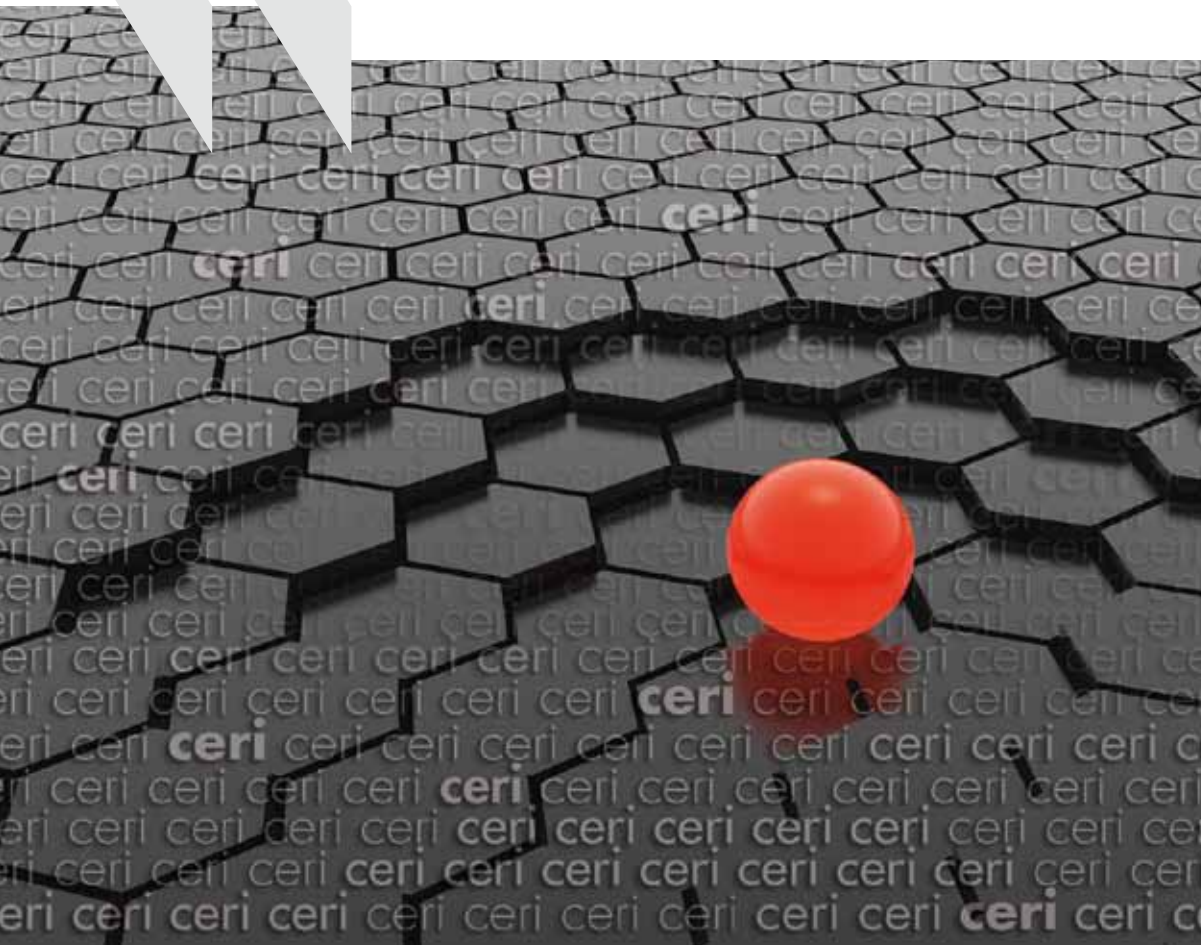
Working Out Change

SYSTEMIC INNOVATION IN VOCATIONAL EDUCATION AND TRAINING



Centre for Educational Research and Innovation

OECD

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SYSTEMIC INNOVATION IN VOCATIONAL EDUCATION AND TRAINING

CENTRE FOR EDUCATIONAL RESEARCH AND INNOVATION



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Foreword

This publication presents the main findings of the OECD Centre for Educational Research and Innovation (CERI) project on Systemic Innovation in Vocational Education and Training (VET). The project was undertaken during 2007 and 2008 as part of a wider CERI commitment to research on systemic innovation, which also included a sister project on Digital Learning Resources as Systemic Innovation.*

This project benefited from the active participation of the following countries: Australia, Denmark, Germany, Hungary, Mexico and Switzerland. Each of these countries completed a questionnaire on innovation in VET, provided a background report for the cases (now available online from the project website),** and organised a series of visits intended to provide empirical evidence based around a selected number of case studies.

The management of change within complex systems is a key challenge to educational policy makers, yet currently the dynamics of innovation in education are not well understood. So far, not much comparative analytical attention has been devoted to the analysis of innovation in education. In this respect, this publication presents recent work carried out in the CERI on the process of innovation in education, and particularly in the VET sector. The report focuses on systemic innovation, which can be defined as any kind of dynamic system-wide change that is intended to add value to the educational processes and outcomes.

Systemic innovation aims to improve the operation of systems, their overall performance, the perceived satisfaction of the main stakeholders with the system as a whole, or all of the above. The approach taken here in the analysis of systemic innovations involves the comparative investigation of how education systems or sectors go about initiating innovation, the processes involved, the knowledge base which is drawn on, and the procedures and criteria for assessing progress and outcomes. These questions are addressed drawing on empirical findings from a selection of 14 case studies in Vocational Education

*More at *www.oecd.org/edu/systemicinnovation/dlr*.
**More at *www.oecd.org/edu/systemicinnovation/vet*.

and Training in six OECD countries: Australia, Denmark, Germany, Hungary, Mexico and Switzerland. The resulting analyses provide key input to the OECD-wide Innovation Strategy, and contribute to our understanding of how innovation can be supported and sustained in education systems, particularly in the VET sector.

The foundation for this work was in the 1995 OECD Centre for Educational Research and Innovation (CERI)'s report *Educational Research and Development: Trends, Issues and Challenges*. This report raised the question of why educational research and development had emerged as a prominent issue and how best it could be linked to innovation. More than a decade later, the key role of knowledge-based innovation in education was restated in CERI's work on knowledge management. A series of country reviews of educational R&D involving Denmark, England, New Zealand, Mexico and Switzerland, and the publication *Evidence in Education: Linking Research and Policy* confirmed that in most, if not all, countries the issues of effective research in education, links to innovation and the importance of allocating scarce resources in the most efficacious manner remain as important as they were almost 15 years ago.

In this work the lens of systemic innovation is applied to VET, a sector recently identified as a priority area of work by OECD education ministries given its important economic and social functions. This study is part of a programme of work within the OECD's Directorate of Education on VET and runs in parallel to Learning for Jobs, the policy review of VET systems that will be reporting in 2010.

As this study brings together evidence and analysis on systemic innovation and on VET, the conclusions and policy recommendations offered in this book will be of interest to researchers, policy makers and practitioners in the fields of education and public sector innovation as well as VET.

The project was initiated by Tom Schuller and led by Francesc Pedró. The conceptualisation and outline of the project was developed by both of them with Tracey Burns. Katerina Ananiadou, Beñat Bilbao-Osorio, and Vanessa Shadoian-Gersing later joined the team, and together with Francesc Pedró and Tracey Burns, were responsible for liaising with countries, carrying out the country visits, and drafting the resulting country reports. The authoring of the final report was shared by the whole team. Chapter 3 draws on a previous contribution by Manuel Souto (University of Bath). The whole project and this publication benefited from the assistance of Ashley Allen-Sinclair, Therese Walsh and Cassandra Davis.

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Last but not least, the team would like to thank the participants from all OECD countries who shared their thoughts and time in the study visit interviews to make them such a success.

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Executive Summary

What is systemic innovation?

The main aim of this study is to analyse the process of innovation in education. To this purpose, systemic innovation is defined as any kind of dynamic system-wide change that is intended to add value to the educational processes. Chapter 1 discusses the advantages of such a perspective. Particular attention is given to how countries go about initiating innovation, the processes involved in development and implementation, the role of drivers and barriers, the relationships between main actors, the knowledge base which is drawn on, and the procedures and criteria for assessing progress and outcomes.

For those interested in innovation in education, whether practitioners, researchers, policy makers or non-specialists, the systemic approach offers a good starting point for examining how a particular educational sector, institution or organisation goes about innovation.

Why does it matter for Vocational Education and Training (VET)?

The analysis of innovation from a systemic perspective has been very limited in this field. Those analyses of innovation in VET that go beyond particular case studies of institutional or discrete initiatives tend to focus either on the links between new technological developments in a particular economic sector and the resulting demands for VET, or on the promotion of the innovative spirit that is usually attached to an entrepreneurial approach to employment and business opportunities. There is thus a shortage of research on both systemic innovation in VET as a whole and in policy approaches to guide such systemic innovation.

In an attempt to close the existing knowledge gaps, this project has worked towards answering the following questions:

- What was the process for identifying key areas for innovation and who was involved?

- How were bridges between stakeholders brokered to allow for exchange of knowledge and practice?
- What were the principal knowledge sources and types drawn on in preparing the innovation?
- How was the process of innovation development implemented?
- How was the process scaled up (e.g. from local to national/regional level)?
- What were the criteria used for evaluating the innovation, and how were these applied?
- What were the positive and negative lessons learned, with respect to both process and outcomes?

What are the lessons learned?

This project improves the understanding of how systemic innovation works in the VET sector in four areas.

1. Systemic innovation is a useful analytical framework for the assessment of innovation policies in VET.

The main benefit of the systemic innovation approach is that it can help governments and other stakeholders have a comprehensive evaluation of how the system works and how they can enhance their innovation capacity. It is thus relevant from a policy perspective because it makes transparent what information gaps exist and, particularly, where in the lifecycle of the innovation a good evidence base might be more useful. In the end, the systemic approach to innovation contributes to the assessment of how the innovation system works and to the identification of policies that are capable of boosting the innovative potential of the VET system.

2. A coherent and targeted system should be in place to promote and support successful innovations in VET and to induce system-wide change. Such systems are still infrequent at country level.

Relatively few countries have a formalised structure to promote and support innovation, capacity building to enable it, and a coherent set of knowledge management mechanisms linking innovation with research. Only Switzerland and, to a lesser extent, Australia, can be said to have designed a systemic approach to innovation in VET. Although efforts to develop a systemic approach to innovation in VET are still rare, they have the potential to develop better processes and contribute to an incremental improvement of the VET system.

The need to respond in a timely manner to the socio-economic challenges that all VET systems are facing in an increasingly globalised and rapidly changing world seems to be driving most of the systemic innovations that this project analysed. Political leadership and capacity to steer and manage innovation, the availability of resources, and the existence of regulatory mechanisms supporting the process all seem to play a crucial enabling role in most systemic innovations. Equally, the availability of evidence, under the form of a coherent and easily accessible knowledge base, and a good level of consensus among stakeholders are important during the design and implementation of the innovations.

Nevertheless, innovation enablers and barriers are not universal but rather context specific, and their importance seems to vary depending on the cases and the context. This is particularly true of the role of consensus among stakeholders, of evidence and of political leadership. In particular, evidence can facilitate the adoption of innovation and inform the process – although the case studies suggest that innovations are mostly drawing on tacit knowledge and beliefs or a sense of urgency to change the *status quo*.

3. VET systems need a formalised, coherent, well-sustained and up-to-date knowledge base to increase their innovation capacity, to address knowledge gaps and to benefit fully from systemic innovations.

VET innovations are seldom the result of an embodied set of knowledge or empirical evidence accumulated over the years on which stakeholders base their decisions and to which they contribute with their feedback. Moreover, countries do not seem to pay enough attention to monitoring and evaluating how innovations evolve in the context of the VET system, particularly those whose realisation requires a large amount of policy commitment and financial investment. In addition, little has been done to assess when a particular innovation can be said to be a success or a failure, and what lessons can be learned.

Although there has not been an empirical validation of the assumption that a better knowledge base results in more successful innovations in our case studies, the existing lack of links between research and innovation efforts in VET is remarkable. This is reflected mostly at government level, with a generalised lack of attention to the issue of bringing together both activities to result in a coherent knowledge base. But it is also clear that innovation on the one hand and research on the other seem to appeal to different profiles of professionals in education.

Finally, it is particularly perplexing to see a lack of research evidence and breaks in the feedback loop of the evaluation process in light of the push for greater accountability and increased assessment of the system, teachers, and students that has been on the political agenda in the last two decades. This is a clear incoherence in the system that needs to be addressed.

4. VET systems may be losing innovation opportunities due to a lack of evaluations and knowledge feedback.

Despite its potential, the evaluation of innovations seems to be missing from most VET systems. This applies to local and discrete innovations and to top-down innovations, including those aiming for system-wide impact. A number of reasons may explain this, ranging from the lack of sustained VET research efforts, the disconnection between practitioners, researchers and policy makers, the lack of dedicated mechanisms to gather relevant information or even the prevalent culture of the sector.

The relevance of evaluation becomes even clearer regarding piloting. Pilots fulfil a very important role in systemic innovations that aim to have a deep impact on the system. While they are costly in terms of time and resources, they play an important role in the prevention of implementation gaps and innovation fatigue. Unless a monitoring and evaluation procedure is carefully implemented, however, the benefits of pilots may be lost.

What are the policy implications for VET systems?

Chapter 4 looks at the role of government, policy, and the research agenda. In times of economic crisis, a systemic approach to innovation in VET is even more urgently needed. The programmes that many governments have launched to respond to the financial crisis have been coupled in many cases with an in-depth reflection about the way in which our economies work and with strategies to promote longer-term development and vision. This reflection shows that in the medium and long-term, innovation will be a key factor not only in economic growth but also in social welfare. The VET sector should be no exception to this.

To set up the conditions for such a system, governments in particular, with the support of the other stakeholders in VET, need to:

Develop a systemic approach to innovation in VET as a guiding principle for innovation-related policies.

Such a systemic approach includes at least five basic elements.

1. A clear policy intended to support VET research in the light of national priorities, both at policy and practitioner levels.
2. An evolving framework for sustaining both top-down and bottom-up innovations in VET, including monitoring and evaluation mechanisms which can contribute to the generation of new knowledge about VET policies and practices.

3. A unified knowledge-base which includes both VET research evidence and the new knowledge emerging from the assessment of innovations, including links to international knowledge bases on these topics.
4. Regular efforts to synthesise and disseminate new knowledge on effective VET policies and practices, so as to challenge the status quo of the system, set new horizons and contribute to incremental change.
5. Capacity building (structural, personal) to enable all the elements above.

Promote a continuous and evidence-informed dialogue about innovation with the stakeholders in VET.

VET policy discussions are particularly prone to biased uses of the knowledge base, given the absence of solid empirical evidence. However, the engagement of stakeholders in policy dialogue is a prerequisite for reaching consensus and promoting successful policy interventions in VET. It is therefore of the highest importance to inform the policy debate with clearly presented evidence.

Build a well-organised, formalised, easy to access and updated knowledge base about VET, as a prerequisite for successfully internalising the benefits of innovation.

In many countries the usual mechanisms that would contribute to the articulation of a knowledge base are not in place (such as dedicated journals, academic journals, conferences, national reference and research centres). Some countries may want to address this need by using existing facilities or mechanisms, while others may prefer to set up new measures as an indication of the increased priority allotted to innovation in VET, for instance the creation of dedicated research centres, networks or public calls with clearly stated research priorities. The benefits of investments made in VET innovations will not be adequately recognised or of use unless the appropriate tools for knowledge management are in place: to share knowledge (for instance, between stakeholders and diverse sources of innovation), to accumulate that knowledge in a consistent and coherent way, to articulate it so as to generate clear messages, and finally to disseminate results in decision-oriented terms both for practitioners and policy makers.

Supplement investments in VET innovations with the necessary efforts in monitoring and evaluation.

It is in the best interest of public governance and accountability to generate the mechanisms and procedures required to approach critically both bottom-up and top-down innovations. An empirical assessment can contribute decisively to:

- Inform decisions about scaling up or diffusion of innovations.
- Instil in the main actors the culture of output-oriented innovation: innovations aimed at measurable improvements which can help to cope with innovation fatigue or resistance.
- Get value for money.
- Obtain feedback on the results of particular policy measures intended to foster innovation.

Support relevant research on VET according to national priorities and link these efforts to innovation.

VET research is, compared to other areas of research in education, ill-served for a number of reasons. VET systems could greatly benefit from a national system of VET research which combines the following elements:

- funding opportunities for researchers according to national priorities with international standards of quality;
- capacity building with the co-operation of research centres and universities, if possible in view of cooperation with international networks;
- dissemination activities, particularly by means of tailored publications, intended to engage a large range of stakeholders in the discussion of the implications of research evidence, who in some cases may require some additional capacity building;
- set up mechanisms for the involvement of those institutions or programmes responsible for initial and continuous VET teacher training.

Chapter 1

Introduction

This report presents the main findings of the OECD Centre for Educational Research and Innovation (CERI) project on Systemic Innovation in Vocational Education and Training (VET). The project was undertaken during 2007 and 2008 as part of a wider CERI commitment to research systemic innovation, which also included a sister project on Digital Learning Resources as Systemic Innovation.[1] Additionally, the Education and Training Policy Division of the OECD Directorate for Education has carried out a policy review on VET, whose first phase has produced a report entitled *Learning for Jobs*.[2] Both parallel strands of work have to be considered responses to the request made by OECD member states to emphasise the VET sector.

The CERI project benefited from the active participation of the following countries: Australia, Denmark, Germany, Hungary, Mexico, and Switzerland. Each of these countries completed a questionnaire on innovation in VET, provided a background report for the cases (now available online from the project website[3]), and organised a series of visits to provide empirical evidence to nurture the project, which is based on a select number of case studies.

Context: why research systemic innovation in VET?

The main aim of this study has been to analyse the process of innovation in education. To this purpose, systemic innovation was defined as any dynamic system-wide change intended to add value to the educational processes. Particular attention was given to how countries initiate innovation, the processes involved, the role of drivers and barriers, the relationships between main actors, the knowledge base being drawn on, and the procedures and criteria for assessing progress and outcomes.

Although the management of change within complex systems is a key challenge to educational policy makers, the dynamics of innovation in education remain to be fully understood. So far, not much comparative analytical attention has been devoted to the policies related to educational innovation, the knowledge base on which they draw, and their ultimate effectiveness.

It is important to acknowledge that the project was designed and developed well before the emergence of the current economic crisis. However, key messages and policy implications have been elaborated in view of the current circumstances and needs, where possible.

As one of the first attempts to analyse innovation in a particular education sector from a systemic perspective to better understand how education systems approaches innovation, this work has been breaking new ground in many respects. More specifically, it looks at how innovations are generated and diffused in the system, to what extent knowledge is the basis of these innovations, how knowledge circulates throughout the process, and how stakeholders interact to generate and benefit from this knowledge. Work from other fields, including both the public and private sectors, provided a solid basis for reflection and analysis. The aim was to better understand the process of innovation and facilitate the policy process involved in promoting, sustaining, assessing, and scaling up innovations.

For this purpose, the adoption of a knowledge management perspective was appropriate and extremely useful. Such a perspective, previously used by CERI in the area of educational research and development,[4] emphasises how knowledge is produced, shared and disseminated, and effectively used in any decision-making process, whether in policy making or professional practice. Again, it should be stressed that this may be the first time that such an approach has been applied to the analysis of systemic innovation and represents a first step in a promising analytical field.

In addition, the analysis of innovation from a systemic perspective has been extremely limited within the VET field. Analyses of innovation in VET that go beyond particular case studies of institutional or discrete initiatives tend to focus either on the links between new technological developments in a particular economic sector and the resulting demands for VET, or on the promotion of the innovative spirit that usually accompanies an entrepreneurial approach to labour opportunities.

Research questions

Although there exists an increasing interest in the role played by research evidence in policy formation in education, not enough is known about the connections among research findings, public policies, and educational

innovations. Previous CERI work on knowledge management, on educational R&D, and particularly on evidence-based policy research (OECD, 2004; OECD, 2007) points to the current difficulties experienced when trying to align these three elements.

The systemic analysis of innovation in education provides another opportunity to continue and refine the work carried out so far, paying particular attention to the connections between evidence and innovation processes in education. In particular, this project has worked to answer the following research questions:

- What was the process for identifying key areas for innovation, and who was involved?
- How were bridges between stakeholders brokered to allow for exchange of knowledge and practice?
- What were the principal knowledge sources and types drawn on in preparing the innovation?
- How was the process of innovation development implemented?
- How was the process scaled up (e.g. scaled from local to national/ regional level)?
- What criteria were used to evaluate the innovation, and how were they applied?
- What were the positive and negative lessons learnt, with respect to both processes and outcomes?

Sharing experience in this way could shed light on the comparative strengths and weaknesses of different systems and policy approaches, in particular:

- the connections between research evidence and innovation policies in education;
- the extent to which innovation policies in education are driven from the centre;
- the openness of education systems to bottom-up innovation;
- the channels through which innovation policies are developed and implemented;
- the time horizons adopted for implementation; and
- the ways in which monitoring and evaluation are carried out, and the roles played by stakeholders in different education system configurations.

The systemic approach includes the reflection on "innovation fatigue", or the pace at which successive innovations can be effectively and iteratively implemented. Sharing experience in this way could also shed light on the experiences and roles of other stakeholders in fostering innovation in the VET system (*e.g.* industry, small and medium-sized enterprises, and/or teacher unions) and the dynamic interaction between so-called "top-down" and "bottom-up" approaches to innovation.

Generally speaking, the systemic approach to innovation applied to VET can provide constructive insights into a broader perspective of innovation systems and policies in education as well as a basis for further research in this area, particularly regarding the connections between research evidence and innovation in education. In particular, work on systemic innovation in the VET sector offers major opportunities to investigate:

- *Competing concepts of innovation* in VET: how is innovation defined and understood in different VET systems? Why should innovation in VET systems be fostered?
- *The dynamics of innovation* in VET from a knowledge management perspective: what are the main models of innovation in VET in OECD countries? What are the systemic factors involved?
- *Innovation policies* in VET: from the perspective of evidence-based policy research, how are innovation policies designed? What is the role of research evidence in nurturing innovation policies? How are these policies monitored and evaluated?
- *Innovation indicators* in VET: can innovation in VET be operationalised and accounted for? What would a system of indicators in this area look like? Would benchmarking countries and monitoring progress over time prove ultimately useful?

Methodology

The project had three phases: *(i)* analytical, *(ii)* empirical and *(iii)* comparative.

The development of the analytical strand started with a stock-taking exercise that brought together not only relevant lessons from earlier work, specifically the CERI work on Knowledge Management, Educational R&D, and Evidence-based Policy Research (OECD, 2004; OECD, 2007), but also other activities, such as Schooling for Tomorrow,[5] in which there have been found direct links to Innovation Units and similar bodies in several member countries. It also took into account similar work done at the OECD in the field of innovation policies in health as well as in science and technology.

This stock-taking exercise was supplemented with an expert meeting on conceptual and methodological issues, for which a number of expert papers were commissioned. The focus of the empirical strand was a series of case studies (see Box 1.1).

Given the exploratory and ground breaking nature of this work and the lack of other relevant work in the area, the methodological approach adopted was based on case studies to test the initial assumptions and to generate a first map of both the interplay between drivers and barriers and the interactions among stakeholders. The choice of cases turned out to be helpful in this respect because it provided a manageable set of factors and variables for analysis.

Although the case studies analysed form a significant set of empirical evidence both in number and in scope, future work on systemic innovation would require a larger evidence base. In particular, we recommend that the case study approach be supplemented with other methodological strategies to better capture the dynamics of innovation at system level.

