both types of research may be, and indeed are, carried out within academic institutions, such as university departments or research centres, and in this section the term academic research is used to encompass both policy-relevant and basic, "blue sky" research. Both have a role to play in the process of systemic innovation in VET and in education more broadly, and the shortage of VET-related academic research discussed later applies equally to both types.

As discussed briefly above, one of the ways that VET academic research can help in the process of innovation is by providing an external, independent point of view that may not necessarily be available to stakeholders, including policy researchers, within the system. In this study, we encountered instances of successful, highly-regarded VET systems that function well and manage to innovate, at least incrementally, without the support of a rigorous body of academic research, both policy relevant and not. Denmark and, to a lesser extent, Germany are cases in point. In the case of Denmark, there was broad consensus that VET research in the formal sense is very underdeveloped and insufficient, despite the Ministry's commissioning of several studies. Although the natural conclusion might be that there should be a strengthening of VET research at universities, it is also necessary to acknowledge that these countries have VET systems that are generally regarded as good or even very good by world standards – and they appear to have achieved this status with a weak knowledge base as measured by conventional research. The relationship between a formal knowledge base and the quality of a VET system therefore appears not to be simple and direct – it is possible to have one without the other.

It is also important to stress that academic research may in itself suffer from biases of its own, in other words it may not always be independent and may well serve the interests of particular groups of stakeholders. Academic researchers are also professionals working within their own networks and systems and will be influenced directly or indirectly by factors such as the existence of monetary or other incentives to carry out research in a particular field or topic. Providing adequate incentives to academics for conducting policy-relevant VET research is therefore one way that Governments could encourage more rigorous research in the field. This could be achieved for example by providing free access to relevant datasets for research purposes.

More formal research on VET could be a means of refreshing and challenging existing thinking rather than serving as a fundamental base for future planning. Stronger external research into VET could contribute alternative approaches and research results that may not conform to the orthodoxy. Such external inputs could also help to overcome some of the problems regarding the influence of political ideologies, and provide a more robust evidence base for policy makers who have to judge among the competing calls for new ideas from stakeholders, including employers.

Another advantage of having a strong body of research evidence is that it can help to find solutions to problems if and when these appear, even in a well-functioning system. The challenge is that if no formal knowledge is gathered on how and why a system is working well, it is difficult to know how to address these problems when there is a break in the system.

It is interesting at this point to examine in more detail two initiatives that aimed specifically to improve the quality of, and capacity in, VET-related research: *NCVER* (Australia) and *Leading Houses* (Switzerland). Although the broad aims of these two projects were similar, the approaches adopted were quite different, as can be seen in Boxes 6.1 and 6.2. Specifically, the Australian *NCVER* is an independent organisation operating at arm's length of national and regional governments and funded by them. It is therefore both the manager of Australia's national VET research programme, with the power to allocate funding to external researchers, and a research organisation in its own right. Apart from issues regarding potential conflicts of interest given this dual role, there are concerns regarding the extent of "blue sky" research carried out by the organisation of the type that could contribute to innovative thinking and initiatives in ways such as those discussed above. While it was acknowledged that *NCVER* is clearly providing government and the country in general with robust and rigorous descriptive evidence about the VET system, concerns were expressed by some individuals that not enough was being done to move beyond description to more critical engagement with the data. To that extent, it might be necessary for more VET researchers working

outside *NCVER* (*e.g.* at universities) to make fuller use of its data to provide the critical accounts and evaluations that *NCVER* does not usually undertake.

The Swiss *Leading Houses* took a rather different approach in an attempt to raise the status and quality of VET research. *Leading Houses* are university-based research centres run by full-time academics, although they are funded primarily by the Swiss Federal Government and carry out research in areas that the Government considers of high priority. They are therefore best viewed as a set of research institutions overseen by a Federal Government steering committee. This approach has in principle the potential to produce more in-depth and analytically robust work in VET than does *NCVER*. Certainly, most *Leading Houses* have already produced a number of interesting research reports and publications, as well as a series of books and a new international journal dedicated to research on VET. However, although it was very clear from the outset that *Leading Houses* were expected to fill the research gaps, respond to national needs, and even explore new issues with a forward-looking perspective, it remains to be seen whether a substantive and formalised knowledge base will be finally built. It is worth stressing at this point the Swiss government's commitment to, and expectations of, high standards and quality; one Leading House has been discontinued because it was considered to not have met these standards, and there is a real threat that others may face similar consequences if their work is judged to be not good enough in the upcoming evaluation. One final point regarding the Swiss approach, particularly as it contrasts to the one adopted in Australia, is that there may be a risk of producing a large but fragmented body of knowledge.