Box 1.1. **Case studies developed**

The case studies covered a variety of areas, ranging from the promotion of research on VET (*e.g. Leading Houses*, Switzerland; *Building a research and statistical evidence base for VET*, Australia), to the development of new tools (*e.g. Flexible Learning Framework*, Australia; *Self-regulated and cooperative learning in VET*, Germany), to the establishment of specific bodies involving various stakeholders aimed at improving VET (*e.g. Innovation Circle on VET*, Germany; *Follow-up on the Globalisation Council's recommendations for VET*, Denmark).

The innovations described in the studies also varied greatly in their regional coverage. Some of the case studies presented innovations implemented in a particular region (*e.g. Linking public and private resources to improve worker preparation and training in the Mayan Riviera*, Mexico), while others affected the entire national VET system (*e.g. Preparing process of the new modular National Vocational Qualification Register*, Hungary; *Technical Baccalaureate Reform*, Mexico).

The case studies also covered a variety of VET sectors and forms of delivery. Some initiatives were targeted at a particular sector such as adult training ("*Step one forward"*, a programme providing financial support to train low-skilled adults, Hungary) or school-based secondary VET (*e.g. Technical Baccalaureate Reform*, Mexico). Some case studies focus on a particular method of delivery, such as e-learning (*Flexible Learning Framework*, Australia, that aims to improve the e-learning infrastructure), while others deal with the whole VET system (*Building a research and statistical evidence base for VET*, Australia).

Table 1.1 gives a brief overview of all the case studies for reference purposes. For an in-depth analysis and discussion of all cases see the country reports available on the study's website *www.oecd.org/edu/systemicinnovation*.

Table 1.1. **Overview of case studies**

Country	Title of the case study
Australia	*Increasing the status of VET* The Joint National VET Communications Project which is undertaking new baseline research into people's attitudes and knowledge about VET
	Australian Flexible Learning Framework A collaboration between the Australian Government and the eight state and territories for supporting and leading the growth of e-learning across the VET system
	National Centre for Vocational Education Research (NCVER) A centre for building a research and statistical evidence base for Australian VET
Denmark	*Globalisation Council* Follow-up to the Globalisation Council's recommendations for a VET system fit for the future with a special focus on improving completion rates and reducing drop-out
	Initiatives for increasing the number of company-based training places Outcomes of the 2002/03 initiatives on more practical training places and less school based practical training
Germany	*Innovation Circle on Vocational Education and Training* Ministerial initiative for improving the structures and interfaces of VET and enabling education policy to adapt to new demographic, economic, technological and international developments at an early stage.
	SKOLA A research project studying the concept of self-regulated learning in the context of VET, advising VET practitioners on the successful implementation of self-regulated learning in practice and examining its effects.
Hungary	*National Vocational Qualification Register* A revisions of the NVQR using a modular and competency-based framework
	"Step one forward" A programme for helping low-skilled, unemployed adults acquire marketable qualifications.
Mexico	*Technical Baccalaureate Reform* A 2004 reform that resulted in substantial changes in VET and gave way to larger reforms in secondary education in Mexico in 2007.
	Playa del Carmen Project Linking public and private resources to improve worker preparation and training in the Mayan Riviera

Table 1.1. **Overview of case studies** *(continued)*

Country	Title of the case study
Switzerland	*Case Management* Introduction of a case management model to aid the transition to post-compulsory education of academically weak and disadvantaged students. *Leading Houses* Research networks on different areas of VET based around one or several University chairs. *Reform of basic commercial training* Reform of basic commercial training at upper-secondary level covering 26 specialities such as retail, banking and public administration.

Countries were responsible for providing background information about each of the cases as well as about innovation policies in the VET sector. This background information was used as the main starting point for the international experts and OECD secretariat, who conducted the corresponding country visits (see Table 1.2).

Each participating country submitted for examination two or three case studies of VET systemic innovations. These cover a variety of areas, ranging from the promotion of research on VET (*e.g. Leading Houses* [Switzerland]), the building of research and statistical evidence base for VET (*e.g. NCVER* [Australia]), the development of new tools (*e.g. Flexible Learning Framework*

Table 1.2. **Country visits**

Country	Dates	Secretariat	Experts
Denmark	25-29/2/08	Katerina Ananiadou	Marita Aho (Finland) Tom Schuller (UK)
Hungary	17-20/03/08	Tracey Burns Viktoria Kis	Jordi Planas (Spain) Berno Stoffel (Switzerland)
Australia	7-14/04/08	Tracey Burns	Hanne Shapiro (Denmark) Lorna Unwin (UK)
Switzerland	28-30/04/08	Francesc Pedró Tracey Burns Katerina Ananiadou[6]	Henri de Navacelle (France)
Germany	8-12/09/08	Katerina Ananiadou	Hanne Shapiro (Denmark) Berno Stoffel (Switzerland)
Mexico	11-19/11/08	Beñat Bilbao-Osorio Vanessa Shadoian-Gersing	Hanne Shapiro (Denmark) Manuel Souto (UK)

(Australia) and *SKOLA* [Germany]), to the establishment of specific bodies involving various stakeholders aiming to improve VET (*e.g. Innovation Circle* [Germany] and *Globalisation Council* [Denmark]).

The innovations described in the studies also vary greatly in their regional coverage. Some of the case studies present innovations implemented in a particular region (*e.g. Mayan Riviera* [Mexico]), while others affect the entire national VET system (*e.g. National Vocational Qualification Register* [Hungary] and *Technical Baccalaureate Reform* [Mexico]).

The case studies also cover a variety of VET sectors and forms of delivery. Some initiatives are targeted at a particular sector such as adult training (*e.g. Step One Forward* [Hungary], a programme providing financial support to train low-skilled adults) and school-based secondary VET (*e.g. Technical Baccalaureate Reform* [Mexico]). Some case studies focus on a particular way of delivery, such as e-learning (*e.g. Flexible Learning Framework* [Australia], which aims to improve the e-learning infrastructure), whereas other innovations affect the entire VET system (*e.g. NCVER* [Australia]).

A small team of international experts in the field of VET, accompanied by one or two members of the OECD/CERI Secretariat, visited each of the participating countries for a series of meetings with stakeholders involved in the case studies. The information gathered from these meetings formed the basis of a series of country reports on Systemic Innovation in VET, available on the project's website: *www.oecd.org/edu/systemicinnovation*.

The last phase of the project was the comparative analysis of cases on the basis of the initial analytical and conceptual framework. The main findings and policy implications resulting from it are presented in the following pages.

Scope and content of this report

In addition to this introduction (Part I), the report consists of the following three parts: *(i)* analytical background, *(ii)* empirical and comparative evidence, and *(iii)* conclusions and recommendations.

Part II presents a full account of the conceptual and analytical background developed and used throughout the development of the project. It pays particular attention to the definitions of critical concepts, such as innovation, reform, and systemic innovation, all of which are inherently elusive. It also presents the results of the stock-taking exercise of the previous OECD work on innovation, and discusses what can be learnt from areas such as innovation in public services and social innovation. A full chapter (Chapter 3) is devoted to the discussion of systemic innovation in education. This chapter is crucial, as it presents and justifies the model of innovation in education that was used during the empirical phase of the study and therefore throughout this report.

It also attempts to apply the model to the VET sector. It is intended to address two main issues: the specific characteristics of VET that differentiate it from other education sectors and whether innovation in VET follows the same rationale as innovation in education.

Part III forms the largest part of this report. In this section we present the study's empirical and comparative work, focusing primarily on three issues: *(i)* the combination of drivers and barriers of systemic innovation in VET that emerge from the different cases, examined in Chapter 4; *(ii)* the process and dynamics of systemic innovation, the theme of Chapter 5, wherein the various stages that constitute the model of innovation used in this project are discussed in light of the empirical evidence: initiation, implementation, monitoring and evaluation, and scaling up; and, finally, Chapter 6 focuses on *(iii)* the use of the existing knowledge base in systemic innovation in VET, which is linked to the broader question regarding the use of evidence in policy making. As a result of the analytical work, this part of the report also includes a chapter on typologies of processes of innovation in VET (Chapter 7).

Part IV deals with conclusions and policy recommendations, as well as the pending research agenda. The first chapter (Chapter 8) discusses the evidence emerging from the case studies related to government policies and systemic innovation in VET, while introducing the issue of the advantages and shortcomings of innovation policies in VET. The following chapter (Chapter 9) presents the pending research questions that this project has unveiled, while introducing new and crucial areas, such as the measurement of innovation or the connections between systemic innovation and research in VET. Areas and issues as complex as these should be tackled in the context of the OECD Innovation Strategy.[7] The last chapter (Chapter 11) wraps up the main findings and conclusions from the empirical evidence and elaborates a comprehensive set of policy recommendations for the design, implementation, monitoring and evaluation of systemic innovations in VET.

Needless to say, this report presents the results of what is primarily an exploratory exercise on systemic innovation in VET, and to some extent in education in the largest sense. It is very likely that the reader will be frequently reminded of the exploratory character of this project, particularly when realizing that the questions posed outnumber the responses emerging from the study's empirical findings. This fact reveals both the greatness and the shortcomings of exploratory research, and we believe that this study will have served its purpose if it succeeds in making policy makers aware of the need to address issues of systemic innovation in VET by drawing more on evidence, while fostering further, and much needed, research.

Notes

1. More on this at *www.oecd.org/edu/dlr*.
2. See *www.oecd.org/document/42/0,3343,en_2649_33723_40344106_1_1_1_1,00.html*.
3. More on this at *www.oecd.org/edu/systemicinnovation*.
4. The definitions of research and development used then are also applied throughout this report. *Research* is defined as the process of knowledge creation that conforms to the agreed scholarly standards intended to warrant its validity and trustworthiness. In this report, *basic research* is differentiated from *applied research*. The former is driven by curiosity and an inherent interest in a phenomenon or problem, while the latter is consciously designed to solve a problem in policy or practice. In both cases, the process of knowledge creation is carried out within the framework of a theory, which might be either validated or challenged by new research. *Development* is defined as any form of knowledge creation designed to improve practice. Thus, the main purpose of development is to facilitate change in a particular context. A number of educational developments are teacher-led activities and consist of *enquiry-based activities* that take place within schemes for the professional development of teachers. More at: *www.oecd.org/edu/rd*.
5. More on this at *www.oecd.org/edu/ceri*.
6. Due to the unexpected illness of an external expert the team for this visit consisted of three Secretariat members and one external expert instead of the usual arrangement of one/two Secretariat member and two experts.
7. For more details see www.oecd.org/innovation/strategy.

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OECD (2004), *Innovation in the Knowledge Economy: Implications for Education and Learning*, OECD Publishing, Paris.

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Chapter 2

Innovation and Systemic Innovation in Public Services

This chapter reviews previous work from the OECD on private sector innovation as well as more recent work on innovation in the public sector. The growing body of knowledge on innovation in the public sector, including social innovation, makes it clear that there is a need to develop a better understanding of the divers, enablers, barriers, and processes specific to innovation in the public services. Specific barriers to innovation in the public sector, for example, include: risk aversion of bureaucracies; political and auditing constraints imposed by performance and accountability frameworks; and inappropriate structures and organisational cultures for innovation. A key yet often missing element to public innovation is rigorous evaluation, which allows both designers and users to identify the precise strengths and weaknesses of a given innovation or reform. As the public sector offers distinct challenges to measuring impacts of innovation and there is as yet no agreed framework for doing so, important public innovations can thus be neglected (or conversely overly supported), with expensive implications for the public purse.

Introduction

The aim of this chapter is both to provide a theoretical framework for understanding innovation as a multi-faceted process and to look at the process of innovation as it occurs in the public sector. The first section will give an overview of how innovation has been traditionally conceived, particularly as a research-based mode of scientific and technological advancement. It will also attempt to distinguish between innovation and systemic innovation, which, along with previous OECD work, is the main focus. The second section will explore the differences between the traditional approach mentioned and one better suited to understanding innovation in the public sector. In addition, it will detail the elements – institutional incentives, barriers, and the policy environment – that are most conducive to innovation. Finally, it will highlight certain lessons and principles useful for guiding public sector innovation.

Innovation and systemic innovation: a literature review

What is innovation?

Innovation is an "elusive concept" (Lloyd-Reason *et al.*, 2002) that is more often used than clearly defined. The literature review undertaken for this project has revealed several uses of the word. Thus, innovation is often used synonymously with "reform" or "change". This lack of conceptual clarity makes research on innovation extremely wide and undetermined. Below, we differentiate "innovation" from related terms.

The word innovation is derived from the Latin "*innovatio*" (renewal or renovation), based on *novus* (new) as in novelty (Williams, 1999; Clapham, 2003). Whereas "invention" is related to absolute creativity and discovery, innovation is positional. Thus, the definition of an action as innovative depends on the social setting to which it refers; an innovation does not necessarily need to be "new" to the individuals that apply it or to other social contexts (Rogers, 1995). Such a positional definition of innovation has been adopted, amongst others, by Bailey and Ford (2003, p. 248), who argue that "innovation occurs when individuals produce novel solutions and members of the relevant domain adopt it as valuable variations of current practice".

A definition of innovation explicitly or implicitly contains – among other things – assumptions about: gradual change versus radical breakthrough, objective judgment of innovativeness versus social construction, and the alleged link between innovation and success or improvement. Some authors (Moore, 2005; Bessant, 2005) explicitly reserve the term "innovation" for radical, permanent change and real breakthroughs. They prefer to use the term "continuous improvement" for smaller steps, while not judging one of the types to be

superior to another. The simplest definition of innovation is *taking a new idea into implementation*. This definition makes a distinction between innovation and invention (having a bright idea) in that an idea must be put into action to be called an innovation. Since it leaves room for failed innovations, it is a definition that protects against a pro-innovation bias, which is one of the pitfalls of the literature on private sector innovation (*e.g.* Warford, 2005; Kelman, 2005; Hartley, 2006).

Yet to identify the mechanisms that lead to successful innovation, a more nuanced understanding is needed. One frequently cited definition of innovation is the one proposed by the Oslo Manual (OECD and Eurostat, 2005), which defines innovation as "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations" (p. 46). This definition highlights the following aspects:

Innovation contains novelty. The Oslo Manual suggests the following three concepts of novelty: new to the firm, new to the market, and new to the world. The minimum requirement for an innovation is that it is new to the firm. As suggested by the Nuclear Energy Agency, "the item should be new to the enterprise, not necessarily new to the market. For instance, pressurised water reactor (PWR) is not an innovative product for a country already building it by itself, but is an innovative one for a country where it is introduced for the first time" (NEA, 2007, p. 21). In other words, innovation includes products, processes, and methods that firms are the first to develop, as well as those that have been adopted from other firms or organizations.

Innovation brings benefits. Another key characteristic of innovation is that it "should bring economic and/or social benefits by being introduced to the market (or by being used within an enterprise)". This implies that:

1. Innovation is distinct from invention. Often we succeed in invention but fail in innovation. A document on innovation in the business sector (OECD, 2005) defines innovation as the "successful development and application of new knowledge" and stresses the difference between invention and innovation, which is a multistage process. "Fixed capital investments are often necessary to be able to produce and utilise new products and processes, as are workforce training and organisational restructuring. In practice, it is convenient to view innovation as a process ranging from initial research (R&D) through to the development of prototypes and the registration of inventions (patents) and eventual commercial applications" (p. 7).
2. Innovation is different from research. OECD (2004) argues that innovation has economic and commercial imperatives. Basic research, however, is defined by the Frascati Manual (OECD, 2002, p. 77) as "experimental or theoretical work undertaken primarily to acquire

new knowledge of the underlying foundations of phenomena and observable facts, without any particular application or use in view".

Institutional complexity. In addition to economic aspects, another key feature of the innovation process is its institutional complexity. This aspect is clearly explained in the following definition by the EU: "the commercially successful exploitation of new technologies, ideas or methods through the introduction of new products or processes, or through the improvement of existing ones. Innovation is a result of an interactive learning process that involves often several actors from inside and outside the companies" (quoted in Simmie and Sennett, 1999).

In the private sector, governments use a variety of definitions in practice. For instance, the OECD Health Innovation Survey (2007) asked respondents (governments and ministries) in various countries to define health innovation. It found that in most cases there was no common definition across the entire government. Health innovation was viewed as including not only new and improved products but also health care system reform. Another finding was that similar ministries, across countries, tended to conceive of innovation in a similar way. For example, Ministries of Industry tended to refer to innovation in terms of the delivery of new or improved products; Ministries of Health tended to conceive of innovation as reforms in health care services, including reforms in the financing or delivery system that improve upon their objectives of equitable access to good quality health services and cost containment. Finally, Ministries of Research often viewed health innovation policies as a subset of more general innovation policy, supported through research, education, and training grants.

Types of innovation: what is the "object" of innovation?

The Oslo Manual distinguishes between four types of innovation: product, process, marketing, and organisational innovation.

- *Product innovation*: "A product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics" (OECD and Eurostat, 2005, p. 48). The term "product" refers to both goods and services. "*New* products differ significantly in their characteristics or intended uses from products previously produced by the firm." *Significant improvements* can be made through changes in materials, components, and other characteristics to boost performance. Product innovations in services can include improvements in how they are provided (*e.g.* efficiency, speed), the addition of new functions or features to existing services, and the introduction of new services.

- *Process innovation*: A process innovation is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment, and software. Process innovations can aim to reduce unit costs of production or delivery, to improve quality, or to produce or deliver new or significantly improved products.
- *Marketing innovation*: A marketing innovation is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion, or pricing. These are intended to better meet customer needs, open up new markets, or newly position a firm's product on the market.
- *Organisational innovation*: "An organisational innovation is the implementation of a new organisational method in the firm's business practices, workplace organisation or external relations. Organisational innovations can be intended to increase a firm's performance by reducing administrative costs or transaction costs, improving workplace satisfaction (and thus labour productivity), gaining access to non tradable assets (such as non-codified external knowledge) or reducing costs of supplies" (OECD and Eurostat, 2005, p. 51).

Taking a systemic approach to innovation

Because innovation takes place within complex networks of people and (sometimes) across multiple organisations, a holistic approach must be taken in conceptualising the process. Below, we focus on conceptualising innovation as it occurs within and across systems rather than as isolated events.

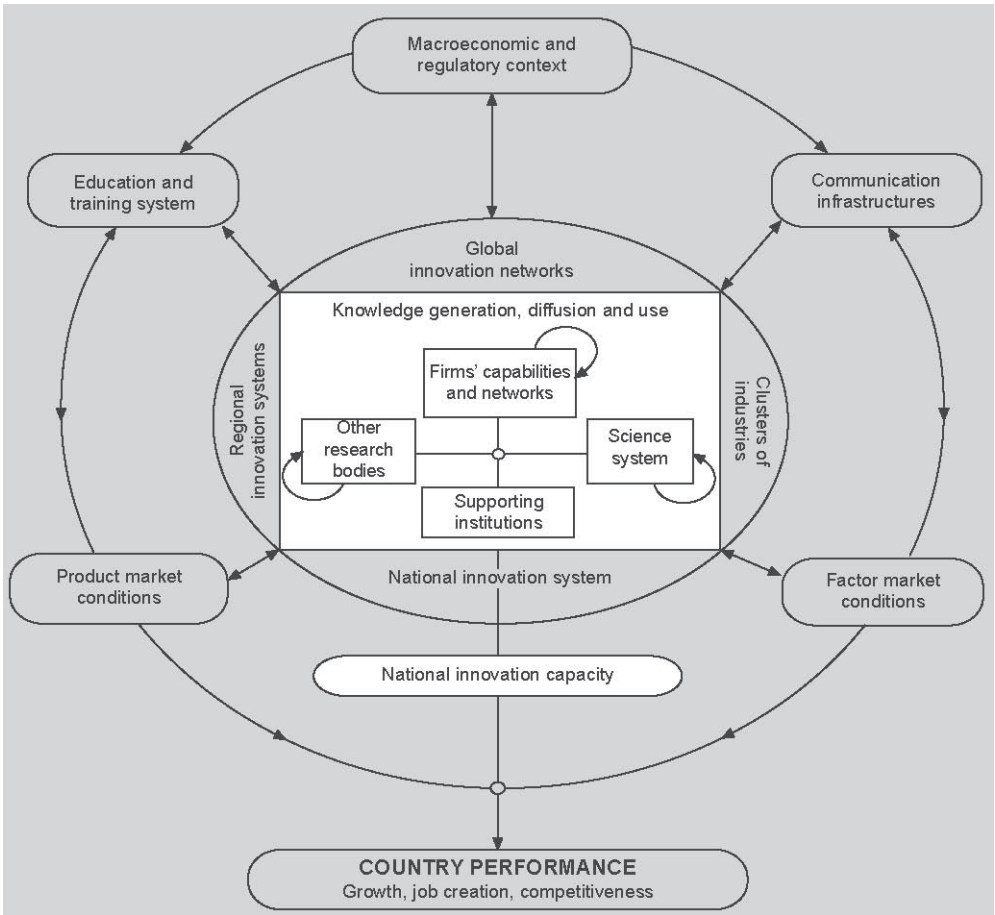
The role of interplay of institutions and actors

Traditionally, technology-related analysis of innovation focused on R&D inputs and outputs. However, innovative performance depends not only on R&D investments but also on successful interactions among actors (OECD, 2004). The innovative performance of a country is determined not only by the performance of individual actors (*e.g.* firms, research institutes, universities), but also by "how they interact with each other as elements of a collective system of knowledge creation and use, and on their interplay with social institutions (such as values, norms, legal frameworks)" (Smith, 1996). Figure 2.1. illustrates the different actors in an innovation system and their interactions.

The "systems of innovation" approach examines how external institutions affect the innovative activities of different actors. According to this approach, innovation is not a linear process performed within a single firm but a process involving a network of institutions in both the public and the

private sector (OECD, 2004). Successful innovation requires, in addition to bright ideas, a system of innovation that involves a combination of activities and many inter-related actors who generate and use knowledge and information (NEA, 2007).

Figure 2.1. **Actors and linkages in the innovation system**



Source: OECD (1999).

Levels in the analysis of national innovation systems

According to OECD (1999), the analysis of national innovation systems embraces the following approaches:

- *Micro level* analysis "focuses on the internal capabilities of the firm and on the links surrounding one or a few firms, and examines their knowledge relationships with other firms and with non-market institutions in the innovation system".
- *Meso level* analysis "examines knowledge links among interacting firms with common characteristics, using three main clustering approaches: sectoral, spatial and functional. A ***sectoral (or industrial) cluster*** includes suppliers, research and training institutes, markets, transportation, and specialised government agencies, finance or insurance that are organised around a common knowledge base. Analysis of ***regional clusters*** emphasises local factors behind highly competitive geographic agglomerations of knowledge-intensive activities. ***Functional cluster*** analysis uses statistical techniques to identify groups of firms that share certain characteristics (*e.g.* a common innovation style or specific type of external linkages)"*Macro level* analysis "uses two approaches: macro-clustering and functional analysis of knowledge flows. ***Macro-clustering*** sees the economy as a network of interlinked sectoral clusters. ***Functional analysis*** sees the economy as networks of institutions and maps knowledge interactions among and between them" (p. 24).

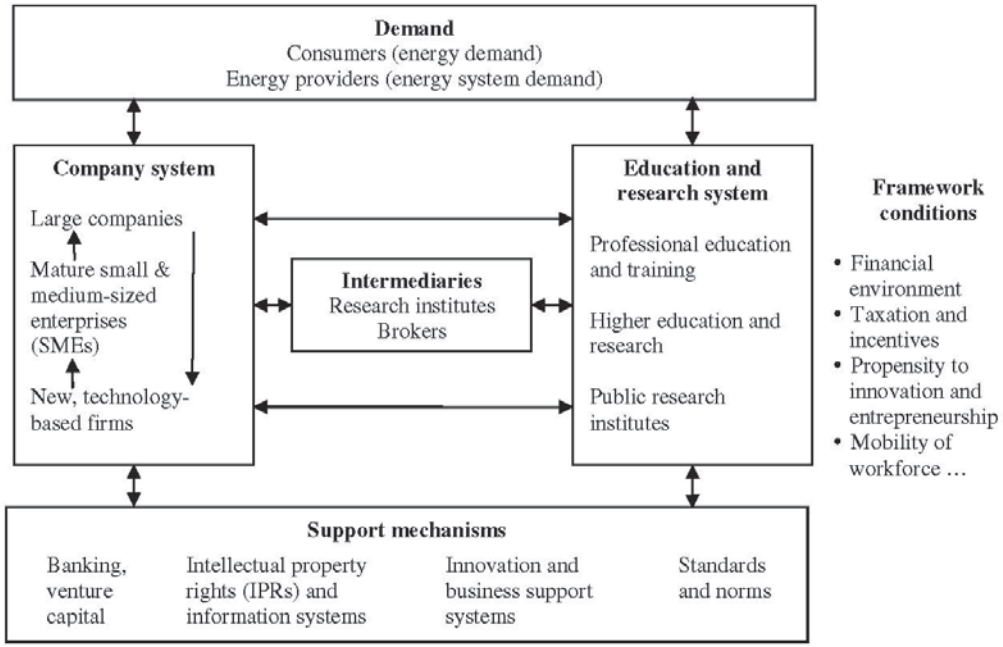
Characteristics of the innovation system

The innovation system (see Figure 2.2.) can be described through the identification of key drivers and analysis of knowledge management, in their relevant contexts (*e.g.* government incentives and framework conditions) (OECD, 2002).

Elements to be characterised include (OECD, 2002, p. 4-5):

- Drivers of innovation
- Production of knowledge (main actors, kinds of networks, and types of knowledge)
- Diffusion of knowledge (formal and informal channels and main actors)
- Absorption of knowledge
- Government incentives and framework conditions

Figure 2.2. **Components and linkages in the innovation system**



Source: OECD (2002).

The innovation process: models of innovation

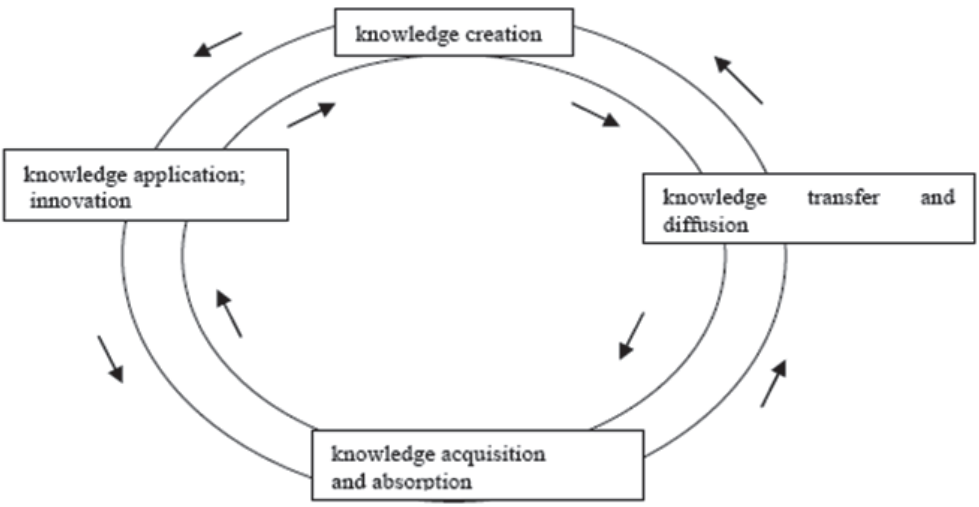
Many conventional accounts of innovation present the process in terms of a "funnel model", starting with lots of ideas, many of which are eliminated until only a few remain. There are, however, very real flaws with this model. It has been argued, for example, that the linear model of innovation does not work well for applied science, let alone other fields. Often the end use of an innovation will be very different from the one that was originally envisaged; sometimes action precedes understanding and can act as a catalyst for ideas. There are also feedback loops between every stage, making real innovations more like multiple spirals than straight lines. Moreover, the linear approach fails to take account of the social factors that shape innovation, including market factors and social demands.

This section provides an overview of some alternative models that conceptualise innovation. The first focuses on the role of knowledge in the innovation process, the following two include commercial aspects of the innovation process, while the last one provides a more complex picture of innovation and includes policy-related aspects.

Knowledge inputs and innovation outputs

The first model focuses on the role of knowledge at different stages of the innovation process. It is argued that science and technology are necessary, but not sufficient, sources of knowledge for innovation. To result in innovation, technological knowledge must be combined with knowledge of businesses and market opportunities. OECD (2004) uses Dankbaar's "circular flow" model, which describes how knowledge flows in both directions and attempts to depict this dynamic relationship.

Figure 2.3. **The four knowledge processes in the learning spiral**



Source: Dankbaar (2004) in OECD (2004).

The four stages of innovation

The next model depicts the successive stages of the innovation process, starting with research and finishing with dissemination. It proposes four stages of innovation (Figure 2.4), further suggesting that "the transition between the stages is difficult since the main actors in the stages and their interest are different from one another" (NEA, 2007, p. 24).

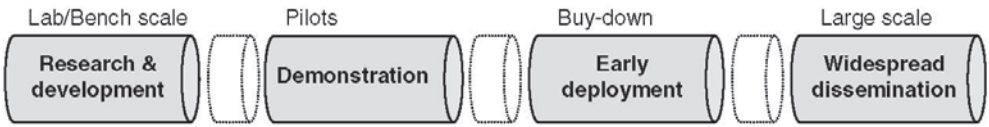
This model uses a view of innovation similar to that of the Oslo Manual, which defines innovation activities as "all scientific, technological, organisational, financial and commercial steps which actually, or are intended to, lead to the implementation of innovations. Some innovation activities are themselves innovative others are not novel activities but are necessary for the

implementation of innovations. Innovation activities also include R&D that is not directly related to the development of a specific innovation".

NEA's (2007) four stages of innovation are:

- *Research and development*: Basic research and conceptual development, the stage at which innovative ideas and concepts are born.
- *Demonstration*: This stage "consists of building one or more target systems of increasing scale to prove the technical and potential commercial viability of the technology. This is the point of *invention*, which then leads to the transition to *innovation*".
- *Early deployment*: This stage involves scaling up manufacturing capacities and learning to reduce costs (manufacturing, system installation, and operations and maintenance) to be competitive with conventional technologies. The term "early deployment buy-down" refers to the process of paying for the difference between the cost of an innovative technology and the cost of its competitors. "This is the point at which a business case can be validated and might begin to attract levels of capital sufficient to permit initial production and marketing".
- *Widespread dissemination*: The large-scale deployment of the innovative product; investors can expect to see the beginning of returns on their investments.

Figure 2.4. **Simplified stages of innovation**



Source: NEA (2007).

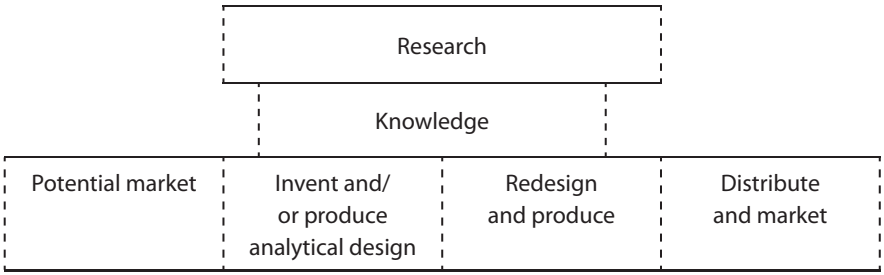
The chain-link model of innovation

One of the useful models that conceptualise innovation is the "chain-link model" of Kline and Rosenberg (1986). This model consists of elements similar to those of the one described in the previous section, including R&D and the stages related to commercialisation. However, an important difference is that in the chain-link model research is viewed not as the work of discovery that precedes innovation but as a form of problem solving that relates to any stage of innovation.

This model emphasises the interaction between market opportunities and firms' knowledge base and capabilities. The outcomes of each broad function

are uncertain, and throughout the innovation process it may be necessary to go back to earlier stages. Maintaining effective links between these stages is crucial to the success of an innovation project.

Figure 2.5. **The chain-link model of innovation**



Source: OECD (1997).

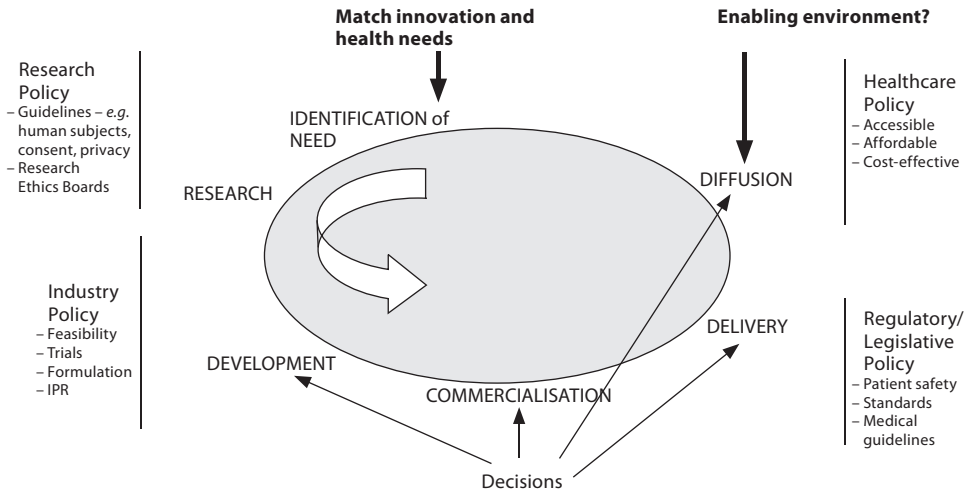
The health innovation cycle

This model, described in the OECD Health Innovation Survey (OECD, 2007), conceptualises innovation, acknowledging both its complexity and the interaction among different aspects. In addition to the stages included in the models described above, this conceptualisation also highlights the importance of identifying needs. The resulting innovation cycle includes the following stages: the identification of needs and opportunities, research, development, regulatory testing, commercialisation, diffusion, and uptake (see Figure 2.6). Here, innovation is viewed as a non-linear, dynamic, and interactive process. This process "includes inherent uncertainties and risks, and is continuously reinforced and reinvented by feedback loops" (p. 4).

While this overview is certainly incomplete, a number of elements emerge. First, novelty and benefits are central to the concept of innovation. In addition, innovation is typically conceptualised as being part of a system that involves numerous actors and institutions involved at several stages of the process. In particular, the systemic approach to innovation emphasises the crucial role of co-operation among multiple actors and institutions throughout the innovation process. Different models conceptualising this process provide a more or less complex picture of innovation. While the key elements of the innovation process (R&D, design, and commercialization) tend to be included in all of the models, there is more variation in how these elements relate to one another, and some models include additional elements.

However, these traditional approaches to understanding innovation rely heavily on the explanatory power of economic incentives and assume the existence of management and organisational structures that are not

Figure 2.6. **The health innovation cycle**



Source: OECD (2007).

necessarily present, or present to the same degree, in public sectors such as public health, education, justice, and transportation. Furthermore, organisations within the public sector are embedded in a vast web of organisations, many with differing aims. Because of the complex interconnections among sectors and the institutional constraints of government, substantial obstacles can impede systemic innovation in the public sector in particular. Thus, in Part B, we will look directly at the public sector to try to understand the distinct challenges it faces in fostering innovation and systemic innovation, as well as identify the elements that can help actors overcome these difficulties.

Innovation in public services and social innovation

Public sector innovation as a distinct challenge

In contrast to the private sector, the public sector faces a very complex incentive structure that is not always conducive to innovation. First, while the private sector responds to the pressures of market competition, the public sector has a host of differing interests, some of which act as incentives and others as disincentives. Second, the public sector generally provides services (in contrast to products, which can be more easily improved through

technological advancement). As Hartley (2006, p. 61) noted "service and organizational innovations require greater tacit knowledge; have less well defined system borders; are less tractable to cost-benefit analysis; rarely have a dedicated development unit; are more difficult to trial; concern behaviours, attitudes, relations and work tasks; often affect more people and are constructed by the subjective interpretations of the adopter". Thus, the kind of innovation that each sector aims to achieve differs in its nature. In addition, measuring the relative success of innovation in the public sector also poses problems for researchers because whereas individual corporations are often used as the unit of analysis in the private sector, the public sector is more frequently divided into entire institutional fields (*e.g.* transportation services and health care).

Although lessons from the private sector cannot always provide direct solutions, it is important to identify what *can* be imported from the private sector. Transferring knowledge from the private sector to public sector innovation is suggested in many studies; however, the peer-reviewed literature suggests that it is rarely done in practice (Vigoda-Gadot *et al.*, 2008). Still, Bessant (2005, p. 41) argues that, "[…] there is a strong case for learning across the two sectors, not just in terms of transferring well-proven lessons (adaptive learning) but also for 'generative learning', building on shared experimentation and comparison of experiences around discontinuous innovation".

Why do governments innovate?

It is true that while the incentives for private sector innovation seem crystal clear – ensuring competitiveness, increasing the market share, and making a profit – the incentives for public sector innovation are less clear-cut. Various motives for public sector innovation are mentioned in the literature. Many authors suggest that to face the challenges of modern society, government/governance must be innovative (Singlaub, 2008; Moore and Hartley, 2008). Those challenges include growing demand for responsive government (Vigoda-Gadot *et al.*, 2008), more client-led and individualised public service delivery (Bowden, 2005; Carter and Belanger, 2005), the need for policy instruments to stimulate sustainable development (Foxon, Gross, Chase *et al.*, 2005), and narrowing the gap of citizen's discontent with performance of public sector organizations (Wesseling, 2005). Those challenges – to which coping with the increasing costs of the welfare state must be added – evoke extrinsic motives for governments to innovate.

In contrast to extrinsic motives for innovation, a more intrinsic motive for innovation is the motive of learning (from failure) or "learning-by-doing". The idea is that even a failed innovation is good in itself because it initiates a learning loop, which requires room for experimenting, taking risks, and

experiencing failure. A common complaint is that experimenting and "double-loop-learning" are exactly what the public sector lacks (Bessant, 2005; Termeer *et al.*, 2005).

In an analysis of the motives and rationale for public sector innovation, the broad concept of *social innovation* is useful in understanding the aims that are common to nearly all innovation in the public sector. The term "social innovation" is used to describe the development and implementation of new ideas (products, services and models) to meet social needs. As in other fields, social innovation is distinct from "improvement" or "change", which suggest only incremental change, and from "creativity" and "invention", which are both vital to innovation but omit the steps of implementation and diffusion that make new ideas useful. Innovation is also distinct from entrepreneurship, since it is possible to be entrepreneurial without being innovative. Nevertheless, there is a substantial overlap between innovation and improvement, change, entrepreneurship, and creativity.[1]

Social innovations have arisen from many sources. Individual social entrepreneurs have sometimes played a significant role; some innovations have been the result of broader societal or technological changes, while others have been driven by market dynamics. Social innovations can come through the public sector, the non-profit sector, and the private sector. The precise boundaries are fuzzy, and some models or services can move between sectors or become more straightforwardly economic or technological innovations. There is growing interest amongst governments, foundations, and other institutions around the world in better understanding the dynamics of social innovation, what institutions and finance can support it, and how social innovations can be more effectively developed, grown, and diffused.

In particular, there is growing interest in innovation within public services. Like other fields, public sector innovation can take a variety of forms. Various typologies of innovation distinguish between *(i)* policy innovations (new missions, objectives, strategies); *(ii)* service innovations (new features and design of services); *(iii)* delivery innovations (new ways of delivering services and interacting with service users); *(iv)* process innovations (new internal procedures and organisational forms); and *(v)* system innovations (including governance structures) (IDeA Knowledge, 2005). Some innovations can be described as "incremental" because they are close to existing practice, while other innovations are so radical that they warrant being seen as systemic (like the creation of a national health insurance system and the move to a low carbon economy) (Hargreaves, 2003).

Typology of public sector innovation

Just as numerous definitions of innovation and rationales for innovation exist, public sector innovations can be fit into conceptual typologies in many different ways. At present, coherence and consistency throughout the academic discourse are lacking. Presenting one possible typology, Hartley (2006, p. 31) suggests the following:

- *Product innovation*: New products (*e.g.* new instrumentation in hospitals);
- *Service innovation*: New ways in which services are provided to users (*e.g.* online tax forms).
- *Process innovation*: New ways in which organizational processes are designed (*e.g.* administrative reorganization into front and back-office processes and process mapping leading to new approaches);
- *Position innovation*: New contexts or "customers" (*e.g.* the Connexions service for young people [*www.connexions-direct.com/*]);
- *Strategic innovation*: New goals or purposes of the organization (*e.g.* community policing and foundation hospitals);
- *Governance innovation*: New forms of citizen engagement and democratic institutions (*e.g.* area forums and devolved government);
- *Rhetorical innovation*: New language and new concepts (*e.g.* that used for the introduction of congestion charging for London and for a carbon tax).

Barriers to innovation

Possibly more relevant than the question of why the public sector is not in itself very innovative (which is a statement many authors would contest) is why its innovative capacity lags behind the private sector so much. Why does it seem that so many government agencies are not innovative, innovating by themselves, investing in their own R&D, or copying successful innovations from other organizations? Is the sense of urgency not present; is there a lack of political pressure to innovate? Is the interplay of interests at stake responsible for failed attempts to innovate? Or is it simply a myth that the private sector is more innovative than the public sector? In this section we look at barriers to innovation.

General barriers

One of the general barriers for innovation suggested in the literature is that "people don't like change". Another general explanation for the lack of innovation is the inherent tension between organizing and innovating. Change requires much energy from the organization and individual employees, who are trained in standard practices. This change refers not only to the routines but also to the mental models that organizations develop. Such models are extremely effective in enabling collective action, but they also create a blind spot for signals from the surroundings that do not match the thought process of the new model. Thus, the desire or necessity to change does not penetrate (Kelman, 2005, pp. 21-31; Koch *et al.*, 2006, p. 38).

Another inhibitor for innovation is the way a bureaucracy is organised. The hierarchy in the organization reduces the chances that management will adopt new ideas, inhibiting employees from offering suggestions. Rules also form a shield for employees such that even if things go wrong, as long as the rules were followed, no one can be penalised. This protection explains the difficulty of reducing red tape, for doing so makes employees more susceptible to criticism. Consequently, employees generally oppose such measures (Kelman, 2005).

Barriers specific to the public sector

A specific explanation for the lagging productivity of the public sector compared to that of the private sector is Baumol's Law. The law states that it is easier to raise the productivity of producing goods than of producing services. For example, today's new computer will cost less in three years and will be four times as fast. That does not apply to the work of a hairdresser or a doctor in a hospital. Because the public sector mainly consists of providing services, its productivity will lag behind that of the private sector.

Another explanation for why the public sector lags behind the private sector in innovation is that government has a monopoly in most of its services. The argument is that there is no incentive created by competing organizations, which might put better products on the market. Innovation in the public sector is also hindered because within the political arena the punishment for mistakes is severer than the reward for excellence. This is partly due to the transparency of politics and the role of the media. Mistakes are more newsworthy and therefore receive more attention. It is possible to have a successful career in the public sector by avoiding risks, whereas one mistake can kill a career (Stuiveling, 2007).

Then there is the rule of law, which states that the government must treat citizens equally. Government organizations tend to be structured as bureaucracies because they excel at following standard operating procedures. From

the state's classic point of view, civil servants comprise a politically neutral instrument. Attention has to be drawn onto the political meaning of innovation when they write about innovation in policing, "…the diffusion and adoption of innovations is a rather complex phenomenon of which understanding cannot be reduced to a simple set of functional or instrumental considerations, especially if we want to understand why an innovation has been adopted. It is not only the relative advantage of an innovation in comparison to older practices that makes the difference" (Korteland and Bekkers, 2008, p. 16). The political dimension of innovation could provide a very good explanation for why organizations that should "innovate or perish" are nevertheless reluctant to copy innovations that have evidence-based relative advantage. Schumpeter originally understood innovation to be "creative destruction" – for something new to emerge, something older has to be destroyed. Perceived in this way, innovation suddenly becomes a more political than self-evident phenomenon. This could explain why innovations – even evidence-based innovations – do not occur naturally but instead are often contested, especially by people who have an interest in maintaining the *status quo.*

Finally, professional expertise has a role in hindering innovation: "(1) social boundaries and (2) cognitive or epistemological boundaries between and within the professions retarded the spread of innovations. These barriers are especially problematic when different professions are co-located within multiprofessional organisations. This argument contests prior work presenting professional networks as positive facilitators of innovation (Coleman *et al.*, 1966; Robertson *et al.*, 1996)." (Ferlie *et al.*, 2005).

Barriers to social innovation

Much of the literature on social innovation emphasises the barriers and blockages standing in its way. Some of these apply throughout the public sector and include:

- Risk aversion of bureaucracies;
- Political and auditing constraints imposed by performance and accountability frameworks;
- Lack of institutional support for innovation;
- Inappropriate structures and organisational cultures for innovation;
- Silo structures of public agencies, making value across organisational boundaries harder to operationalise;
- Uncertain results, increasing the difficulty of winning support for innovation.

In addition, academics such as Clayton Christensen have demonstrated that performance during the early stages of innovation is often poorer than that in more mature stages of existing models. The management of these periods has always proved challenging for the innovators and their supporters, especially in the public sector. The literature on the barriers to social innovation raises a number of salient points and highlights the importance of constraining risk where lives and careers are at stake. Ideas that may work well in theory may not work so well in practice; therefore, new models should be tested on a small scale and genuinely proven before they are scaled up. This has driven the greater emphasis on pilots, pathfinders, and experiments to test out different models of innovation.

The policy environment

It is difficult to single out specific policies that have helped to foster innovation in the public sector because of the complex networks in which public sector organisations operate. Frequently, the most salient factors, such as leadership and openness to new ideas, are intangible or involve the convergence of many factors. However, certain policies can be considered innovation *enablers.*

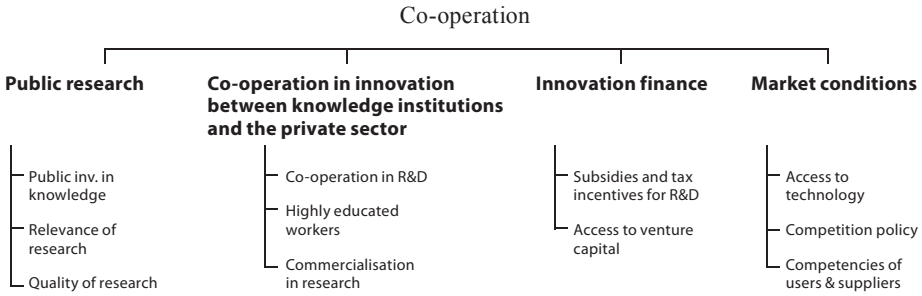
In the IDeA literature review of Innovation in Public Services, Borins (2001) describes certain factors in the policy realm that can help to stimulate innovation. First, he suggests that any innovation must be accepted and supported from above. This support can be achieved through "organisational priorities to guide innovation, recognition for innovators, granting the latitude for experimentation to take place, and protection for innovators from central agency constraints". Recognition can often extend to reward (*e.g.* financial incentives). Second, innovation can only occur when resources are available. When specific funds are earmarked for innovation by the central government, the possibility and incentive for conscious innovation is enhanced. A third element of fostering an innovative environment ensures (through policy) that participants come from diverse backgrounds, thus bringing with them distinct perspectives and experiences, and that staff and stakeholders at all levels are included. Finally, policies can encourage organisations to research and rigorously evaluate the experiments of others. Learning from others and being able to identify which innovations have been truly successful are key steps to fostering an on-going culture of innovation.