An issue that remains unclear in Australia, Switzerland, and many other countries, in the field of VET and in education in general, is the connection between research efforts and actual innovation. The lesson here is precisely how difficult such a connection seems to be. The Australian and Swiss approaches to research on VET certainly deserve international attention, but it would be advisable to also explore ways in which nationally funded research can have an impact on educational innovations, particularly in areas related to teaching and learning.

Another area of concern is the relative absence of formal links between VET researchers and stakeholders from the world of industry as well as academic researchers outside the traditional education fields, such as economists and labour market specialists. As stated at the beginning of the chapter, VET is a particularly difficult area in which to conduct research, as it stands at the interface of education and employment. However, so far there have been few systematic attempts to address this conceptual separation of VET from the world of work and the resulting ghettoisation of the domain; however, *NCVER*, for example, is deliberately attempting to address this separation through the recruitment of labour economics researchers, and two of the

Swiss *Leading Houses* are run by labour economists with strong links to the business world. This poses a challenge for universities and research centres, as it requires them to support inter-disciplinary and mixed-method research as well as actively encourage and reward academics wanting to collaborate across the disciplines. It also stresses once more the importance of good quality brokerage that will ensure that knowledge shared by a group of stakeholders, *e.g.* academics, is transferred and disseminated to other groups in ways that are relevant to their goals and interests. A possible way forward may be the commissioning of more systematic reviews on specific VET-related questions. Such reviews already exist in many areas of educational research although they are not yet as widespread as in the fields of medical and health-related research (for more on systematic reviews see for example the work of the EPPI Centre[5] or the Cochrane Collaboration.[6] Finally, the ways in which the impact or success of innovations intended to foster research in VET needs to be assessed. One way of evaluating an initiative aiming to improve the quality of research and statistical knowledge base is in terms of the quality and quantity of its research output. In this respect, both the *NCVER* and most *Leading Houses* seem to be successful. In addition, both of these initiatives aim to develop research capacity in the area by training young researchers, and they have both been successful. However, these innovations were intended to improve either *(i)* the policy making process in this sector (by using evidence to inform the process and stakeholders' views) or *(ii)* the quality of the provision (through improved learning processes or technologies and/or by raising the employability of VPET trainees and their productivity). In light of this, it is not clear that either of them can be deemed to have been entirely successful at this point. Proving that the knowledge base created has had an important impact on VET policy and practice will be a challenge for the Governments in the future.

Conclusions and policy implications

This final section attempts to summarise some of the findings of this study regarding the use of knowledge in systemic innovation. This is a rather complex task, given that many of the issues discussed above are interrelated and do not lend themselves easily to brief summary statements. The section finishes with a set of implications for policy makers in the area of innovation that stems from the analysis presented above.

These are further developed and discussed in Chapter 10 in the context of policy recommendations for the whole study.

Conclusions

- Multiple types of knowledge, developed and owned by a range of stakeholders, are used in Systemic Innovation and VET, either on their own or in combinations.
- The empirical evidence collected in this study does not suggest that certain types of knowledge are more likely to be used in certain types of innovation. However, an examination of the case studies, according to the typology framework presented in Chapter 7, suggests that top-down, large-scale initiatives tend to draw on more than one type of knowledge (See Chapter 7, Annex 7.A1).
- There is a lack of a critical mass of codified, formal knowledge on VET, both at national and international levels.
- Partly as a result of this lack of codified knowledge, VET seems to be particularly prone to biased uses of the knowledge base and to introducing new ideas that are not adequately supported by or subject to robust evidence.
- Good communication among stakeholders is critical, and it is therefore imperative that innovative and well-supported mechanisms are in place in the system to allow this to happen efficiently.
- Policy implications
- Academic research can play an important role in providing fresh, alternative points of view on the system that may not be obvious to internal actors and stakeholders. These can help to stimulate innovative thinking and capacity in the field.
- International and comparative bodies of knowledge currently seem to be under-utilised. They could provide useful input to the process of innovation, provided that appropriate consideration is given to the national/local context. This is becoming even more urgent, given the globalised nature of industry and commerce and the rising role of multinational companies.
- Attention should be paid to the possibility that knowledge and evidence may be politically or institutionally biased; VET may be particularly prone to such biases, being at the interface of education and the labour market. Independent research, for example from academia, may help to protect from this.
- It is essential that appropriate mechanisms are in place that will facilitate the flow of knowledge across the system and among all groups of stakeholders. Good flow of information is particularly

important in VET, as many systems seem to rely to a large extent on tacit or informal knowledge and expertise shared among professionals in the field.