It is also possible to identify certain policy arenas that have an impact on the ability to innovate. The 1997 Oslo Manual (OECD, 1997) suggests that four main "policy terrains" (*i.e.* policy and institutional factors) shape innovation activities:

- The broader *framework conditions* of national institutional and structural factors (*e.g.* legal, economic, financial, and educational) that set the rules and range of opportunities for innovation;
- The *science and engineering base* – the accumulated knowledge and the science and technology institutions that underpin business innovation by providing technological training and scientific knowledge;
- *Transfer factors* are those which strongly influence the effectiveness of the linkages, flows of information and skills, and absorption of learning essential to business innovation – these are factors or human agents whose nature is significantly determined by the social and cultural characteristics of the population; and
- The *innovation dynamo* is the domain most central to business innovation – it covers dynamic factors within or immediately external to the firm that directly impinge on its innovativeness.

Another view on the policy areas that shape innovation is presented in Figure 2.7. This model provides a more clearly defined and measurable list of factors that influence innovation activities. For the measurement of performance in each policy area, see the section on innovation indicators.

Figure 2.7. **Framework conditions**



Source: OECD (2004).

In addition to the factors listed above, two other factors are claimed to be essential:

- *The role of policy co-ordination*: A publication on the management of national innovation systems suggests that institutional arrangements play a key role in enhancing efficiency. Improved policy co-ordination among ministries and the involvement of various stakeholders in policy formulation can help increase transparency, facilitate information flows, and reduce systemic mismatches (OECD, 1999).

- *The role of proximity:* Researchers have argued that firms are embedded in national and regional innovation systems, in which physical interaction facilitates access to tacit knowledge. However, relational proximity cannot be simply reduced to spatial proximity because other forms of proximity (e.g. professional or organisational) also play a key role (Amin, 2003, as cited in OECD, 2004).

Factors that lead to successful innovation

A number of countries are leading the way in terms of creating national innovation systems. Denmark, Finland and Iceland have already put in place a number of measures, organisations, and financial packages to support and promote innovation. From these and other examples, a number of elements of an innovation system can be identified. The key is to have a well-functioning knowledge system that is able to learn quickly, aware of its changing environment, and is able to test out new models.

The first of these is **leadership and organisational culture**. Leaders can send strong messages about the importance of innovation and help to create a culture in which innovators are valued, recognised, and rewarded, and where innovation is seen as an integral part of everyone's job. Such leadership may come from ministers, senior officials, business leaders, and others, but it is also critical in establishing an innovative culture in which people in lower levels of hierarchy are supported to take risks.

However, this is easier said than done. In a review of ten years of articles written for the Creativity and Innovation Management Journal, Rickards and Moger (2006, p. 14) concluded that "[the concepts of] creativity and leadership remain highly ambiguous in definitional and operational terms". Leadership is mainly investigated through quantitative data analysis (*e.g.* Aragon-Correa, Garcia-Morales and Cordon-Pozo, 2005; Considine and Lewis, 2007; Mack, Green and Vedlitz, 2008). Through analysis of large numbers of leaders and public entrepreneurs, it is believed that both personal characteristics of leadership and contextual/environmental factors can be discovered.

One insight widely shared among authors is that a senior position in the hierarchy of an organization does not automatically make someone a leader in innovation. Leadership and public entrepreneurship arises at all levels of organizations.

Second, there needs to be **effective supply** or direct "pushes" for innovation. Such supply depends on various enabling factors: sources of finance for early stage ideas to be developed and experimented with; free space, either within or outside larger institutions, where creative ideas can be developed; more formal support structures, sometimes with intermediary organisations playing a critical role in linking promising ideas to potential uses; and

research capacity to develop evidence. Finance may come in the form of funding and support, equivalent to the research and development support in science. Alternatively, it may come from the overt allocation of small percentages of turnover to new models, the use of experiments or zones, competitive bidding sources, or large foundations that play a prominent role in countries like the Germany, Italy and the United States.

Third, there needs to be **effective demand** or "pull" factors for innovation. This demand can come either directly from the public (*e.g.* service users, patients, and learners) or from purchasing and commissioning bodies seeking better performing and better value models.

Networks to share spread and diffuse innovations comprise another crucial element in the innovation system. Crudely, such intermediaries can link innovators with people who may have the skills, support, and means to turn their idea into a product or service. Such networks also play an important role in linking the micro level (*e.g.* school and further education) with the macro level (*e.g.* the Department for Education and Labour).

Finally, innovation is much more likely to occur if there exists either a **widely held view that current models are underperforming** or failing or a widely held view that such models have ceased to adequately respond to the likely pressures of the environment or of competitors. The evidence that smaller countries have proven more innovative – in their view, because of a greater awareness of the threats of a rapidly shifting external environment – is striking. Social innovation is a field that is developing in terms of research and understanding, and it is doing so in tandem with parallel fields: social enterprise and entrepreneurship; public sector improvement and change; design, including user-led; and, in its growing role in enabling innovation, technology.

These factors must be aligned if this idea is to grow into a successful model, product, or service. Thus, below we synthesise the necessary conditions for putting innovative products, services and models into practice sustainably and on a large scale.

- "Pull" in the form of effective demand, which comes from the acknowledgement of a need within society by organisations, consumers, or commissioners with the financial capacity to address it. These might include employers seeking new types of skills (*e.g.* an ability to work in teams and software programming knowledge).
- "Push" in the form of effective supply, which comes from: first, the generation of innovative ideas (by creative individuals and teams, potential beneficiaries, and users often inspired by anger, suffering, or compassion); second, the development of those ideas into demonstrably workable forms; and third, their communication and dissemination.

- Effective strategies that connect "pull" to "push" and find the right organisational forms to put the innovation into practice.
- Learning and adaptation to ensure that the innovation achieves social impact and continues to do so as the environment changes.

Many promising innovations have floundered because critical elements were missing. For example, a need might be widely recognised but not by organisations with power and money. Moreover, these factors all work in more distinct ways when compared with innovation in the private sector. This is especially the case with both "push" and "pull" factors, which will be shaped – within the public sector – by political priorities, budgetary demands, and public opinion.

Evaluating innovation in the public sector

One of the most important elements in any kind of innovation (or reform) is rigorous evaluation. A framework, in which new projects and ideas can be measured, allows both the designers and the users to identify the precise strengths and weaknesses of any given endeavour. As we have seen, the public sector offers distinct challenges to any innovator through its complex network and myriad institutional constraints. Although the role of the service sector is increasing in OECD economies, measuring innovation in this sector is problematic, and thus important innovations are often neglected. Developing, and using, a framework for evaluation specifically tailored to the public sphere is essential.

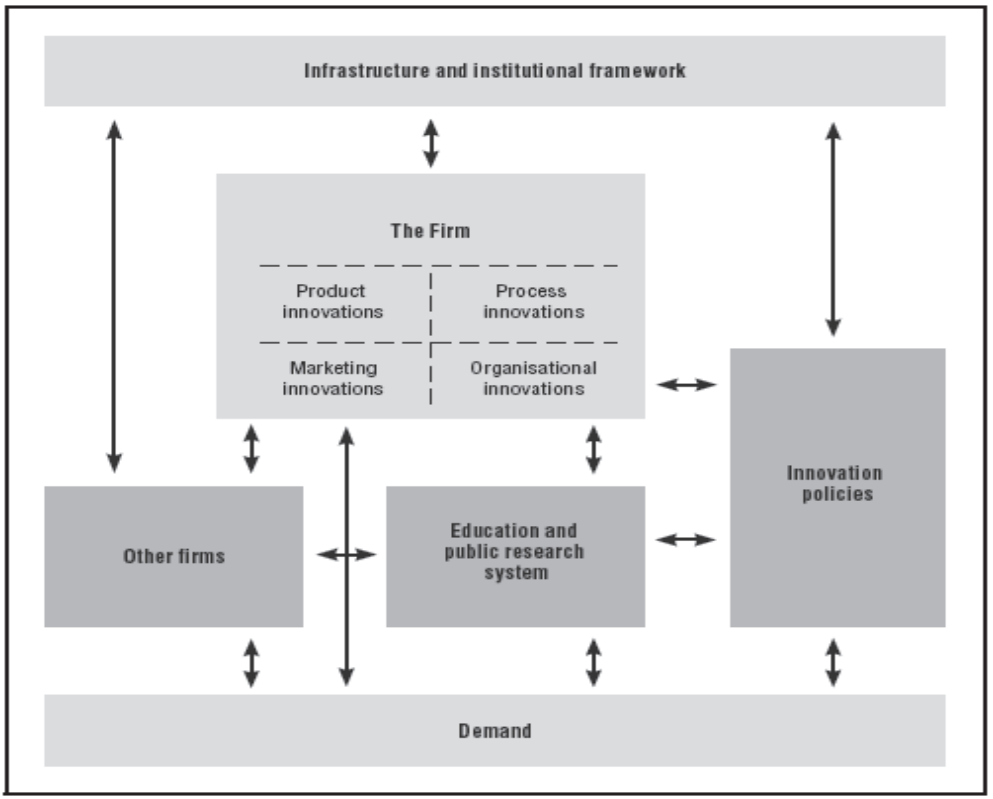
Numerous studies have aimed to develop indicators that provide a better picture of innovation in the private sector than do simple indicators such as the share of innovation or R&D performing firms. OECD (2007) suggests that R&D indicators are the most widely used indicators of innovative activity and that the usefulness or impact of innovation indicators is rather minor. Possible reasons include an assumption among policy makers that R&D data are of better quality, a lack of innovation indicators as widely accepted and used as R&D, and an unawareness of the availability of innovation data or its potential uses.

The limitations of quantitative indicators

The same document argues that the proliferation of composite indicators will raise questions regarding their accuracy and reliability. Due to the sensitivity of the results to different weighting and aggregation techniques as well as the problems of missing data, composite indicators can result in distorted findings on country performance.

The "Strategic view of innovation policy" (OECD, 2003) highlights three points regarding the weaknesses of quantitative measures of innovation. First, quantitative indicators provide an incomplete picture of innovation. Many factors that shape innovation are difficult to measure quantitatively. It is particularly problematic to measure the relationships between these factors and assess the structural relationships that determine correlation between variables. Second, "it is a fundamental problem of innovation policy that it lacks anything even vaguely resembling the fully specified dynamic general equilibrium model of innovation, which would be required to allow the numerical computation of an optimal innovation policy" (p. 7). It is therefore often necessary to rely on qualitative measures, "plausible but incompletely tested hypotheses and a significant measure of informed judgment". Finally, qualitative measures are necessary due to the impact of country-specific features, such as institutional system and culture, on innovation performance.

Figure 2.8. **The innovation measurement framework (from the perspective of the firm)**



Source: OECD and Eurostat (2005).

Figure 2.8 illustrates the innovation measurement framework proposed by the Oslo Manual. This framework integrates perspectives from firm-based theories of innovation, as well as the approach that views innovation as a system.

There are a number of other indicators used by the OECD, including the EU indicators of science, technology, and innovation. However, all of these fail to cover some important areas. First, they do not indicate the links between industry and science. Second, while the business environment is an important determinant of successful innovation, the indicators do not cover economic incentives and institutional regimes. Finally, the indicators focus at the national level, whereas many innovative actors, particularly large firms, have important international activities (OECD, 2007). Follow-up work (Innovation Indicators: Some Proposals and Preliminary Results Based on the NIND Project, 2007) develops several composite indicators for use in policy. It is argued that these may also be useful in developing a single robust indicator of innovative performance. However, as they have been developed for the private sector, they cannot be easily or readily transferred to the public sphere.

Indicators of non-technological innovation

Especially in the public sector, innovation does not always include technological changes, as illustrated by the 2005 Oslo Manual, which extended the definition of innovation to include organisational and marketing changes as well as non-technological characteristics of product and process innovations. In light of the importance of non-technological innovative activities, it seemed necessary to develop indicators of non-technological innovation. An OECD Directorate for Science, Technology and Industry document on "Indicators of Non-technological Innovation" (OECD, 2007) suggests the following method to develop indicators of modes of innovation, including not only technological but also non-technological aspects. This consists of three steps:

First, five multivariate factors were constructed from the innovation survey:

- Factor 1: Index of technological activity (high factor loadings in relation to internal and external expenditures on R&D, capital, and IT, and knowledge acquisition, with training for innovation).
- Factor 2: Index of innovation outputs (high scores in product and process innovation outputs)
- Factor 3: Index of organisational innovation (high scores regarding changes to organisational structure and strategies).
- Factor 4: High values for protection methods related to design.

- Factor 5: High scores for expenditure on design and on marketing innovations.

The second step involved extracting clusters of firms specialising in modes of innovation, based on their combinations of factor scores. The resulting clusters were:

- Cluster 1: High in product and process innovation output; close to average on all other factors.
- Cluster 2: Low intensity in all factors; lower levels of innovation activity.
- Cluster 3: High engagement in all activities.
- Cluster 4: High in design related activities.
- Cluster 5: High levels of organisation change.

This review of innovation indicators suggests that numerous quantitative indicators have been and are being developed that cover both technological and non-technological innovation; these aim to evaluate not only innovative performance but also the characteristics of the entire innovation system. However, comprehensive frameworks for the public sector as a whole and for individual sectors within it (*e.g.* education, health, and transportation) are essential and need to be further developed.

Lessons from the comparative analysis of innovation in the public sector

Innovation systems will look different in different countries – with different actors, agencies, and cultural environments. Innovation is often contingent on the structures, institutions, and networks already in place, and it will therefore take different paths and forms in different countries. However, there are common identifiable principles or factors. These factors may include, for example, the nature of practitioner networks, the specific needs of the local community, the availability of resources for innovation, and whether there is a sense of crisis or underperformance.

Some useful lessons have emerged from specific projects. For example, the success of the Sure Start program in the United Kingdom showed that an important sense of ownership results from the inclusion of service users in the process of program development. Flexibility and leeway given to the service providers, in the context of administrative support from the top, allowed the various providers to design a network and system of joined-up services that reflected that actual needs of local users (IDeA, 2005, p. 44). A conceptual innovation in the London transportation system elucidated two key lessons: first, that innovation in the public sphere requires strong political

leadership and support; second, that there exists a clear legislative framework that can serve both to guide designers and to support the project's eventual implementation (IDeA, 2005, p. 45).

The IDeA (2005) literature review sums up the lessons from its case studies of successful public sector innovation by identifying seven key elements:

3. The identification of gaps and problems
4. The capacity for action
5. The commitment to innovation by political leaders
6. Administrative and institutional support
7. Collaboration between different departments and providers
8. The incorporation of service users' ideas and sensitivity to their needs
9. The use of new technologies

These general lessons could apply to all public sector innovation.

An effective innovation system will comprise the following principles:

- *Knowledge creation – the evidence base*: New ideas are the lifeblood of innovation, so space for idea generation and design of new approaches that draw the insights of front line workers, such as teachers, trainers, learners, and business leaders, are essential to the innovation process. Here, there is a role for open discussions, prizes, small funds, competition, and contestability.
- *A commitment to implementation*: The evidence base can also be improved by committing resources to a series of more formal tools for testing innovative ideas in practice. Inevitably, innovation involves costs to generate ideas, test them, and then to adapt them according to experience. In *business*, a significant proportion of funding for innovation comes from governments – through grants, tax credits for R&D, and subsidies – and from private investment within companies and through dedicated investment vehicles, ranging from technology oriented venture capital to banks. In the *public sector*, the balance of funding will depend on the role and involvement of the different stakeholders. Although government is generally the major source, the public sector could draw on the experience of other sectors and organisations to diversify sources for social investment. Although commercial funds are likely less suitable for higher risk ventures, which cannot demonstrate a prospective income stream, they fill an important niche alongside the growing field of venture philanthropy of providing some debt and quasi-equity finance alongside grants. Foundations may also be an

important source of finance for the incubation of innovations because they often have greater freedom to experiment and target unfashionable or politically controversial fields or high risk, high impact innovations.

- *Transferring Knowledge – networks, federations, etc.*: An innovation system implies connectivity, which can be achieved through links such as networks, federations, and partnerships. Collaboration among schools, government, and business is critical in generating and spreading innovation as it allows greater access to knowledge, capabilities, and resources, space for creative thinking, and opportunities for testing and trialling. Such networks do, however, carry a number of risks. The benefits of such collaboration are greatest when there is a degree of "cognitive distance", *i.e.* some level of difference in approach among the organisations, as this can provide novel insights (Dutch Ministry of Economic Affairs, 2005). However, if this distance is too great, there can be a complete lack of understanding.
- *A culture of innovation*: An organisational culture that is supportive of innovation is necessary to embed and mainstream innovation. Such a culture has to be underpinned by individuals with the requisite skills and mindsets for innovation, strong leadership at all levels, and innovation champions to help foster and support the development of new ideas. A culture of innovation would entail space for experimentation and risk, an acceptance that sometimes things will fail, and an awareness that rapid learning can stem from failures as well as from successes.
- *Replicating and scaling up*: As well as organisational cultures, there are also crucial processes to scale up, replicate, and spread successful innovations. This is where strategic budget setting and performance management can be vital.
- *Analysis and learning*: Finally, there needs to be constant assessment, analysis, and learning since unexpected results are likely. Currently, many organisations are developing the evidence base through the use of case studies. Usually, these case studies will highlight successful practice. It is, however, equally important to learn from failures to make sure that lessons are learnt and not repeated.

These principles need to be applied to innovation systems – but they also need to be matched by actions to remove some of the barriers to innovation. Barriers include bureaucratic inertia and the power of precedent; delivery pressures; short-term budgets and planning horizons; silos and organisational boundaries; inadequate funding or resources; lack of incentives and rewards to innovate; vested interests (among teaching unions, students and other institutions); risk-averse cultures; reluctance to stop failing programmes; and legislative or regulatory constraints.

Conclusions and policy implications

It is clear that the innovation and systemic innovation in the public sector is shaped by a unique configuration of incentive structures, resource availability, and goals, and that this configuration needs to be conceptualised in a way that captures its internal dynamics and complexity. Although the principles and lessons discussed above provide a starting point from which to understand innovation in the public sector as a whole, they do not always reflect the specific difficulties faced by particular arenas within the public sector. The following chapter will explore the role of innovation and systemic innovation specifically within the education sector to identify the particular challenges faced by schools and VET programmes. It will also propose a model of innovation in the education system that can be used to better conceptualise the processes and dynamics taking place.

Key messages

Research on innovation has traditionally focused on science and technological advancement in industry. Models of innovation have traditionally focused on the direct link between research and innovation in industry and measurements of impact have been based on patents or sales figures and the pressures of market systems. These are arguably not transferable to modeling or measuring innovation in the public sector.

The growing body of knowledge on innovation in the public sector, including social innovation, makes it clear that while there are lessons that can be transferred from traditional industry models of innovation to the public sector, there is also a need to develop a better understanding of the divers, enablers, barriers, and processes specific to innovation in the public services.

Specific barriers to innovation in the public sector include: risk aversion of bureaucracies; political and auditing constraints imposed by performance and accountability frameworks; lack of institutional support for innovation; and inappropriate structures and organisational cultures for innovation.

Enablers of public sector innovation include a commitment to innovation by political leaders with the capacity for action; administrative and institutional support; collaboration between different departments and providers; and the incorporation of service users' ideas and sensitivity to their needs to increase sense of ownership.

A key element to public innovation is rigorous evaluation, which allows both designers and users to identify the precise strengths and weaknesses of a given innovation. The public sector offers distinct challenges to measuring impacts of innovation and there is as yet no agreed framework for doing so. Important public innovations can thus be neglected (or conversely overly supported), with expensive implications for the public purse.

Note

1. The section of this paper on social innovation draws heavily on the ongoing work of the Young Foundation and in particular, Mulgan, G. (2006), "Social Innovation: what it is, why it matters, how it can be accelerated", Basingstoke Press, London; Mulgan, G. (2007), "Ready or Not? Taking Innovation in the Public Sector Seriously", NESTA Provocation 03, NESTA, London; Mulgan, G., R. Ali, R. Halkett and B. Sanders (2007), "In and Out of Sync: The challenge of growing social innovations", NESTA Research report, NESTA, London; Bacon, N., N. Faizullah, G. Mulgan and S. Woodcraft (2008), "Transformers: How local areas innovate to address changing social needs", NESTA Research report, NESTA, London.

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Chapter 3

Innovation in Education and Vocational Education and Training

This chapter presents a literature review of innovation in education and vocational education and training. Innovation is a term more often used than clearly defined in education, often employed interchangeably with related terms such as invention, reform, and change. New ideas, knowledge, and practices, however, can fail if they do not bring their desired results, impact negatively on other objectives, create new problems, or are not cost-effective. Although an assessment of whether to implement an innovation requires looking at its implications for other parts of its environment beyond those immediately affected, such kinds of systemic analysis are infrequent. There is a wide range of stakeholders in the process of innovation in VET, whose commitment and collaboration is crucial to success and who have different incentives for the inception and adoption of innovation. Available evidence suggests that VET organisations are not making use of the whole range of facilitators of innovation available to them and consequently, there is much unlocked potential in the VET sector to facilitate and increase innovation. Educators and policy-makers, on the other hand, have not sufficiently used the motors of innovation, including research in education. Research on teaching and learning from cognitive science, neuroscience, organizational theory, and other disciplines has thus rarely been put into practice. Furthermore, adequate research capacity has been lacking even in relatively general areas. The chapter closes with a model of innovation in education developed by the OECD Secretariat for this study, that is utilised in the analysis of the case studies in the empirical chapters of this publication.

Introduction

This chapter presents a literature review of innovation in education and vocational education and training. The chapter is organised as follows: it first deals with the definition of innovation, its types and measurement; second, it reviews stakeholders involved in – and processes leading to – innovation; third, it analyses the relationship between educational research and innovation. The final part of the chapter provides a model of innovation in education, developed by the OECD Secretariat for this study, that serves as a background to the analysis of the case studies in the empirical chapters of this publication and the subsequent path towards the development of a typology of innovations in VET in Chapter 7 and a set of policy lessons. The reader is invited to note that while the chapter focuses on innovation in VET, substantive references are made to innovation in education more generally. There are two reasons for such references. First, there is greater coverage in the literature of innovation processes in education than in VET; this is precisely a gap that subsequent chapters of the present report try to address. Second, in spite of the specificity of VET, some commonalities with education exist in terms of innovation processes. Thus, several of the models reviewed have been proposed as generic models applicable to both education and VET – as well as, occasionally, to other areas.

Innovation in education and VET: definition, typologies and measurement

Definition

Most literature on innovation in education and VET defines innovation as the implementation not only of new ideas, knowledge, and practices but also of improved ideas, knowledge, and practices (Mitchell, 2003; Kostoff, 2003). In this respect, innovation could be differentiated from reform or change (see also King and Anderson, 2002), as these terms do not necessarily imply the application of something new to the social setting of reference, nor do they imply that the change relates to the application of improved ideas or knowledge. The most obvious problem with the incorporation of this additional attribute to the concept is that, in practice, it is difficult to know whether something is an improvement over the existing situation. Sometimes this judgment can be made only in the long term, and often it is not known at all because there is a significant lack of evidence and systematic assessment of what changes improve the previous situation.

Thus, part of the literature refers to innovation as a synonym of "novelty", *i.e.* ideas or knowledge that had not been implemented before in a given context, without incorporating the need for the concept to refer to an

improvement. Under this definition it would be possible to talk about "unsuccessful innovations" (Fullan, 1982; Carless, 1997; Kinser, 2005; *cf.* below in this chapter), which can occur, for instance, when education/training institutions are already achieving their maximum possible effect, for this situation mitigates any difference expected from new practices; when innovative ideas and technologies tried are inadequate or underdeveloped; or when innovative practices have not been properly implemented (see Berman and McLaughlin, 1974). More generally, innovations can be successful relative to their objectives but detrimental to other objectives, or they might simply create new problems (Blumenfeld *et al*., 2000). For instance, innovations can cause enormous disruption in classroom/training centres' practices. They can also be considered unsuccessful if their costs (monetary as well as those related to required training, etc.) exceed their benefits. Yet, the literature reviewed emphasises successful more than unsuccessful innovations. Most problems referred to in the literature regarding innovation are related to low take-up or low usage of valuable innovations.

The extent to which something is new to a given social context is crucial to identifying innovation. But how does one define "new"? Fuller (1981) studies innovations in various industries and argues that when half of the industries in an area have adopted an innovation, it stops being an innovation and enters a new phase: accepted practice. Malian and Nevin (2005) apply this definition to education, looking at practices in teacher education establishments, and report that there are many examples of innovation in teacher education that are increasingly being applied but are yet to achieve the 50% market penetration standard: professional development schools, teaching with educational technology, use of self-study, inquiry-as-stance, service-learning, socio-cultural pedagogical approaches. The contextual dimension of innovation is also prominent in VET, perhaps even more explicitly acknowledged than in the case of education. Indeed, some authors have argued, referring to VET, that "it is difficult for an innovation in training to demonstrate anything intrinsically 'new': its newness cannot be understood out of context" (CEDEFOP, 2005).

Types of innovation

Innovations could be classified in relation to different dimensions. Most classifications have been developed outside educational research and then applied to education. Below we describe different classifications of innovations according to the:

- Level of the innovation;
- Impact produced;
- Area in which the innovation is applied.

Which classification to use for a given study depends naturally on its focus and purpose. The classifications outlined are, moreover, not mutually exclusive.

Level of innovation

At the level of change associated with an innovation, these can be classified as radical, incremental, and systemic.

- **Incremental innovation** is associated with minor changes to existing services or processes.
- **Radical innovation** would be associated with the introduction of new services or ways of "doing things" in relation to process or service delivery.
- **Systemic innovation** is associated with new workforce structures, organizational types, and inter-organisational relationships, aiming to improve the overall performance of a system.

Most of the papers reviewed described innovations in education and training as incremental. Presseisen (1985) analyzed eight major projects, created to address widely recognised (American) educational problems, and concluded that none of them proposed any serious innovation, only adjustments to the current way of doing things (see also Cuban, 1999 for higher education [HE] institutions, Mead, 2007 for primary education, and Sellin, 2002 for VET). More generally, Mulgan and Albury (2003) argue that the majority of innovations in the public sector are incremental in nature, contributing small but continuous improvements in services.

This view is contrasted by Johnson (1984), who analyses HE faculty receptivity to innovation and concludes that HE teaching staff is less resistant to change than is often assumed in the innovation literature. The widespread "resistance to change" view is, according to Johnson, scarcely supported by evidence and often held as a self-evident truth. This view is also reinforced by reporting biases, for the innovation literature is produced mostly by the designers of innovation and excludes the perspective of those who implement it: the teachers (see also Russel and Schneiderheinzer, 2005; Berman and McLaughlin, 1974). Consequently, behaviour that does not affirm a particular innovation may be labelled "non-innovative" and regarded as problematic, whereas the difficulties may actually lie either in the innovation itself or in other factors, such as characteristics of the academic organization (Johnson, 1984, pp. 496-97). Johnson points to complex and varying patterns of faculty receptivity to change rather than straightforward resistance to change. Kirkup and Kirkwood (2005) reach a similar conclusion looking specifically at the case of the introduction of ICTs. Teachers welcome innovative uses

of technology, even if mainly to support and improve their existing activities (see also Erlt and Kremer, 2006, for innovations in VET in England and Germany). Kirkup and Kirkwood highlight a bias similar to that pointed out by Johnson when they argue that it is a mistake to extrapolate from the actions and enthusiasm of earlier adopted innovations to predict the use and impact of an innovation on the larger scale. They point to much of the recent literature on ICT in education, which has tended not to report on the behaviour of late adopters and resisters.

The *systemic change paradigm* in education was pioneered by Banathy (1968, 1991) and popularised by Reigeluth (Reigeluth *et al.*, 1993, Reigeluth and Garfinkle, 1994). Its main aim is to understand the nested interdependencies among system components that allow the system to function as more than the sum of its parts or leave it unable to function at all. While an emphasis on the whole of the system is crucial, Goertz *et al.* (1995) reported that the effectiveness of tools for building systemic capacity seems to be dependent on the degree to which they are explicitly designed and used to foster learning among individuals and organizations within the system. Reigeluth and Garfinkle (1994) edited a volume in which contributors focus on different aspects of systemic reform but share several underpinnings of the term (Ellsworth, 2000). Systemic innovation depends, according to these underpinnings, on:

- **Ensuring stakeholder involvement** (ensuring that everyone affected provides inputs and can participate)
  - Co-ordinate efforts (as opposed to people pulling in different directions)
  - Work as a team (avoiding confrontations)
- **Designing for the ideal** (challenging old assumptions)
  - Re-examine obstacles (do old barriers still exist?)
  - Research solutions (have new tools or techniques become available?)
- **Understanding interrelationships** (planning for systemic system effects)
  - Be alert for dissonance between new and existing subsystems
  - Maximise synergies (seek ways for new and existing sub-systems to reinforce one another)

- **(Re)-creating a viable system**
  - Remove barriers (that might inhibit continuous adaptation to the changing environment)
  - Re-engineer the organization (to support the new set of processes)

In VET, Ertl and Kremer (2006) point out that teachers tend to focus on subject-specific innovations rather than innovations regarding teaching and learning approaches, which could affect the system more broadly. "Systemic reform" and "scalability" are critical in this context. Systemic reform implies scalable innovation, although a scalable innovation may not be systemic, unless it explicitly addresses issues of co-ordination within the school or VET system. Such issues might include co-ordinating the development and adoption of curriculum materials with assessment requirements, insuring that teacher professional development is provided to help enact the curriculum materials, and creating teacher and administrator leadership capacity so that schools are able to make local decisions commensurate with the reform agenda. Systemic reform ultimately must be part of any scaling effort if it is to have long-lasting and wide-spread impact (Fishman, 2000). A systemic analysis should also be recommendable when considering the adoption of any innovation. Focusing on the limited effects of some innovations and the lack of adoption of certain ideas and technologies, the work of Carr-Chellman (*e.g.* Carr-Chellman and Reigeluth, 2001) links these minimal effects to the lack of consideration given to the larger system and the concomitant lack of engagement of stakeholders (see also Carr Chellman and Savoy, 2004). As Carless (1997) explains, the difficulties of introducing large-scale systematic curriculum change should not be underestimated. Problems including resistance to change, lack of adequate resources, and insufficient time for teaching training, can be expected.

Reports on an extensive use of piloting are seen to a much greater (and structured) extent in VET (*e.g.* within the Leonardo programme and other EU-funded programmes, particularly in Eastern Europe) than in education. The lessons learnt from these pilots, however, often find it difficult to make their way into mainstream practice and to generate systemic innovation both in VET and in education. While the ETF (2006, p. 23) reports a strong gap between the piloting approach and systemic transformation, it also acknowledges that increased awareness of pilot projects can go some length in changing practice (see also McNaught *et al.*, 1999). As Chrisman and Crandall (2007) note, progress in adopting, expanding, and refining innovation has been made difficult by a shortage of essential information (see also Gill *et al.*, 2000) for similar conclusions in different national contexts). Saint (2006) suggests the following dissemination strategies to stimulate changes within the education system from pilot innovation funds:

- A national innovation exhibit
- A workshop on a particular innovation of common interest
- Institutional prizes for innovation
- Periodic press coverage of promising ideas
- An education providers' (he provides the example of the university system, but this could equally be applied to secondary VET, etc.) innovations newsletter
- An institutional innovation fair

Some limits regarding the potential of dissemination and awareness, moreover, apply. Although European programmes, which are key funders of innovation in VET, aim to disseminate good practices, they do not always feed well into national systems, whereas European institutions do not have the competences to influence large numbers of other European institutions on their own. Similarly, ECOTEC (2008) highlights that often the organisations piloting innovations do not have a clear understanding of how to sustain or mainstream the effects of their pilot projects. According to ECOTEC, external evaluations of larger projects would improve the "credibility" of those projects' outputs, results, and impacts and improve the scope for mainstreaming their achievements.

Impact produced

Christense and Lærgreid (2001) look at the impact of innovations and differentiate between:

- *Sustaining innovations*: introduce improved performance to existing services, systems, or products along an established trajectory; and
- *Disruptive innovations*: define a new performance trajectory by introducing new dimensions of performance, either creating new markets or offering more convenience or lower prices to customers at the lower end of an existing market.

This terminology has been used in the area of education by Szabo and Sobon (2003), who defined instructional communication technology, and previously distance education, as disruptive innovations.

Current innovation trends: key areas in which innovations in education are occurring

The works reviewed for the production of this report have described innovation most often within certain areas, which can be employed to classify innovations. Following each area are examples of current and recent trends in innovation:

- *Access*: Recognition of prior learning, increase in opportunities for adult learning through flexible provision, etc.
- *Teaching and learning*: Unit design to enhance active learning (Ghail, 1992), use of new technologies for learning in the classroom and outside the classroom, increase use of constructivist approaches and student-centred approaches, focus on learning outcomes, etc.
- *Assessment*: Increased use of peer-assessment, focus on competences rather than knowledge alone, etc.
- *Organisational*: Mergers, increased international partnerships – including curriculum development and certification – specialisation, creation of particular types of institutions in a context where they did not exist (*e.g.* Fachhochschulen in Austria in the 1990s; European Institute of Technology), organization of the system of qualifications through the introduction of national qualification frameworks, etc.
- *Financing*: Tax-exempt or tax-deferred fee saving programmes, pre-paid tuition programmes, broad-based merit scholarship programmes, individual learning accounts, performance funding, increased diversification of income sources, etc.
- *Management*: Devolution of powers to educational institutions; increased accountability)
- *Services*: Often through the use of IT for enrolment, assessment, library changes, personalised services, etc.

Innovations in some of these areas have obvious implications in other areas. Moreover, the outlined innovations may be occurring at systemic and/or organizational level. The relationship between both levels is, in any case, strong. Widespread organizational innovations can feed into systemic innovations and systemic innovations can have obvious direct effects at the organizational level (see also the discussion on the role of different stakeholders in the innovation stages provided below in this chapter, as well as in Chapter 5 on the process and dynamics of innovation). Some of the outlined innovations, however, are chiefly being adopted at the systemic level and initiated by public authorities. This is the case with management innovations in terms of devolution of powers to institutions, increasing accountability (*e.g.* setting

up Quality Assurance and other monitoring agencies, as has been the case in many European countries in recent years), the overall framework for financing (*e.g.* diversifying revenues for education and training institutions), delivery (*e.g.* creating new types of institutions) and accreditation (*e.g.* introducing national qualifications frameworks). However, innovations in teaching and learning and assessment tend to be adopted at the organization/classroom level.

The European Commission has devoted substantial efforts and resources to the stimulation of innovation, channelled mainly through different phases of its LEONARDO programme, the European Social Fund (European Commission, 2004), and previously the ADAPT programme (Janssen, 2002). The LEONARDO programme is well resourced and had a budget of about EUR 1.4 million for the period 2000-06, of which roughly one third was allocated to Pilot Projects to develop and transfer innovation in VET (ECOTEC, 2008). In the 2008-10 general call for proposals, the programme highlighted as priority areas for innovation (European Commission, 2007):

- Developing the skills and competences of **VET teachers, trainers and tutors**
- Developing the **quality and attractiveness** of VET systems and practices
- **Transparency and recognition** of competences and qualifications
- Skills development of **adults** in the labour market
- Raising competence levels of **groups at risk**
- Developing the **learning environment** (notably through the use of ICT)

Other areas in which innovation in VET is currently sought include the integration between initial and continuing VET (see also Stasz and Bodilly, 2004), financing (*e.g.* tax rebates, state re-funding of taxes, bipartite and tripartite funding arrangements, etc.), modularization, the use of training packages (Simons *et al.*, 2003), the inclusion of industry standards in courses and assessments (Stasz and Bodilly, 2004), and the creation of stronger partnerships among stakeholders, particularly between training providers and employers (see for instance ETF, 2006; McCoshan and Souto-Otero, 2003, Mitchell, 1998; Munch, 1996).

Measurement

The measurement of innovation in education and VET, as well as in such areas as the economy at large is in its infancy (US Advisory Committee on Measuring Innovation, 2008). Maliand and Nevi (2005) note that their

review of the table of contents of the *Teacher Education Quarterly* from 1990 found no articles with titles indicating an emphasis on assessing innovation. Consequently, they conclude that "the assessment of innovation appears to be a novel, or can it be said, an innovative notion". (Maliand and Nevi, 2005)

Some indications could be made here, however, regarding the measurement of innovation in education at both the organizational and the education system levels. In this respect, it is useful to differentiate indicators on different dimensions. A common approach is to differentiate among input (which would capture the structural conditions required for innovation), output, and impact indicators of innovation (for a discussion on throughputs in innovation processes in education see below in this chapter).

Innovation **inputs** could be measured through indicators related to investment levels on innovation projects, such as the volume of funds allocated (at the organizational, national or international level) to innovative education/training pilot projects, for example. Some national institutions devote significant amounts to innovation projects, such as the US Fund for the Improvement of Postsecondary Education (FIPSE). The same is true for international institutions, such as the EU and the World Bank (see Saint, 2006). However, data gaps are important; data on national and international investment in education is extremely scarce, and data on institutional and sub-national investment in innovation is largely non-existent. Other input indicators for innovation in education have been related to ICT (*e.g.* proportion of computers for student and staff and type of access to the internet) and its use (as argued by Berman and McLaughlin (1974), the adoption/use of a technology may not be considered an innovation unless it produces an associated change in a pattern of behaviour). Another input indicator increasingly present is the time allocated to the development of innovative activities, provided that double-counting of investment in the form of funds is avoided, as this can be used by staff to "purchase" innovation time or infrastructure.

In terms of **outputs,** it is questionable whether educational innovation could be subject to independent measurement beyond a "head-count" approach. Indeed, at the organizational level, developments could be classified as innovative or not – according to a set of properties as outlined above in this chapter – and their effectiveness and/or efficiency (not only in terms of students' outcomes but also in terms of capacity created and other aspects (Blumenfeld, *et al.*, 2000) could then be measured. This would mostly deflect the measurement of innovation to general measurements of the effectiveness of different initiatives. There would not be a specific measurement of innovation in this context. A specific approach to measuring "outputs" would involve counting innovative initiatives adopted by an organization in given context of reference and benchmarking with peers. Thus, an attempt could be made to measure, for instance, students' improvements resulting from

teaching and learning innovations. By aggregating the count of innovations in individual educational organisations, a calculation of the rate of innovation at the system level – probably with reference to a set of defined areas, such as teaching and learning, assessment, or others – could be achieved. "System-wide" initiatives, such as legislation and regulations, can be subject to "headcount" output measurement too.

To measure the **impact** of innovations, two main approaches can be adopted. One would be more descriptive, comparing the performance of innovative and non-innovative education and training institutions or initiatives (or the same institution before and after the innovation) along some predefined parameters. This approach is the most commonly used in education and training and has been employed in Driel (1997), Gibbs (2001), Bodilly *et al.*, (2004), and ECOTEC (2008). The second would be an econometric approach that tries to explain performance (*e.g.* in terms of students' outputs) using a range of variables, including some that reflect innovation (see Guellec and Pattinsson, 2006 for a fuller discussion). Some authors, however, question the validity of impact measurements in relation to innovations, which may reveal their impacts only after some time (*e.g.* innovations ahead of their time may require extensive investment in infrastructure and seemingly low-impact innovations may lead to further innovations that will eventually yield great returns (see Dubner, 2008)). A practical example of impact indicators regarding the use of innovations funds is provided by Saint (2006), who outlines the following broad impact indicators for World Bank projects:

- Whether the **government** decide to **retain the innovation fund** as a mechanism for allocating its own resources when the World Bank-funded project is finished;
- **Number** of strategically selected academic **programs** updated and strengthened;
- Measurable increase in **pass rates** within targeted academic programs;
- Measurable increase in student **grade point** averages;
- Institutionalization of innovation fund within **national** higher education **budget**;
- Average waiting time of graduates for first **employment**;
- Average duration of study **time** needed to attain **graduation**;
- **Curriculum changes** in selected faculties that show evidence of increased use of new materials, updated content, different pedagogical methods, and incorporation of information technology.

Other indicators, Saint clarifies, could be linked to the specific national and institutional priorities. Still others will be determined by the unique characteristics of the individual innovations. As seen, those indicators measure the impact of the World Bank funds mechanisms specifically (indicators 1, 2, 5, 8) and the impact of the innovation itself in terms of different levels of student achievement (indicators 3, 4, 6, 7). The measurement of the impact of the innovation is in line with the previous discussion, although it also presents impacts on easily quantifiable aspects and does not cover process and capacity building aspects to any extent. Other dimensions that have been measured regarding innovation in areas other than education include goals and rates of co-operation for innovation.

Stakeholders and processes in the creation and diffusion of innovation

Introduction

This section provides information, first, on the main stakeholders, incentives to innovate, main policies, and barriers in innovation as they pertain to VET. Second, it covers the link between research and innovation in VET.

Main stakeholders, incentives to innovate, main policies and barriers

A snapshot of the main stakeholders in VET is provided in Table 3.1. Whereas several types of stakeholders overlap with those in education, a wider set of actors are involved in innovation in VET. In particular, the roles of individual employers and social partners are stronger in this area. Similarly, international organisations have stimulated innovations more directly in VET than in general education, as already highlighted.

Some of these stakeholders have long worked in innovation in education, whereas others are relative newcomers. They also have different "market shares" in the education market. This share may not be directly related to the contributions different stakeholders provide in terms of innovation. Accordingly, Hess and Finn (2007) argue that for-profit and not-for-profit private entities can be real "human capital innovators" in spite of their relatively low market share in education and VET. Some of the stakeholders presented in Table 3.1. have a bias towards innovation, but not monolithically. Thus, whereas some private companies (particularly ICT companies) have a great incentive for innovation to emerge in education, others, such as traditional publishing houses, may have strong incentives to preserve the *status quo* (Christensen and Horn, 2008). Osborne and Gaebler (1992) have noted that change in the public arena is often interpreted as a positive sign of the health

Table 3.1. **Main stakeholders in innovation in VET and selected incentives to promote innovation**

Stakeholder	Incentives to innovate/promote innovation
Teachers/Trainers	Professional development Increased effectiveness in teaching and learning
Schools/Training Organisations	Availability of innovation funding
Students/Trainees/Employees	Increased effectiveness of teaching and learning
Social Partners	Greater levels of competence of the workforce
Private Companies and For-Profit Private Companies	Creation of new markets (e.g. ICT companies) Delivery of VET Greater levels of workforce competence
Non-for-Profit Organisations and Charitable Foundations	Identification of best practices to improve the system Delivery of VET
Public Innovation Agencies	Identification of best practices to improve the system Increased role in policy making
Government (including state and sub-state agencies)	Positive public perception of change Increased effectiveness in VET policy
International Organisations	Identification of best practices to improve the system Increased role in policy making

Source: Manuel Souto-Otero (2008).

of governmental institutions – innovation reflects policy makers' responsiveness to new ideas and changing environmental conditions – and can have implications for electorate behaviour and for how they see innovation (Berry and Berry, 1992). Just as politicians may have some incentives to innovate, innovation can also make legislation complicated to adapt and can uncomfortably redefine well-established practices, such as the use of one-size-fits-all textbooks or established pedagogical paradigms (Christensen and Horn, 2008).

Within the existing range of stakeholders, teachers – and their buy-in – are singled out in the literature as being paramount for successful implementation of innovations (Fullan, 1982; Fullan and Hargreaves, 1992; Havelock, 1982; Bodilly *et al.*, 2004). Russell and Schneiderheinze (2005) report that aspects influencing the effectiveness of implementing an innovation (a constructivist-based learning environment) included teachers' abilities to benefit from it (*e.g.* through online collaborative professional development forums), teachers' problem-solving strategies, their prior conceptions about teaching and learning, and their compatibilities with the changes of instructional pedagogy. Fullan (1982) even goes on to argue that ignoring teachers' experiences is the principle reason for unsuccessful innovation: neglecting to understand

of how people actually experience change – as distinct from how it was intended – is, according to some authors, at the heart of the spectacular lack of success of most social reforms (Fullan, 1982; Cheung ,1999). As Grootings and Nielsen (2005) argue, implementing innovation no longer requires only establishing broad ownership and acceptance by teachers; if that were the case, more traditional methods of securing compliance (centralised, authoritarian, political, and administrative) with innovations could be applied. Yet, purely centralised initiatives have regularly failed because teacher accept the innovations but do not implement them (Carless, 1997). Instead, the operational detailing of innovations by teachers (even within centralised systems of governance) is crucial and must be fed in to policy makers; this is in opposition to establishing a unidirectional top-down relationship (see also Atkin,1998; Blumenfled *et al.*, 2000).

A marked trend in VET is that new partnerships are emerging among the stakeholders presented in Table 3.1 as a result of the search for innovative approaches to renew training systems (Mitchell and Young, 2001). These partnerships are redefining the roles of the state and of private partners in VET, with enterprises acquiring a significant role in improving the relevance, effectiveness, and efficiency of training systems by adapting them more closely to the requirements of markets and improving the quality of training. The inherent characteristics of business – namely that it is market-driven and flexible, and therefore rapidly adaptable to change, as well as entrepreneurial and innovative – are precisely the qualities that are often lacking in public training systems and government bureaucracies (Mitchell and Young, 2001).

One of the key lessons for countries seeking to cope with high levels of labour market uncertainty, however, is that VET should not be overly responsive to short-term labour market needs. It should instead provide broad qualifications that offer a basis for further specialisation and future development (Faudel and Grootings, 2006). The state can thus contribute to enterprise effectiveness by creating a supportive environment and promoting the adoption of a broader and longer-term perspective for training policy and systems, as well as by balancing considerations of efficiency and equity. Therefore, current efforts to form partnerships seek the advantage of using the strengths of both partners for their mutual benefit (Mitchell and Young , 2001).

New relationships are also emerging between VET organisations and their teachers, managers, and supervisors in businesses, and with members of local communities. These new relationships are leading to major innovations in training delivery, the involvement of industry as partners, and greater levels of customisation of training. As Mitchell (2003) notes in his report on innovation in teaching and learning in VET, such change is requiring new and intensified professional, technical, and educational roles for VET practitioners, especially among teachers, workplace assessors, and supervisors

(see also Callan, 2004). According to Callan (2004), in recent times, funds from large and successful industry partnerships and fees from international students and consulting activities, to name just a few developments, have provided some of the extra funding, which VET institutions have been able to invest into strategic innovation initiatives.