- It is also essential that any information and knowledge generated as a result of the innovation process itself, including but not limited to the monitoring and evaluation phases, is used and put into practice at later stages of the process and/or in future initiatives in order to avoid both duplication of work and innovation fatigue by professionals and practitioners in the system.

Box 6.1. **The National Centre for Vocational Education Research (NCVER) (Australia)**

The National Centre for Vocational Education Research (NCVER) was established in 1981, and is a not-for-profit company owned by the national and state and territory ministers responsible for VET. Its key responsibilities are: a) the coordination of research in the VET sector, including the management of the national VET competitive grants programme and the analytical programme of the Longitudinal Surveys of Australian Youth (LSAY); b) the collection and analysis of national VET statistics and survey data; and c) the coordination of a national programme of student and employer satisfaction surveys. NCVER has become acknowledged both nationally and internationally as a leading centre for VET research, and its VOCED database and website provide a unique service to VET researchers throughout the world. NCVER currently secures its core funding under the Commonwealth-State Agreement for Skilling Australia's Workforce (DEST, 2006), receives other funding from state and territory governments for specific projects, and conducts consultancy work on a fee-for-service basis. The NCVER Board provides advice to federal and state training ministers on the national research priorities.

The most substantial area of its work involves the collection of fully-national VET statistics, managed through the Australian Vocational Education and Training Management Information Statistical Standard (AVETMISS). AVETMISS is overseen by the National Training Statistics Committee, which comprises Commonwealth and state and territory VET officials, with operational support from NCVER. The statistical data include: *(a)* a student and courses statistical collection; *(b)* an apprentice and trainee collection; and *(c)* a finance collection that comes from the separate administrative systems of the states and territories. These statistical collections are supplemented by an annual national student outcomes survey and a bi-annual survey of employers' use and views of the VET sector. This evidence base enables the national and sub-national governments to audit and monitor the performance of the publicly funded VET sector and to inform their policy making. An annual VET system report, moreover, is provided to the Federal Parliament. The emphasis that NCVER has placed on data quality uniformity means that considerable trust has been established in the statistical evidence base. In effect, therefore, NCVER acts as the custodian of VET data on behalf of the Australian Government, and makes both data and other related information available to external users for a minimal charge.

Box 6.1. **The National Centre for Vocational Education Research (NCVER) (Australia)** *(continued)*

In terms of the importance of its research activity, NCVER, over a period of 25 or so years, has trained a cadre of highly skilled VET researchers, some of whom have moved into and between academia, nationally and internationally. This has provided Australia with a considerable dedicated capability which many other countries would find hard to match.

The Australian Government's (DEST, 2006) review of NCVER's research and statistical services identified the need to build research capacity in the VET sector by:

- Attracting experienced researchers from outside the sector
- Encouraging early career researchers
- Supporting people in the sector to undertake research

NCVER has begun to respond to these issues with a new approach to commissioning programmes of work rather than projects. This has seen the engagement of four prestigious university centres from outside the VET research area, and also instigated a modest scholarship scheme to encourage VET practitioners to engage in research.

Box 6.2. ***Leading Houses*** **(Switzerland)**

The Swiss *Leading Houses* represent a unique and innovative approach to coordinating at a national level the research efforts on Vocational and Professional Education and Training (VPET)[7] and making them responsive to the country's needs and priorities in this domain. They are designated centres of expertise, located in universities, whose main mission is to build a competence network to conduct research on their own account, grant research contracts, and promote young research talent, while being well connected internationally. Their priorities come from the Federal Office for Professional Education and Technology (OPET), their principal funder, which sets them according to the perceived needs of the VPET system, mostly as an input to mid- and long-term policy making in this sector.

Leading Houses are in charge of the OPET programme to promote VPET research in a sustainable way and with a mid- and long-term horizon. The aim of the programme is to examine the major issues in relation to the needs of the VPET system and to provide research evidence to facilitate policy making and improve the overall quality of the system.