As already advanced, international organisations, namely the EU, have also been playing an important role in the stimulation of innovation in VET. The EU LEONARDO programme pilot projects have sought to develop and transfer innovation in VET. The main outputs of the programme have been the development of new training approaches or training courses and the production of vocational guidance services/products. Similarly, UNESCO's UNEVOC work focuses on best and innovative practices concerning technical and vocational education and training – particularly for developing and post-conflict countries – using tools such as networking, knowledge sharing and publications, interagency collaborations and partnerships, advisory services and training, and human resources development. The ILO has been active in research in innovations in VET, focusing particularly on social-dialogue and partnerships.

Next is an analysis of the innovation processes and policy making, within which these stakeholders operate.

Innovation processes and policy making

Mulgan and Albury (2003) propose a model of innovation encompassing the following four steps:[1]

- *Generating possibilities*: Ideas for innovation are stimulated and supported;
- *Incubating and prototyping*: Mechanisms are used to develop ideas and manage associated risks;
- *Replicating and scaling up*: Successful and effective innovation is promoted and timely diffused;
- *Analysing and learning*: Innovation is evaluated with an aim to promote continuous learning and improve public services.

At this point, it is useful to provide some further clarification on the relationship between these steps and the different stakeholders introduced in the previous section. To that end, it will help to distinguish between sponsors and advocates of an innovation. Whereas a sponsor is an individual, group, or organization that has the authority to legitimise and the power to enforce an intervention (often by exercising rewards and pressure), an advocate wants to achieve a change but lacks the authority to sanction it. Advocates tend to be

more active at the generation and incubation phases (although they can provide support throughout the implementation of the innovation), trying to convince sponsors to replicate and scale up. Individual teachers and students, private companies, for-profit entities, non-for-profit organisations, charitable foundations, and international organisations often take the role of advocates of innovations. Ultimately, government, public innovation agencies, schools/training organisations (through legislation/regulations), and individual teachers need to take the role of sponsors for the innovation to be implemented by frontline staff – often teachers. The reminder of this subsection covers the first three stages of the innovation processes as defined by Mulgan and Albury (2003). The role of analysis, learning, and evaluation is then covered in a separate subsection.

Generating possibilities, incubating and promoting

Over the past decade, theory and research on the adequate conditions for the generation of innovation at the system level have grown in sophistication, yet this research has focused much more on education than on VET. Using longitudinal analytic techniques, education scholars have remedied the methodological limitations that accompanied early reliance on cross-sectional designs. Scholars also have developed models that are increasingly comprehensive in their explanatory scope and trespass old divisions. Indeed, some studies now provide integrated social, economic (*e.g.* many studies emphasise that socio-economic development is likely to influence the adoption of innovations in education, as they can be resource-intensive), political (*e.g.* degree of centralization, degree of professionalization of civil servants, and levels of inter-party competition for instance), and diffusion-related explanations of innovation (McLedon *et al.*, 2005).

Among political determinants of innovation in education, the role of organizing the public sector along the centralisation-decentralisation continuum is a key factor in generating innovation in education. In this respect, countries such as the United States have experimented with radically different models, and their experience can be enlightening. In the 1950s and 1960s, United States states centralised decision-making processes by granting regulatory co-ordinating boards greater power and responsibility to make centralised academic and fiscal decisions for an entire state, supplanting advisory co-ordinating boards that interfaced previously with governmental institutions. Among the supposed benefits of centralised planning and policy development, it was argued, was greater state policy innovation (Callan, 1975; McConnell, 1962; Mortimer and McConnell, 1982). The nonpartisan professionals that would staff the new state-level boards would bring increased technical knowledge and analytical capacity to bear on the management of postsecondary systems, thereby providing elected officials (*e.g.* legislatures and governors) and their staffs with new ideas for improving postsecondary access, quality,

affordability, and productivity (McLedon *et al.*, 2005). In the 1980s and 1990s, however, there was a re-structuring of the system governance patterns (Marcus, 1997) with a tendency toward "deregulation" and "decentralization" to the local level (campus) (Couturier, 2003; MacTaggart, 1998; Schmidt, 2001). A frequent argument at the time was that centralised governance might inhibit policy innovation in the postsecondary arena because government bureaucracies are inherently resistant to new ideas (Berdahl and MacTaggart, 2000; Hebel, 2000; MacTaggart, 1998). McLedon *et al.*, (2005) provides one of the few studies that test empirically how decentralisation affects innovation, covering the case of the US. They report that centralised governance arrangements are positively – albeit weakly – associated with governmental adoption of new postsecondary financing policies, but not accountability policies. This finding appears to offer modest support for the claim made during the 1960s, and subsequently tested by Hearn and Griswold (1994), that centralised governance structures may spur state governments to adopt certain innovative postsecondary policies. No similar study looking at the relationship between governance patterns and innovation in VET was found during this review. Stasz and Bodilly (2004) do explore how the degree of centralization of a system (measured by the number, and degree of authority, of agencies involved in decision-making and delivery of educational services) affects its capacity for policy change – including innovative change – but with a methodology less sophisticated than those of studies conducted for education, such as McLedon *et al.* (2005). It concludes – as do McLedon *et al.* (2005) – that centralised systems were more likely to implement innovations in certain areas*, i.e.* case standards, graduation requirements and assessment.

As already mentioned, the use of pilots has played an important role in incubating, promoting, and generating possibilities for innovation in VET. There indeed exists a more extensive use of pilots as incubators of future innovations in VET in relation to education as well as a greater role by international organisations in this area, particularly the EU. Looking at the role of international organisations and their piloting approach in incubating and promoting innovation, the evaluation of the LEONARDO II programme (ECOTEC, 2008) found that the role of the programme has been greater in the incubation and promotion of innovation than in the diffusion of innovation (see also next subsection). A substantial proportion of LEONARDO pilot projects had only had a modest impact on policy making, particularly in old member states – impact was greater in new member states, given their initial conditions. Project co-ordinators described the limited scope of their projects as the main reason for low impact. Whereas the programme created many valuable outcomes, they must still be better embedded into policy making processes to achieve their full impact. In this respect, greater dissemination and valorisation of results could prove useful (Janssen, 2002; ECOTEC, 2008), although this approach still faces some limitations.

Examples of government initiatives to promote innovation in VET can also be found at the national level (see, for examples across a large number of countries, Gill *et al.*, 2000). Stasz and Bodilly (2004) provide an evaluation of the role of USA federal and state policies in improving the quality of VET in secondary schools within the context of the Perkins Vocational and Technical Education Act of 1998 (Perkins III Act), which included innovation initiatives, such as the ill-defined (Stasz and Bodilly, 2004; Stasz and Grubb, 1991 for a discussion in relation to Perkins II) but central concept of integration of vocational and academic education through, amongst other tools, curricular innovations. However, this review offers limited specific information on the role of governance patterns in generating possibilities for innovation at the policy level in VET. Callan (2004), in a study based on the experience of Australian VET providers, outlines specific suggestions on how to incubate and promote innovation below the policy level, namely in individual VET organisations (see also section below in this chapter on the conditions that facilitate innovation and barriers for a more general discussion, as well as Chapter 4 specifically on barriers and drivers). These are as follows:

- Bring new ideas into the organisation, encourage staff to attend **conferences and workshop**s, to join **professional groups**, and to bring in **outside experts** who have different or new opinion about issues.
- **Provide seed funding,** which can be applied to initiate new projects. Initially, this funding might be limited to buying-out staff time to allow them the time to progress their ideas to some form of innovation or concept plan.
- Select and promote those **partnerships** that allow the organisation to develop its skills and knowledge, and to have staff work closely with partners through s**hared working arrangements, job rotations, and exchanges of staff**.
- As an organisation, identify whole-of-enterprise issues that can best be resolved through **cross-functional teams** with members from various business divisions in the organisation.
- Encourage the broad concept of **communities of practice**, including time for staff to meet informally and socially with others from inside and outside the enterprise to facilitate the sharing of knowledge and practical experiences.
- Build the **expectation** among staff and members of the institution's board of management that staff will be putting new ideas and projects to the board for consideration, debate, and potential endorsement.
- Define and publicise a simple **process which staff can work through to propose new ideas** for initial consideration.

- Include within organisational **websites details about innovations being considered**, and invite those from both inside and outside the organisation to email comments and advice about how the idea might be further progressed.
- Implement recognition programs that **publicly support** and celebrate innovative solutions to teaching and learning and to partnering and related activities.
- Encourage innovative **ideas from students** though the sponsorship of enterprise competition in which students can compete for cash and in-kind support to take their innovations to market.

Erlt and Kremer (2006) note that the greater degree of stability (*e.g.* less staff fluctuation) of German vocational colleges (*Berufsschulen*), as compared to English FE colleges, also seems to allow lecturers to reflect more freely on innovative practices in general. The next subsection looks at innovation diffusion.

Diffusions: how do benefits escalate?

Rogers (1995) reviews around 900 empirical publications concerning the diffusion of innovation in non-educational contexts and conceptualised the process of adoption and diffusion of innovation in probably the most influential and widely used model (for a critique of Rogers' model see Ferrier *et al.*, 2003), which is based on five stages and can be summarised as follows:

- *Knowledge*: knowing what the innovation is, how it works, and why it works.
- *Persuasion*: forming a personal or professional attitude toward the innovation.
- *Decision*: deciding to reject or adopt it on a partial basis for assessing its usefulness.
- *Implementation*: putting it into use, experiencing problems with uncertainty about its outcomes, re-inventing it for various reasons, and integrating it into ongoing practices.
- *Confirmation*: seeking reinforcement for previous decisions, which may involve reversing this decision because of conflicting messages.

This general model has been used in an educational context, amongst others, by Cheung (1999), who concludes that Rogers' model appears to be applicable in the educational field. The implementation stage which Cheung, however, notes appears to be much more complicated than that in the Rogers Model and could be refined into four phases of implementation – experiment

phase, adjustment phase, mastery phase, and personalisation phase. As the above conclusion is derived from a case study of eight teachers, the findings need to be verified by a large scale of research across different educational innovation as well various working contexts and cultures.

The Glennan *et al*. (2004) study for RAND also provides substantial information on how educational reforms can "scale-up" through mutual adjustment, covering a wide set of educational initiatives that have taken place over the last 20 years. The model could be considered an attempt to represent synthetically the stages of diffusion (*e.g.* as attempted in Rogers 1995) with the role of key stakeholders in processes of change.

Hull *et al*. (1973) cover VET specifically and add to the discussions on the diffusion of innovation by going beyond the outline of stages for diffusion and the role of stakeholders in that process to the development of a conceptual framework to understand both structural (the basic elements of the phenomenon) and relational aspects of the phenomenon of diffusion. Their framework thus outlined three relational conditions and five structural conditions of diffusion. These conditions are:

- *Antecedent conditions*: The ingredients that form the "substance" of the diffusion event, without which the event of diffusion cannot occur; this is a relational dimension and consists of the following structural dimensions:
  - *Change advocate*: The initiator (individual, group, organization, institution, or culture) of the diffusion event.
  - *Targeted consumer*: The ultimate user (individual, group, organization, institution, or culture) of the innovation, rather than any instrumental targeted audience.
  - *Innovation*: A product its form and characteristics, which can be viewed differently by the change advocate and the consumer.
- *Interaction conditions*: The synthesis of the antecedent elements; this is a relational dimension and consists of the following structural dimension:
  - *Strategy-response*: A dimension that consists of the strategy initiated by the change advocate; the response – rejection, resistance, acceptance – initiated by the targeted consumer; and the strategy-response relation, in which the change advocate and the targeted consumer are found at a given point in time. The strategy itself is conceived to consist of the level – individual, group, organization, culture – at which the message is being targeted, the communication linkage modes (*e.g.* media or personal); and the strategy style – coercive, persuasive, or re-educative.

- *Consequent conditions*: The result of a diffusion model; this is a relational dimension and consists of the following structural dimension:
  - *Impact*: Change in the advocate, targeted consumer, and/or innovation. The changes can be in terms of cognitive effects, affective effects, and/or behavioural effects.

No empirical study has been found in this review applying this framework.

Innovation diffusion patterns among political entities have also been related to geographical proximity, as nearby entities enter into a system of emulation and competition as described in Walker (1969) (see also McLedon *et al.*, 2005). In the processes of diffusion, the initial form of an innovation may be altered. The study of policy reinvention (Glick and Hays, 1991) argues that as states seek to learn from their neighbours' past successes and failures when making their own policy choices, policies may change substantially as they spread from state to state. Thus, states may adopt different forms of a policy innovation, depending on whether adoption occurs earlier rather than later. In the process of diffusion, successful innovations can also become unsuccessful (Rogers, 1995).

Conditions that facilitate implementation and barriers

An important question is what factors facilitate or make it more difficult to innovate. The work of Ely (Ely 1999, 1990) systematised a range of conditions that facilitate innovation and has been widely used in educational research (*e.g.* Bauder, 1993; Jeffery, 1993; Read, 1994; Stein, 1997; Ravitz, 1999):[2]

Dissatisfaction with the status quo: refers to an emotional discomfort resulting from the use of current processes or technologies that are perceived as inefficient, ineffective, or not competitive. This affective state is either self-induced or results from organizational awareness or leadership campaigning for the need to change.

Adequate Time: refers to the willingness for organizations to provide paid time for users to learn the new skills or procedure to use the innovation, as well as the user's willingness to devote time to develop these new skills. It also represents individuals' belief that they can successfully adapt to the change.

Resources: refers to availability and accessibility to resources needed to implement the innovation. Resources include finances, hardware, software, materials, personnel, and technological support.

Knowledge and Skills: refers to users possessing, and/or acquiring through training, the needed skills and knowledge to employ the innovation.

Rewards and Incentives: refers to either intrinsic or extrinsic rewards that result from using the innovation and vary from user to user. External rewards are provided to intended users as means to motivate them to employ the innovation.

Participation: refers to the level of involvement stakeholders have in the decision-making process – from design to evaluation – to adopt and implement an innovation. Participation may take the form of user group representatives if it is difficult to get feedback from all potential users.

Commitment: refers to "visible" support – beyond verbal commitment (*e.g.* through the development of strategic plans, dedication of resources, etc.) – by the upper level leaders or powerbrokers. The key to this condition is the users' perceptions of the powerbrokers' commitment to the implementation of the innovation.

Leadership: refers to the level of ownership and support given by the leaders who will manage the daily activities of those using the innovation.

The innovation process is also mediated by the factors of environmental turbulence (Zaltman *et al*., 1973), autonomy (Blau, 1973), and availability of slack resources (Holdaway *et al*., 1975). Similarly, the policy reinvention literature (Glick and Hays, 1991) suggests an additional dimension on which to analyze postsecondary diffusion patterns: the degree of controversy that surrounds a policy or practice.

Mitchell (2003) identifies a number of "macro-drivers" meant to specifically refer to innovation in VET:

- *Changing structures of work*: In particular, part-time, casual or contingent, and shadow workforces are growing, while the standard employment model based on fixed hours, long tenure, and prescribed benefits is declining and work organisations are decentralising.
- *The changing structures of industry and employment*: There exists a need to continue modernising traditional industries and increase focus on competitive alignments among markets, work organisation, skills, and professional standards for high performance workforces. In this scenario, training, retraining, and replacement training are critical for both organisations and individuals.
- *The dynamic knowledge imperative*: The economic and commercial value of knowledge and skills, and especially know-how, is increasing.

- *Public policy*: Governments continue to redevelop their positions on society and economy and within the constraints of their limited revenue and tax base they need.
- *New technology*: The spread of digital communications is increasing the need for information technology (IT) literacy and fluency across many workforces and is challenging the VET system and its staff to model and lead this type of learning, where and when it is relevant. Changes in technology alter the way in which people carry out their normal work tasks and often require new learning by staff in industry and VET providers.
- *Shrinking time horizons*: Options such as e-learning potentially provide some solutions for the "time poor" worker who is keen to stay abreast of the developments in their field.
- *From mass production to market segmentation*: Agility in delivering training that matches the particular preferences, wants, and needs of different clusters and market segments is a discipline of increasing importance.

These macro-drivers may affect the need to be innovative in VET, but they do not specify the practices in which highly innovative VET institutions are engaging. These practices have been studied by Callan (2004), who reports six; they are:

1. Create learning cultures that promote innovation as a **core capability**
2. Have leaders who are **failure tolerant**
3. **Identify** their innovators
4. **Reward** people who bring forward new ideas
5. Use **partnerships**
6. Promote innovation through **teams**, teamwork, and communities of practice.

Callan reports that VET providers are predominantly making use of only three of these six facilitators of innovation: identification of innovators, partnership with industry, and teamwork. They are experiencing a gap between the rhetoric about innovation and its funding and are in need of more leaders who, rather than just playing around the edges, want to build corporate cultures that deeply value innovation and innovators.

VET organisations identify their champions of innovation, who typically operate in partnerships with various specialists, such as business development managers, business managers, enterprise officers, and partnership managers.

However, with the exception of funding to release staff from teaching or other responsibilities, the organisations are generally still working through how to reward or more fully support their innovators (Callan, 2004). Some technical and further education institutes in Australia, Callan reports, provide a wider range of examples of how innovation can be rewarded through other means, such as the provision of awards and prizes to those responsible for the innovation. These rewards included additional access to training opportunities and both national and international visits to view ways in which other institutions are promoting learning and innovation. Such reward systems, according to Callan, make innovation more tangible and serve to demystify the concept for staff. At another level, Callan's study reports how other institutions have engaged in teacher foreign exchange programmes designed to bring new teaching methods and skills to them.

Innovation in VET organisations is also being driven through the development of training partnerships with industry. Callan reports that of the six characteristics of innovative organisations, this was by far the most dominant strategy in shaping and driving innovative thinking and practice. Industry training partnerships promote more flexible training programs, good financial returns, and staff development opportunities for both VET and industry organisations. The partnerships have allowed for experimentation and fine-tuning of practices, resulting in flexible and individualised training, as well as customisation of training, blended models of delivery, the use of workplace assessors, and the mapping of competency development within existing workplace projects.

However, VET organisations are engaging in innovation with little time and without financial rewards for their efforts. Moreover, there appears to be little evidence that VET organisations have established either well-developed organisational capabilities for innovation or clear structures for rewarding innovators. Given the financial and operational constraints faced by organisations in the VET sector, this is understandable. Yet, there is still tremendous potential in the VET sector, argues Callan, to increase innovation within their enterprises.

Zalman and Duncan (1977), on the other hand, provide an influential analysis of the conditions hindering innovation. They identify 18 factors, comprising four major categories of barriers that focus on increasingly smaller units of reference:

- *Cultural barriers*: cultural values and beliefs, cultural ethnocentrism, incompatibility of a cultural trait with change, "saving face" ("I can't do that; I'd never live it down");

- *Social barriers*: group solidarity, rejection of outsiders, conformity to norms, conflict among different factions, group introspection (inability to see problems objectively);
- *Organisational barriers*: threat to power and influence, organizational structure (*e.g.* need to reform more than one department), behaviour of top-level administrators, climate for change in organization opposed to change, technical barriers for resistance;
- *Psychological barriers*: perception (*e.g.* inability to envision change), homeostasis (innovative change can be uncomfortable), conformity and commitment (*e.g.* "this is not the way people do things in my profession"), personality factors (*e.g.* "this change is not right for who I am").

Recently, the US Department of Education (2006) reported that both state and federal policy makers have failed to prioritise support for innovation by not adequately providing incentives for individuals, employers, and institutions to pursue more opportunities for innovative, effective, and efficient practice. This study singled out "lack of incentives" as a key barrier to innovation. The report recommended developing improved accountability measures and creating a consumer-friendly information database on available provision with reliable information on institutions, coupled with a search engine to enable students, parents, and policy makers to compare institutional performance. Besides this, the report encouraged educational institutions to develop new pedagogies, curricula, and technologies to improve learning. This would be partly funded through a revitalised Fund for the Improvement of Postsecondary Education (IPSE) within the context of a more clearly defined national strategy for lifelong learning. In this strategy, institutions should be required to expand their reach to adults through technology (*e.g.* distance learning), workplace learning, alternative scheduling programmes, and the facilitation of credit transfer. Finally, it called for institutions to harness the power of information technology by sharing educational resources among institutions and using distance learning to meet the needs of rural students and adult learners. It also urged states and institutions to establish course redesign programmes using technology-based learner-centred principles that draw upon innovative measures already in place in these areas. In the next sub-section we examine the fourth element in Mulgan and Albury's (2003) model: the relationship between educational research capacity and innovation in education.

Educational research capacity and innovation in VET

Almost 40 years ago, Lilly wrote that "the technical soundness of an innovation as demonstrated by educational research is seldom necessary and never sufficient to guarantee adoption of that innovation by educational practitioners" (1973, p. 227). OECD's work on knowledge management has recently highlighted that still today educators tend to be reluctant to exploit the motors of innovation (contrary to what many other sectors do), including research knowledge in education and related fields. It is argued that research and development lack both the support and the capacity they need to effect change and promote innovation, and they have only weak links with policy and innovation (OECD, 2007). The results of scholarly research on teaching and learning, indeed, are rarely translated into practice, especially for those working at the grassroots level in fields such as teacher preparation (see also OECD, 2003; US Department of Education, 2006).

Some of the suggested solutions to improve the current situation consist of effective brokerage and promoting collaborative forms of professional development to ensure that the current research directly informs the practice of teachers in schools and classrooms. Also, too much educational decision-making is preoccupied, in the short-term, with disincentives to innovate. Accountability regimes, when testing for a very limited range of knowledge and capacities, can also be so punitive as to stifle any genuine initiative, promoting neither quality nor innovation (OECD, 2007).

To qualify some of the statements provided above, a distinction can be drawn between commissioned and non-commissioned research in education, including education innovation, and who commissions that research.[3] Much academic research on education is not seeking to inform policy, nor is it suitable for doing so. Equally, "government is not applied research" (Silva, 2008): experimentation cannot be freely applied, without further considering the consequences over its subjects; political constraints (rather than scientific evidence) may also play a strong role over the range initiatives that can be implemented. Of the research that could be suitable for informing policy, much may not influence it simply because it does not reach decision-makers, but there are other factors as well (*e.g.* lack of resources). Commissioned research tends to have stronger links to policy and practice because there is an organization behind it that has both an interest in the research topic and "power-resources" to implement action following the research results. The link between research and action is stronger when the commissioning organization is the decision-maker.

There are instances in which research not directly commissioned by the decision-maker can have a significant impact on policy too. Ertl (2006) analysed how PISA has influenced the political discourse, curriculum development processes (growing importance of outcome control, competence-orientation

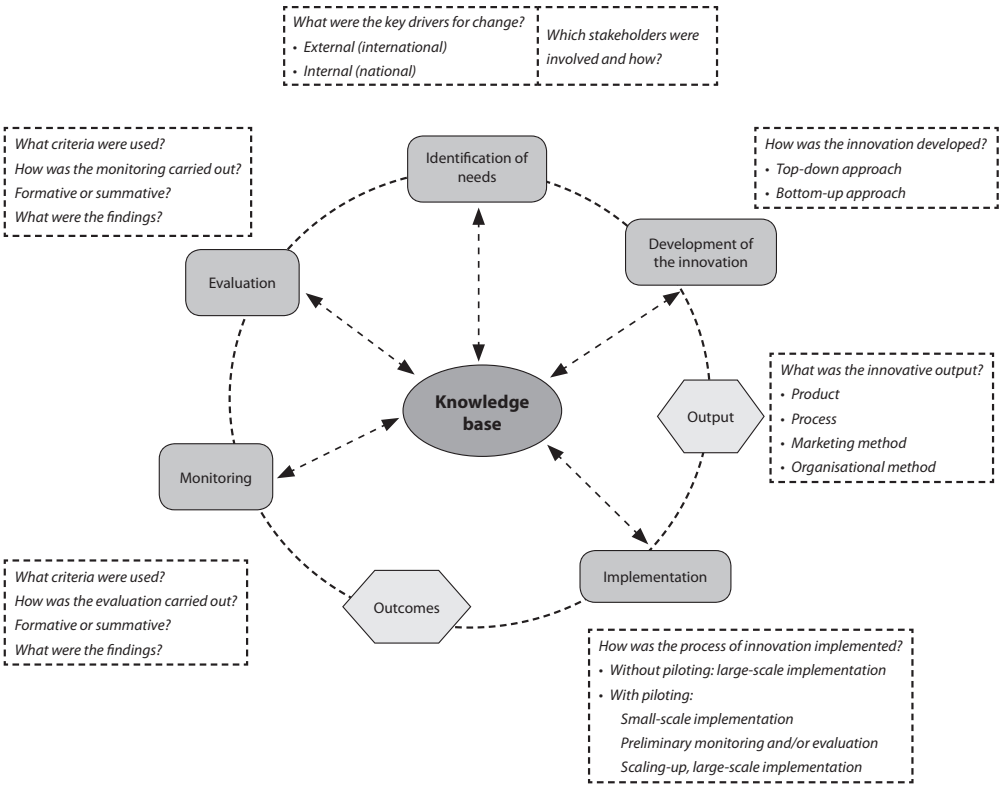
and external assessment), and the academic discourse on compulsory education in Germany. Moreover, Ertl argues that changes in the political discourse resulted in a wide-ranging reform agenda, including – most significantly – the introduction of national educational standards as well as an increased importance of empirical research on pedagogic practice and comparative education. European Commission research has also stimulated innovative national policy making in vocational training (Souto-Otero *et al.*, 2008).

Overall, however, greater links between research and practice are yet to be developed in most countries. Research conducted by the Centre for Global Development (Savedoff *et al.*, 2006) for the Gates Foundation looked specifically at the role of impact evaluation on policy making in several social areas, including education and training, and revealed both a substantial gap between what is known and actual policies and under-investment in evidence-based social development policy. Thus, the authors explain that rigorous studies of job training, conditional cash transfers, and nutrition interventions only in a few countries have guided policy makers to adopt more effective approaches, encouraged the introduction of such programmes to other places, and protected large-scale programmes from unjustified cuts. By contrast, a dearth of rigorous studies on teacher training, student retention and many other important programs leaves decision makers with good intentions and ideas but little real evidence of how to effectively spend resources to reach worthy goals. While governments and agencies regularly seek ideas and guidance to develop new programmes or to improve existing ones, they frequently do so on time frames and budgets that do not allow rigorous evidence to be developed. These institutions may do well in their normal data collection and evaluation tasks related to monitoring inputs, improving operations, and assessing performance, but they largely fail in building knowledge because doing so requires studies that fall outside normal budget and planning cycles and incentives are sorely lacking (Savedoff *et al.*,2006). However, communication of research findings is not the only challenge. In addition, research capacity is often lacking (IBRD, 2005).

Model of innovation in education

The following figure presents a model of innovation in education from a systemic perspective, created by the OECD for this study of systemic innovation. It provides a background to the analysis of the case studies and the subsequent elaboration of a typology of innovations in VET, and includes the potential stages and elements of the innovation process in education, taking a number of elements discussed above into account. The square shaped boxes contain a number of key questions (with some typical options) that arise in the systemic analysis of innovations.

Figure 3.2. **Model of systemic innovation in education**



This model views innovation as a cyclical and iterative, rather than linear, process. Throughout the process it may be necessary to return to previous stages. For instance, if the implementation process involves a pilot and the results of the preliminary evaluation are negative, it may be necessary to return to the stage of "development of the innovation".

Some stages in the model represent processes (*e.g.* development of the innovation), while others could be qualified more as "products" (*e.g.* the output of the innovation process). The process elements of the model are in square shaped boxes, while the non-process elements are in hexagonal boxes. This distinction is important for creating a clear view of the overall innovation process. The "output" of the innovation process is always innovative: it is a new or significantly improved product, process, marketing method, or organisational method. However, while the process elements may be innovative themselves (*e.g.* an innovative way of identifying needs), they are not necessarily so. What is required is that they are necessary steps to produce an innovative output.

The stages of the model

This section presents the different elements of the model presented above, describing different ways in which each stage may take place, as well as providing some illustrative examples from cases studied in the field of VET. It should be noted that in practice some stages of the model may be omitted. For instance, an innovation may be monitored but not evaluated, or conversely evaluated without continuous monitoring.

Identification of needs. The innovation process begins with identifying an area where improvements can be made, *e.g.* a lack of skilled workers in a particular sector. Two aspects of this stage are important for a systemic analysis of innovation: the drivers of change and the stakeholders involved.

- Drivers of change: A number of factors affect this stage, such as diverse policy pressures, media, and public perceptions. Such factors, or drivers of change may, come from within the country (internal drivers) or from abroad (external). In some case studies, international, external drivers had an important role in the innovation process. The *Step One Forward* programme (Hungary) was introduced with substantial EU support under the framework of the Structural Funds, Human Resource Development Programme. Another illustrative example is the *Playa del Carmen Project* (linking public and private resources to improve worker preparation and training in the Mayan Riviera, Mexico), which was developed in co-operation with the Inter American Development Bank. External factors, however, may be important drivers of innovation without the involvement of international organisations as well. In Denmark, efforts to reduce drop-out rates and increase completion rates in VET were made as a follow-up to the Globalisation Council's recommendations, which aimed to help the country face the challenges of globalisation. In many cases, the innovation process was mainly internally driven and often initiated by the civil service (*e.g.* building a research and statistical evidence base for Australian VET).
- Stakeholders involved: This stage may involve various stakeholders, including government officials, international organisations, employers' organisations, VET institutions, researchers, etc. There may be great variation among innovations in the range of stakeholders involved and in the ways in which they are involved.

Development of the innovation. After the identification of a need (*e.g.* a lack of skilled workers), the following step is to develop the innovation that will address the need (*e.g.* a grant scheme to attract young people into a specific VET programme). This stage implies the process of elaborat-

ing the innovation, *e.g.* elaboration of a new curriculum, a particular grant programme, or a network of institutions.

- An important feature of this stage is whether it is driven by public authorities in a top-down or developed through a bottom-up approach. In most cases, such as the follow-up to the Globalisation Council's recommendations for a VET system fit for the future (Denmark), the implementation process was a predominantly top-down one. Conversely, a bottom-up approach was dominant, for instance, in the technical baccalaureate reform in Mexico, where teachers played a key role in the design of the new programmes as well as in the implementation and evaluation of the reform.
- Another aspect of this stage is the different types of stakeholder it involves. Examples of stakeholders involved in the development of innovations include officials from public authorities, representatives of employers, VET institutions (school leaders and/or teachers), and academic experts.
- **The output of innovation.** The result of the development work is an innovative output, which can take different forms. The following section provides a brief definition of the types of innovation suggested by the Oslo Manual (OECD and Eurostat, 2005), as well as some illustrations from the field of VET.
- *Product*: A product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. An example in the field of VET is the *Step One Forward* programme (Hungary), which introduced a new service to encourage low-skilled workers to engage in VET.
- *Process*: A process innovation is defined by the Oslo Manual as the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software production, and delivery method. An example for process innovation in VET is the *Flexible Learning Framework* (Australia), which introduced new infrastructure and expertise into the provision of e-learning.
- *Marketing method*: A marketing innovation is a new marketing method involving significant changes in product design or packaging, product placement, product promotion, or pricing. They aim to better meet customer needs by opening up new markets or by newly positioning a firm's product on the market. The Australian initiative of increasing the status of VET illustrates how the "marketing method" type of innovation may be realised in VET. This initiative aims to

change the status of VET and to "newly position" VET programmes on the market of educational services.

- *Organisational method*: An organisational innovation is a new organisational method in the firm's business practices, workplace organisation, or external relations. They deal mainly with people and the organisation of work. An example of organisation innovation in VET is the creation of *Leading Houses* (Switzerland), which involved the establishment of a network of academics.

Implementation. An innovative initiative may be implemented initially on a small scale, through a pilot aiming to "try out" the innovation before proceeding to its large-scale implementation. When a pilot is used, it is typically followed by a preliminary evaluation, which assesses preliminary outcomes. If the preliminary outcomes meet the initial expectations (*i.e.* the innovation seems to bring the expected results), the innovation may be scaled-up, *i.e.* transferred from small-scale to large-scale. If the preliminary evaluation shows that the innovation does not bring the intended outcomes, it may be necessary to return to previous stages, such as the development of the innovation. Alternatively, the innovation may be immediately implemented on a large scale without a previous pilot.

Outcomes. The outcomes are the impacts or consequences of the innovative initiative, for instance changes in completion rates as the consequence of a project targeted at potential drop-outs. In this model, outcomes are represented as a "product" rather than a process, since the outcomes represent the results of the innovation.

There may be an "implementation gap" (Newton, 2001), defined as the difference between planned outcomes of policy and the outcomes of the implementation process. Possible reasons for such a gap include a theoretical mechanism that does not work in practice and an ineffective implementation process. Such an implementation gap may be revealed through monitoring and evaluation (see below).

Monitoring. Monitoring can be defined as the continuous surveillance of the implementation and/or progress of an initiative. It tracks progress against a predetermined schedule and aims to provide stakeholders with regular feedback and early indications of progress or lack thereof in the achievement of planned outcomes (UNFPA, 2004). Three key questions may be asked about monitoring from a systemic analysis perspective: How was the process monitored? What were the criteria used? What were the findings?

Evaluation. Evaluation is a judgement of whether the initiative has met its intended outcomes. It assesses the outcomes of an innovation (*e.g.* changes in completion rates) against the objectives set at the beginning of the process (*e.g.* reduce drop-out by a given percent). The questions arising regarding this

stage are similar to the ones mentioned in the case of monitoring: How was the process evaluated? What were the criteria used? What were the findings?

The distinction between monitoring and evaluation may not be obvious in practice. The two processes are often related and use the same tools. For example, evaluation often uses information from monitoring in addition to other data sources to judge the results. However, an important difference between the two techniques is that monitoring is a continuous process that tracks ongoing or incremental progress, while evaluation is a one-off or periodic judgement of results.

The approach to monitoring and evaluation can be *formative* or *summative* (or both). Formative monitoring refers to frequent, interactive review of progress towards specific pre-set goals, with an underlying aim of identifying both strengths and weaknesses to inform and improve practice (throughout the monitoring period, for example). Formative monitoring/evaluation aims to improve the object under scrutiny by identifying weaknesses, providing feedback, and suggesting strategies for improvement, and by supporting the implementation of these strategies (OECD, 2005). Summative evaluation, in contrast, is focussed on providing a single judgement on the outcomes of the object being evaluated. It generally judges success or failure and may not feed back in to the continuing development of the innovation.

The central role of knowledge

The knowledge base lies at the heart of the process of innovation, with each stage feeding into the knowledge base and the knowledge base providing input into each stage. For example, evaluation uses existing knowledge while its conclusions expand the existing knowledge base.

A basic distinction can be drawn between explicit and tacit knowledge (Polanyi, 1966). Explicit knowledge can be precisely and formally articulated. Therefore, although more abstract than tacit knowledge, explicit knowledge can be more easily codified, documented, transferred, or shared. Explicit knowledge nurturing innovation in VET is typically scientific knowledge that results from research, mostly carried out by universities or other research institutions. However, explicit knowledge is not limited to scientific knowledge. It also includes explicit and codified know-how, *e.g.* a procedure manual used by a ministry based on previous experience.

"Tacit knowledge is subconsciously understood and applied, difficult to articulate, developed from direct experience and action, and usually shared through highly interactive conversation, story-telling and shared experience" (Zack, 1999). In VET, tacit know-how knowledge results from collaboration between diverse stakeholders, teachers and school leaders, public authorities, employers, students, etc.

Development of typology of innovations in VET

The model of innovation in education presented above serves as an analytical tool and helps map systemic innovation in VET. Innovation Questionnaires completed by each country, the background reports provided for each case study, and the case study review visits have helped to provide answers to the questions arising at each stage of the innovation process. This model has been used as the basis for the OECD Secretariat analysis, which begins in Chapter 4. The model is furthermore used to explore issues around the development of a typology of systemic innovation in VET in Chapter 7. The following chapter will explore several of the same themes explored in this chapter, emphasising the literature on vocational education and training.

Conclusions and policy implications

A number of policy lessons emerge from the literature reviewed both on innovation in education and on innovation in vocational education and training. The recommendations address, in particular, actions for government and other public bodies involved in educational innovation policy making. However, these general policy lessons could also often easily be articulated as recommendations for both educational institutions. Although each field has its own particularities, there is substantial overlap in the models and analyses offered for education and VET; thus, a distinction between these two areas is not made in this section. The identified lessons:

There is a greater need to **specify the concept** of innovation. Although the use of different conceptions of innovation is logical, there exists a need to more clearly define the concept in the context of different public initiatives. Otherwise, government demands for innovation will continue to be **too broad** to **incept action** by educational institutions and other stakeholders, and **progress tracking** will be exceedingly difficult to achieve.

Greater priority should be placed on developing **indicators** for educational innovation and systematic **data collection** for monitoring and benchmarking purposes as well as to provide incentives for innovation.

Data collection, benchmarking, and accountability requirements should be **sufficiently flexible** to account for the specific and unforeseeable character of innovation, and they should **not only focus** in the achievement of **short-term** results.

In terms of processes, **partnership work** is crucial. Greater collaborative forms of work must be developed to ensure appropriate planning and implementation of innovative initiatives. This should include, in particular, greater links between **policy makers, the educational research community, and teachers** (front-line deliverers).

The public sector has a key role in the creation of the environmental conditions that can stimulate innovation in education. Governments, however, have so **far failed to make supporting innovation** in education a **priority,** a situation that should be reversed. This would include the establishment of **appropriate incentives** for innovation, the stimulation of greater **research capacity,** and **increased links** with the research and teaching community (see also above). Educational organisations should also strive to make use of a wider range of incentives to innovate, learning from already existing practice.

Moreover, innovations are too often taken and implemented in isolation, *e.g.* without looking beyond their immediate consequences. Governments and individual educational organisations should place a greater emphasis on analysing the consequences of introducing innovations at the **systemic level** prior to the adoption of major innovations.

There are few examples of successful systematic procedures for the **dissemination and mainstreaming** of good practices created from the bottom up (*e.g.* intensive activities of pilot projects). This gap leads to the underuse of many potentially useful innovations and to duplication (or multiplication) of efforts. **Stronger institutionalised systems** should be established for knowledge-sharing, dissemination, and mainstreaming.

Greater analytical efforts should also be put in place to **avoid the adoption of ineffective new practices** from other contexts and to consider the particular **context** to which effective practices are being diffused.

Linked to this point is an **urgent need** to **develop governmental capacity** to assess methodologies, required resources, and time frames for evaluating innovative practices and ideas.

With these conclusions and policy lessons on innovation in education and innovation in vocational education and training in mind, the reader is invited to turn to Part II of the study on empirical work of systemic innovation in vocation education and training.

Key messages

Innovation is a term more often used than clearly defined in education, being employed interchangeably with related terms such as invention, reform, and change.

New ideas, knowledge, and practices, however, can also fail if they do not bring their desired results, impact negatively on other objectives, create new problems, or are not cost-effective.

Therefore, an assessment of whether to implement an innovation requires looking at its implications for other parts of its environment, beyond the immediately affected. However, such kinds of systemic analysis are infrequent.

There are a wide range of stakeholders involved in the process of innovation in VET, with different incentives towards the inception and adoption of innovation and the preservation of the *status quo*.

Commitment and collaboration between these stakeholders is crucial for the creation and success of innovations.

Available evidence points out that VET organisations are not making use of the whole range of facilitators of innovation available to them and are still working through how to reward or more fully support their innovators. Consequently, there is much unlocked potential in the VET sector to facilitate and increase innovation.

Educators and policy makers, on the other hand, have not sufficiently used the motors of innovation, including research in education. Research on teaching and learning from cognitive science, human resources, organizational theory, and other disciplines has thus rarely been put into practice.

Adequate research capacity is lacking even in relatively general areas.

Notes

1. Other models are the CREATER model of Havelock and Zlotolow (1995), the CBAM model of Hall and Hord (1987), and the models developed in Stockdill and Morehouse (1992), Kotter (1996), and Klien and Sorra (1996).

2. See Chapter 6 for a full discussion on barriers and drivers.

3. Data Driven Decision Making in Education (DDDM) may be increasingly important at the school and system level to make decisions – *e.g.* taking into consideration outputs results (see Marsh *et al*., 2006). Although data collection and analysis used for DDDM could be considered in a broad sense as research, we do not include this in this section.

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Chapter 4

Drivers, Enablers and Barriers to Systemic Innovation in VET

Introducing change and implementing innovative ideas is difficult, particularly in rather traditional systems such as education. This chapter presents those factors that play a crucial role in triggering and/or facilitating innovation (drivers and enablers), and those that can hinder the successful introduction of these changes (barriers). The chapter draws on the empirical evidence gathered in the case studies and shows the different roles that drivers and barriers can play at different stages of the innovation process. These drivers and barriers are also context specific, with each system required to develop its own successful "recipe" to guarantee adequate response to the needs and barriers it faces. Overall, some of the major barriers identified in the study are: innovation fatigue, competing policy agendas, and accountability mechanisms that radically restrict risk. The chapter closes with a number of policy implications aimed at helping policy makers with the crucial questions they face when promoting systemic innovation in their VET systems: what are the ingredients for successful systemic innovations in VET? How amenable to change are the foundations that create/contribute to barriers?

Introduction

Introducing change and implementing innovative ideas are difficult, particularly in rather traditional systems such as education. In the study of systemic innovation it is crucial that any analysis include a discussion of the factors that could play a role in understanding the need for change in the system, and that could trigger and/or facilitate the implementation of these changes. Likewise, it is imperative to also focus on factors that hinder and/or bar innovation or change within the system.

The drivers and barriers for systemic innovation in VET are multiple and of many different natures. Economic, social, political, technological, and other factors can all work to either drive or hinder innovation. While each driver responds to a major challenge that the VET system faces and is perceived as urgent to resolve, each barrier also represents an important element of the *status quo* that can, if not managed appropriately, delay or derail innovative initiatives.

Understanding and identifying these factors becomes crucial for policy making, as policies can be designed and implemented to foster those factors that nourish an environment conducive to innovation; conversely, measures can also be defined to address those factors hindering the genesis and diffusion of innovations.

Drivers and barriers: a complex interaction

It is difficult to provide a definitive list of key drivers or barriers, as the role a particular factor plays in the innovation process can change as a function of context, and what in some circumstances could be a driver of innovation might in others act as a barrier (see Box 4.1). In addition, it is difficult to isolate particular factors as driving or hindering any specific systemic innovation, as drivers and barriers act within a dynamic and closely interconnected context. Furthermore, the process of systemic innovation involves many stages (as laid out in the model of innovation in Chapter 3), and so barriers/drivers at one stage (*e.g.* development) may or may not play the same role at another stage of the process (*e.g.* implementation, evaluation). To further complicate matters, systemic innovations tend to be complex processes aiming to resolve more than one challenge. Any analysis of the role of drivers and barriers to systemic innovation in VET must therefore take into account these complexities.

Despite this complexity, meaningful analysis can be done on the types, roles, and functions of drivers and barriers within any given context. A first step is to look more closely at what we mean by the terms drivers and barriers, and by extension the roles they play in systemic innovation. ***Drivers*** can be defined as variables that trigger innovation (*e.g.* the decision of a senior

Box 4.1. **Driver or barrier? It depends on the context, or the role of unintended outcomes**

The growing demand for greater accountability in education systems has signaled a rise in outcome and achievement measurements, as well as an increased emphasis on the role of research and evaluation. Research and development is essential to the innovation process, and the monitoring and evaluation of ongoing innovations a central element in our model. Evaluation and monitoring, while not explicit drivers of systemic innovation, comprise an essential component of the process and can be thought of as setting positive preconditions and/or acting as enablers of innovation.

However, despite being an undeniable impetus for innovation and improvement as well as a necessary component in the innovation process, the increasing system-wide emphasis on evaluation and monitoring has also an unintended barrier effect to innovation. Systems that place a high importance on evaluation and monitoring are, by their very nature, highly accountable. Yet greater levels of accountability restrict the level and nature of permissible risk in the system. In highly accountable systems, then, very little room exists for risk-taking, as the possibility of failure is too high. This is an example of an unintended barrier effect of a positive driver/enabler of systemic innovation. Although not a deliberate outcome or strategy, governments and policy makers must monitor this known tension to allow systems to operate at the level of accountability desired, as well as permit the kinds of risk-taking required for impactful innovation to occur.

level policy maker to develop a new programme). These drivers are effective when embedded in ***positive contextual preconditions***, such as a perceived need for change due to a social or economic crisis or issue. An example of this would be the context of strong economic growth and the birth of new technologies that have broad applicability to numerous VET domains. These preconditions would not be sufficient to begin the process in and of themselves, but, as mentioned previously, would aid the driver in effectively triggering the process of innovation. This can also be thought of as the distinction between immediate/direct and distal/indirect causes.

Drivers are distinct from but closely related to ***enablers***, which are factors that aid and support the process once it has been triggered. These would build on the positive preconditions as described above and might include the creation of specific funds for systemic innovation projects in a given VET system. Other variables, such as a social crisis (*e.g.* the riots in the suburbs of Paris and central Athens in 2006 and 2008 respectively), might also act as enablers of change in that they could motivate stakeholders to take action and push them to address elements of the system requiring improvement. Such enablers would be crucial in setting the stage for innovation to occur, but would not necessarily be drivers in and of their own right.

The same conceptual distinction can be made for ***barriers***, factors that impede or block innovation. An example of a barrier could be the election of a new government with a stated goal of reducing the number of apprenticeships or disbanding VET colleges. Such hindrances would be crucial in obstructing the process of systemic innovation in VET, but would not necessarily stop it. Examples of a formal barrier (*e.g.* one that effectively ends the innovation) would be the cancelling of specific funds for systemic innovation projects in a given VET system. These barriers also exist in a set of contextual preconditions. These are generally **negative contextual preconditions** that impede innovation, and could include, for example, the context of poor economic growth but with relatively low unemployment. In such a context the urgency to innovate existing systems is low and suffers from a paucity of funds. These negative preconditions, as already mentioned, would neither aid the process of innovation nor suffice to halt or bar the process.

These arguments and their applicability to the case studies and the VET systems in the countries we studied will be more fully developed in each of the sections below.

In sum, any discussion of drivers and barriers to systemic innovation must acknowledge two things:

- Factors identified as drivers can also, depending on contextual factors and preconditions, act as barriers (and *vice versa*);
- Drivers/barriers play different roles at different stages of the innovation process and can be thought of as direct determining factors that operate within contextual preconditions. These are distinct from enablers, which are influencing, but not determinant, factors.

To allow for an in-depth analysis, this chapter is divided into two parts: *(i)* drivers and *(ii)* barriers. The first half of the chapter will provide an analysis of the drivers in influencing the system. The second half will look specifically at barriers to innovation, from both a system and a process level. The chapter will end with joint conclusions and a set of recommendations based on these analyses.