Box 6.2. ***Leading Houses*** **(Switzerland)** *(continued)*

Leading Houses develop a thematic area of relevance for vocational education and training. Aside from conducting research, their main tasks are the promotion of young researchers, keeping abreast of the state-of-the-art in the field, and networking with other national or international institutions or researchers active in the same area. Every VPET research priority is linked to one or several chairs at Swiss universities, and defined by a temporary service agreement with the OPET. The holder of the chair is responsible for the content and scientific quality of his or her research priority. The aim is to fill conceptual gaps and meet the needs of VPET policy and practice.

The research projects also serve to promote young researchers. For this reason, only third-level institutions that confer doctorates can be given leading house status. Conferences and doctoral student programmes provide young researchers with valuable opportunities to discuss questions and findings with experts. The long-term aim of *Leading Houses* is to develop sustainable VPET research and thus boost existing research capabilities. By achieving a critical mass, the intention is that a research tradition should firmly take root. *Leading Houses* should also provide incentives for the creation of lectureships, as well as serve as stepping-stones in the creation of research posts within the Federal Institute of VPET (*Eidgenössisches Hochschulinstitut für Berufsbildung*, EHB) and other VPET institutions.

Organisationally, *Leading Houses* are grouped into research priorities, which are then subject to scientific investigation carried out by one or several academic chairs. There are currently the following six research priorities, which have led to the establishment of five *Leading Houses* throughout the country since 2003:

- Quality of vocational education
- Social competences[8]
- Learning strategies
- Technologies for vocational education
- Economics of vocational education
- VPET systems and processes (although this one has not yet been created due to the lack of quality in the tenders received by OPET thus far)

Key messages

Knowledge plays a crucial role in all stages of the process of systemic innovation in VET, from initiation to monitoring and evaluation. Some of the issues regarding its role, *e.g.* the need for brokerage, are related to similar questions regarding the increasingly prominent role that knowledge and evidence play in policy making in general.

Good brokerage is particularly important in VET for facilitating the flow of knowledge among diverse groups of stakeholders such as policy makers, researchers, practitioners and the social partners. The empirical findings of this study suggest that the quality and quantity of brokerage is less than optimal, often resulting in difficulties in information flow and sharing of expertise among stakeholders.

Tacit and informal knowledge is often used in systemic innovation in VET. This is partly due to the lack of a large body of codified knowledge in the field and has sometimes led to the generation of new knowledge during the innovation process itself.

The monitoring and evaluation culture of systemic innovation in VET is generally rather weak. This has implications for the state of the knowledge base, since rigorous monitoring and evaluation processes can generate new knowledge that can help to inform future initiatives.

Good quality, robust academic research on VET is also lacking in most countries. Two of the case studies investigated in the context of this project, the Australian NCVER and the Swiss *Leading Houses*, deal specifically with this issue and provide interesting models of how the challenge of increasing the quality of academic research may be addressed.

VET sits at the interface of education and the labour market and can therefore be a politically charged policy area, often affected by political interests and ideologies. Ensuring communication among groups of stakeholders as well as encouraging more independent research from outsider groups, such as academic researchers, can help to address some of these biases.

Notes

1. There are also virtual brokerage agencies in VET, such as European Research in Learning and Work at *www.b.shuttle.de/wifo/educ/news.htm*.
2. "Vocational knowledge" in the sense of knowledge that a trainee needs to acquire to become an expert in the field is not included or discussed here, as it is not relevant to the scope of this study, which deals with the processes rather than substance of innovations.
3. A possible negative consequence of a very strong commitment to consensus, however, is that it may act as a barrier to more radical innovations. This issue is further elaborated upon in Chapter 8.
4. There were, however, some serious concerns regarding the quality of the evaluation. For example, the 2007 Benchmarking Survey did have self-reported ratings on whether e learning had improved actual or expected employment outcomes, but this was not correlated with independent measures (of pre and post-employment options, for example, or comparisons with non-user groups). The planning for 2008 11 benchmarking surveys seemed to include measurement of learning outcomes and perceptions of learning outcomes as a function of e-learning, but not enough information was provided to evaluate whether these would be assessed using independent criteria (other than self-report, and/or in comparison to non-users' learning outcomes). For more details, see the country report for Australia at *www.oecd.org/edu/systemicinnovation*.
5. *http://eppi.ioe.ac.uk/cms*.
6. *www.cochrane.org.*
7. This is the official Swiss term for vocational education and training.
8. This *Leading House* was subsequently discontinued for its failure to meet the quality standards set by the Federal Government.

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