Drivers to systemic innovation in VET

As explained in the introduction, drivers and enablers are factors that can trigger or facilitate a process of change intended to introduce a positive outcome in the system. Drivers can be defined as those factors that press for innovation, while the enablers are those that help uptake and disseminate these innovations.

The drivers for systemic innovation in VET are multiple and of different natures (*e.g.* economic, social, political, or technological). Each driver responds to a major challenge that the VET system faces and is perceived as urgent. The enablers of systemic innovation are also multiple and different in their natures, and as mentioned earlier, facilitate the adoption of innovations.

However, identifying and distinguishing between drivers and enablers is not always easy in practice. In general, these forces tend to interact and co-evolve in all stages of the innovation; therefore, it is difficult to distinguish which specific factor is affecting what in each stage. In any case, what counts is that they are positive factors for innovation and that policy makers should be aware of their presence or absence in order to facilitate, whenever possible, the overall process of innovation.

The importance and role of the main drivers and enablers of systemic innovation may vary depending on the structural characteristics of the VET and the VET innovation system. Different countries face different challenges, and VET systems are extremely diverse in their natures and the roles they play. As one could therefore expect, the driving forces behind the adoption and implementation of innovations would also vary.

This section aims to provide a more detailed and nuanced picture of these factors, based on the empirical evidence gathered during the country visits of this project.

Economic factors

The push for globalisation requires that countries compete in a context of decreasing trade barriers and constant improvement in technologies, methods of transportation, and communication. Innovation and competitive markets are increasingly regarded as the engines for economic growth, and this induces dramatic and increasingly rapid changes in the economic structure of a given country as new economic activities rise and others are abandoned or severely restructured. As a result, nations, institutions, and enterprises require a new and dynamic pool of skills that can respond to their productive needs. For example, skills related to innovation, knowledge management, or specific economic sectors – such as ICT – and a greater adaptability/flexibility/permeability of both workers and labour market are required. Globalisation and innovation, and the resulting changes in economic conditions, are thus generally considered to comprise a main *driver* of innovation.

The empirical evidence of this study suggests that most innovation initiatives undertaken by governments have aimed to respond to the economic challenge of adjusting training supplies to the economic needs of a new productive structure. This adjustment could involve the upgrading of particular sector-specific knowledge and skills, such as the *Mayan Riviera* case

(Mexico) for the hospitality sector; core transversal skills, such as managerial skills in the reform of *Basic Commercial Training* (Switzerland); or the system as a whole, as in the *Globalisation Council* (Denmark).

In addition to globalisation, times of economic crisis can also provide a "window of opportunity" to push for systemic change in VET as the economic restructuring processes may be accelerated. The present report is based on innovations that were adopted in the context of expanding economies. In further research, it could be interesting to compare and contrast these finding with the type of systemic innovations and processes that may emerge in times of economic downturn.

Social factors

VET is considered to be a tool for improving social equity and inclusion in most OECD countries. This is due to a number of reasons: first, it provides a natural transition between school and the workplace, and plays a crucial role in integrating young people into the labour market. In addition, VET is often regarded as a tool for retaining students at risk – those who are socially, economically, or academically disadvantaged – and providing them with sufficient qualifications to access the labour market. In numerous systems, it also offers opportunities to rejoin the traditional schooling stream or choose to pursue higher education later on. This belief in inclusion is strongly rooted in many OECD countries, and the need to provide better-targeted programmes or introduce complementary services aimed at this target group of students has been a main driver for many of the systemic innovations in this project.

More precisely, *Step One Forward* (Hungary) is aimed at helping unskilled and poorly skilled workers acquire more "marketable" qualifications and improve their chances of obtaining better-paid jobs. A similar rationale has been the underlying driver of the *VPET Case Management* (Switzerland) that targets young people at risk of becoming unemployed. The empirical work has also revealed that in the cases of the *Innovation Circle* (Germany) or The Reform of *Technical Baccalaureate* (Mexico), the main driver was not only to assist students in a difficult situation but to enhance the permeability of students across systems, either horizontally (*i.e.* between different VET streams) or vertically (*i.e.* from VET to higher education). These initiatives were driven by the need to avoid study lock-ins and potential dropouts and enhance the opportunities for students to continue their studies and access potentially better-remunerated jobs.

As in the previous case, the current economic crisis may put new pressure on VET systems to relocate all those who may find themselves out of the labour market and whose skills may not be fit for the changed economic conditions that could emerge after the crisis.

Technological factors

New technologies, especially the use of ICT, can provide new ways of teaching and learning and thus improve both student satisfaction and student achievement. In VET studies that involve costly training and extensive practice (*e.g.* welding, using heavy machinery, etc.), virtual training modules have been used to improve the preparation of students in both technical skills and safety procedures before they reach the shop floor. This helps both the employer, who receives better-prepared apprentices, and the trainer, as it reduces time spent overseeing individual students. Students also report positive perceptions of this kind of training. In addition, new technologies can facilitate communication between stakeholders and therefore enhance the satisfaction of different stakeholders with the VET system. The use of new technologies, and especially ICTs, is thus considered a consistent *driver* of systemic innovation in both the design and delivery of VET.

The case of the *Mayan Riviera* (Mexico), in which new ICT and mobile sets have enabled the reaching out to a wider public, is an example of how technology facilitates new and better services. Without the technology made available, these students could not have had access to specific training courses; thus, their ability to access the labour market could have been jeopardised. In Australia, ICT and the development of e-learning infrastructures have also provided an opportunity to bring all the governmental stakeholders in the VET system together to work on a national plan and to set standards for a flexible learning framework.

Political factors

Systemic change in education in general, and in VET in particular, may often require a strong top-down political push to overcome many of the barriers that hinder the adoption and diffusion of change. These barriers will be discussed in detail in the next section of this chapter.

Public institutions and policy makers can play a crucial role in initiating and steering the adoption of innovations in VET systems through funding, legislation, and leadership. Depending on the country and geographical context, the political field may include the regional, national, and/or international (*e.g.* European) spheres.

The empirical evidence gathered in the context of this study provides many examples of the different roles that public institutions and politicians have played in initiating the innovation process. Just to mention a few examples, strong political leadership and will to bring the various stakeholders together were key to the creation of the *Innovation Circle* (Germany), the *Globalisation Council* (Denmark), and the *Reform of the Technical Baccalaureate* (Mexico). Moreover, political legislation and funding from the

European Union drove the systemic changes initiated in Hungary with the creation of a National Vocational Qualifications Registry.

In addition, political leadership and funding can be highly instrumental in bottom-up innovations. When innovation is initiated by an actor other that the public sector, the public sector can play an important role in enabling the environment that allows these innovations to flourish by bringing stakeholders together, providing funding, or merely eliminating potential legislative barriers that could hinder the implementation of the innovation. This enabling capacity is particularly true when the innovation aims at being scaled-up to other areas of the system. The Mexican example of the *Mayan Riviera* provides an excellent example of not only how government, both at Federal and State level, capitalises on an initiative started in the private sector but also the crucial role public authorities play when a similar experience is intended to be replicated in other sectors of the economy or other geographical areas.

An important factor in the analysis of the role of political context in innovation is timing. All countries go through cycles of political stability, which provide greater or smaller opportunities for implementing change and supporting innovation. Countries that have had shorter periods of political stability (*e.g.* Hungary, whose transition in the early 1990s from a communist to market economy means that the current *status quo* has been in operation for a relatively short length of time, compared to most OECD countries) have in fact an opportunity to develop and implement reforms and innovations relatively quickly. These innovations can also more easily be radical in nature, as systems in political flux provide an opportunity for fundamental change. In countries with long cycles of political stability (*e.g.* Switzerland, Denmark, Germany), the role of the constitution and regulatory framework is paramount, and while there is room for change and innovation, such change is much more likely to be incremental. In addition, stability can be, and is, a driver of innovation – but the change is all too often slow. Of course, even in countries with longer periods of political stability but recent changes in government (*e.g.* Australia), the arrival of a new government is a natural window of opportunity to effect change.

Research evidence

Research evidence of better or improved teaching, learning, or training processes, or of the provision of new services in VET, can be regarded as a supporting element that informs and enables the innovation process. Research evidence can contribute to the design of the innovation process, the identification of potential barriers during the implementation, and the elimination of resistance to change among stakeholders through the use of evidence on the benefits that the examined change may bring about.

There are few examples on the role of research triggering innovation in our case studies, and the SKOLA project in Germany is one of those. Box 4.2 presents the main characteristics and the role of research as a trigger for innovation.

Box 4.2. **Research enabled innovation: the SKOLA/Segel BS project**

The Segel-BS project is part of a pilot programme called SKOLA, which is run by the Bund-Länder Commission for Educational Planning and Research Promotion (BLK), supported by the Federal Ministry of Education and Research, and counts on the participation of 12 *Länder*. The programme aims at further developing, testing, and evaluating the didactic concepts for the promotion of self-regulated and co-operative learning, using modern information and telecommunication technologies. In doing so, it contributes to the development of practice-oriented solutions for establishing a modern learning culture and organisation as well as strengthening self-regulated and co-operative learning.

The SKOLA programme has been initiated by researchers at the Universities of St. Gallen and Dortmund, who convinced the Länder authorities to undertake the initiative and to select the necessary schools to participate. It was informed by the relevant academic research and literature of self-regulated learning on education and educational psychology, which emphasised the benefits of those students learning in self-regulated systems: familiarity and know-how to use a series of cognitive strategies, which help them to organise, elaborate, and recover information; know-how to plan, control, and direct their mental processes towards the achievement of goals; enhanced motivational beliefs and adaptive emotions; improved capacity to plan and control time and effort; and higher capability to maintain concentration.

The role of academic research and academic evidence was crucial in persuading the different stakeholders to participate in the innovation, and instrumental in its design and implementation, as it provided the content material for the design of the training programme as well as the necessary measures to be adopted (*e.g.* communication with VET trainers) for a smooth implementation that would ultimately minimise the resistance to change among stakeholders.

Consensus among stakeholders on the need to innovate and on the innovation

Based on the challenges that a VET system may face, either economic or social, an overall consensus on the need to try new recipes may arise, thereby perhaps facilitating the decision to innovate. This was the case in Mexico, where the severe challenges and the shared perception of the inability of the VET system to face these challenges facilitated the decision to initiate innovations deep in both the nature and scope of the changes envisaged.

Moreover, consensus on the procedures and timings to carry on the innovation can also become a crucial enabler for smooth implementation. The existence of consensus can make implementation much easier, and eliminate or reduce potential resistance from stakeholders. Most of the analysed innovations showed the great value of stakeholder consensus as well as the problems of not counting on this consensus in numerous VET systems. For example, the *Innovation Circle* (Germany) showed how stakeholders agreed to implement the initiative based on shorter-than-usual times to facilitate the momentum for innovation. This initial consensus on the procedure facilitated implementation and avoided stakeholder resistance to the project.

Finally, when consensus is necessary to adopt and implement an innovation, a lack of agreement may affect the potential and capacity of the system to introduce significant and far-reaching innovations. This will be explored more fully in the next section of this chapter.

Innovation support institutions

Innovation in VET is a complex process, and one in which many stakeholders need to get involved and count on the necessary information and knowledge to achieve a successful outcome. At times, the interactions between the different stakeholders involved with innovations are not as strong as would be desirable, and sometimes the stakeholders may not rely on the necessary knowledge that would allow them to make an informed decision. Historical, geographical, or sociological factors may be responsible for this lack of connectivity, and at times the existence or creation of institutions such as partnerships, networks, institutional champions, and knowledge brokering organisations can help bridge this gap.

The empirical research in this project has shown both that innovation support institutions, such as knowledge brokerages, are not abundant in the VET system and that some countries have aimed to address this deficiency by creating or strengthening this type of enabling institution. Box 4.3 presents two initiatives of recently created innovation support institutions in Australia and Switzerland.

Financial resources

The availability of financial resources can act as an enabler for change at all stages of the innovation, from the moment of making the decision to the implementation of innovation, thereby eliminating potential barriers the foreseen change may encounter.

Although not necessarily a driver in itself (*i.e.* the availability of funding may not be the main reason to initiate an innovation), financial resources can be a catalyst to initiate the innovative process and to buy in stakeholders.

Box 4.3. **Innovation support institutions – Australia and Switzerland**

Australia has created a number of innovation enabler institutions to help create, maintain, or foster institutional breadth, and thereby allow for the generation and diffusion of innovations in the system. Some examples of these institutions are: *(1)* the Local Learning Employer Network of the State of Victoria, which linked the worlds of work, education, and training by exposing young people to occupations they would most likely never have thought of; *(2)* a group of training organisations that were felt to encourage the growth and sustainability of apprenticeships in the key trades, particularly in small and medium-sized enterprises; and *(3)* the Australian Technical Colleges, which were innovative institutions to increase the outreach and delivery of VET.

The creation of these institutions requires a well thought-out plan regarding their role in the system as well as the instruments, activities, and resources they would need to fulfill these tasks. Short-term tasks, insufficient funding, and lack of integration in a coherent innovation strategy may result in a lack of substantial impact, leading to potential innovation fatigue (see section below on barriers).

In Switzerland, the *Leading Houses* represent a unique and innovative approach to coordinating, at a national level, research efforts on VET 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 simultaneously maintaining strong international connections.

Examples of this are two Hungarian case studies in which the availability of funding from the European Union allowed the national public authorities to continue with the project.

Moreover, the availability of funds may be a precondition for implementing the different dimensions of the innovation, as systemic innovations may require new, broad, and financial-intensive changes. The lack of these resources, as will be presented in the next section of this chapter, could constitute a strong barrier that could hinder a successful implementation of any innovation.

Capacity for innovation

Innovation is a complex process that requires a deep understanding of the system, stakeholders' involvement, requirements both in terms of dynamic changes and financial implications, and foreseen objectives and activities. The capacity to understand, manage, and steer this process is crucial, and is certainly an enabler of innovation. Perhaps, one could say that more than an enabler, as previously argued for financial resources, it is a necessary prerequisite for any successful innovation.

This innovation capacity must be present at all levels of the innovations and throughout all of the different stages. At different stages of the innovation, different actors may take the leading role of pushing the innovation forward. All these actors need to have the vision, attitudes and managerial capacity to innovate.

However, the capacity to innovate cannot always be taught. While management can be learnt through formal training, the capacity to innovate is believed to be a "learning by doing" process, in which the involved stakeholders in VET, including politicians, need to acquire specific competences and attitudes. In many cases, these competences, and mainly the attitudes, are the result of cumulative innovative processes that have generated an innovative culture embedded in the specific systems. As a result, some systems may benefit from stronger embedded innovative capacity than others. Given that it is a necessary prerequisite for successful innovation, the lack of this capacity constitutes a serious barrier for successful innovation.

Barriers to systemic innovation in VET

As outlined in the introduction, drivers and barriers to systemic innovation in VET operate within contextual preconditions that either encourage or hinder particular innovations at particular times. In our analysis of case studies, it became clear that a factor considered a driver or enabler of systemic innovation in some contexts could actually have the unintended opposite effect in others. Although systemic change operates in such a fluid policy and practical context that it is impossible to foresee all eventualities, it is crucial to consider both direct and possible indirect outcomes of initiatives to minimise the development of unintended barriers (see Box 4.4).

As set out in the section entitled "Drivers to systemic innovation in VET" of this chapter, the major basic categories of barriers can be considered to fall under the following headings: economic, social, technological, and political. The following discussion is based on our typology and analysis of case studies, and looks at both clear and consistent barriers and the (more frequently observed) barriers that were unexpected results of well-intentioned initiatives. The barriers identified are thus VET-specific, but many are also transferable to education systems as a whole.

Economic factors

There are a number of different barriers to systemic innovation in VET that stem from economic sources. These include the obvious and most common barrier to systemic innovation in VET: cost. They also include the current push to link innovation in VET to labour market demands and mid-term skills forecasting, as well as the unexpected result of addressing short

and medium term requirements at the expense of long-term vision. Each of these factors will be more fully developed in turn.

Systemic innovations cost money, whether they are products, processes, or ways of organising the delivery of services. There are the direct costs of designing, developing, and implementing a particular innovation; of training the practitioners; and of new technology. There are the (often skipped) costs of evaluating the innovation and feeding that information back into the system to improve the functioning and quality of the innovation. Finally, there are also the indirect costs of change, including how constituencies with vested interests (which in this case would range from social partners in the education system to the private partners representing the labour market and employers) create costs when required to change their ways of operating.

However, even when funds are available and set aside to support innovation in the system, they can have unintended effects that are directly the opposite of what was initially intended. Box 4.4 provides a closer look at how one particular source of funds, specifically aimed at promoting development and innovation, had in fact an unintended barrier effect.

Box 4.4. **Hungary and the role of European funding**

It was very characteristic in the present Hungarian context that both case studies were EU projects (European Structural Funds and European Social Funds). EU funds act as a main driver of innovation and change in Hungarian VET and are essential to the innovation process. However, the highly centralised and competitive nature of the funding process also inadvertently imposes barriers to the process by:

1. Supporting a top-down approach to innovation. This has ramifications for the origins and dynamism of systemic innovation in the Hungarian VET system, as well as for the degree of openness in the system to bottom-up or grassroots initiatives.
2. Adding a heavy administrative burden and timelines. Given the tight deadlines imposed by the EU project schedule and the delay in beginning the case studies on the part of the Hungarian authorities, there was not enough time to conduct pilot projects and gather research evidence that would underpin policies and project development. For both of the case studies, this harmed the quality of implementation and the ability of the system to learn from both pilot results and final outcomes.
3. Restricting sustainability. EU funded projects come with a built-in timeline and end date. Although intended to avoid non-delivery of promised outcomes, continuously new projects can have the unintended effect of hindering the development of previous reforms and innovations. This has implications for long-term planning and strategizing as well as for the use of evaluation and research results, and carries with it the danger of "innovation fatigue" from the population and user groups.

Short-term innovation at the expense of long-term vision

There is a risk, particularly in times of economic crisis, to prioritise short-term needs over long-term innovation and strategy. In the years leading up to the country visits, there was a push across all countries studied to bring the VET system more into line with the requirements of the labour market and make it more responsive to labour market needs. Tighter links to labour market needs and skills remove the focus from education, and place it instead on skills needs, industry demand, and the current technology framework. As discussed in the previous section on drivers, this was a driver/enabler for many of the case studies in this project (*e.g.* in Australia, Hungary, Mexico, and Switzerland) and was a response to the criticism that the VET system had become too entrenched in educational needs and structures and was becoming out of touch with employers. However, even though the short and medium-term strengths of the system have allowed it to innovate and shape itself in response to market changes, they are also limitations.

An example of this has been that basing innovation on current conditions and skill requirements does not permit the system to explore truly innovative projects (*e.g.* emerging technologies and job areas/skill sets). If the system is driven primarily by industry needs, the need to take risks and think outside the box (including introducing funding levers for these activities) is obscured. This leaves little room for long-term projections or strategic visions for systemic innovation in VET, and little room to try and foresee emerging skill sets and jobs in real time. It also leaves little room for user-side orientation, which has also been identified as key to identifying bottom-up innovations and emerging skills. Overall, this is not a major barrier, as certainly the bulk of system orientation should consist of the demands of the labour market. However, an overzealous focus on skills forecasting (which has been criticised in its own right) comes at the expense of capturing the emerging, non-predictable skill sets and occupations that are a necessary part of systemic innovation. Chapter 8 explores how the use of other sources of evidence, including blue sky research from academics and emerging innovations coming from the field, can be used to augment the traditional sources of information for labour market needs and expected progression.

In addition to strategic choices for funding and curriculum focus, the current pressure for more skills in the labour market has initiated ongoing debates about how and in which ways VET programmes may be accelerated or shortened to have a quicker transition to the workplace. One obvious way to do this is to include the recognition of informal and non-formal learning as a system feature across different forms of VET provision, as a means of programme acceleration. The risk of shortening programme structures is that resulting qualifications may suffice for immediate labour market needs but

may not ensure sufficient transferable skills for medium-term employability and mobility. This, then, is another example of how a short-term enabler of innovation could result in a longer-term barrier to the strength and adaptability of VET systems. Across dual systems in the OECD countries there exist numerous examples of how systems are trying to bring in greater flexibility without sacrificing the general applicability of the skills learnt by the individual.

Social factors

There are a number of different barriers that fall under the general heading of social barriers to systemic innovation in VET. These include issues related to demographics, such as the aging of the VET workforce and the changing landscape of students in OECD countries. They also include lack of attention to implementation issues, including generating consensus among stakeholders and capacity building in individuals as well as the system. Each of these will be discussed in turn.

Challenging demographics

A key social barrier to systemic innovation in VET is the rapidly ageing workforce of trainers, as well as the current fragmentation of requirements and working conditions for trainers. A lack of skilled trainers and new training recruits is a serious problem both for quality provision and the overall status of VET in many of the countries studied (Australia, Hungary, and Mexico). Given the fundamental importance of VET teachers and trainers for the economies of all countries studied, attracting skilled and competent individuals – especially trainers with backgrounds in a relevant industry as well as traditional education – to the field, raising pedagogical standards, and ensuring relevant and up-to-date occupational knowledge and skills are all vital. However, the demographics of an ageing population and a generally low interest in teaching as an occupation in most OECD countries increase the difficultly of the task. For those countries where VET is seen as a low-status option (Australia, Hungary, Mexico), the situation is even more crucial, as a cycle is created in which low-status systems become less attractive to qualified staff, especially those from industries with a number of other options, and the lack of qualified staff feeds into the perception that the system is weak.

By virtue of its focus on social inclusion, VET has come to be seen in some countries as an option for those less skilled, less bright, and/or less advantaged. This has translated in many OECD countries to a status problem for the VET system, where it is perceived as a second (or third) best option for education, and thus has problems attracting and retaining high quality

students and teachers.* This status problem is then susceptible to a vicious circle in which the system's perceived failings turn into actual failings, as the quality of the education received drops as a function of the falling quality of staff and students. Low quality (perceived or real) can translate into low support for systemic innovation in VET from the government and also an unwillingness of firms/employers, a major source of innovation in the system, to engage with the VET system. This, in fact, is one of the key themes addressed by one of Australia's case studies (*ATCs and the Status of VET*).

Lack of clarity and capacity building stakeholders

A barrier to the implementation of systemic innovation is the **lack of clarity of the roles** of the various players. In many of the case studies, we observed that knowledge and uptake of the initiative in daily practice and policy orientation were not at the level that could be hoped for among all relevant actors. One clear cause is that guidelines for implementation are often too general and broad in content to allow for obvious and direct action plans on the ground by practitioners either at schools or in companies. In the *Innovation Circle* (Germany), for example, the development of a communication plan and a common methodology to allow for the identification, documentation, and dissemination of promising practices was a key recommendation of the report. In other case studies, deliberate strategies to communicate new roles and expectations were part of the development of the innovation, though not always successful (*e.g. NVQR* in Hungary, *Case Management* in Switzerland).

Another barrier to the successful implementation of systemic innovation is the **lack of capacity building,** or training, for those stakeholders expected to play new roles. In *Step One Forward* (Hungary), the programme necessitated the creation of mentors charged with acting as bridges between participants, local authorities, employers, and the regional training centre. However, despite planned capacity building measures (training on practical issues, regular meetings to share experiences), the rolling out of those programmes was delayed or missing in the actual implementation. A number of other examples from other case studies (*e.g. Case Management* [Switzerland]) make it clear that these small but important steps in implementing systemic innovation can easily be missed. In many cases, the lack of a pilot project (*e.g. Reform of the Technical Baccalaureate* [Mexico], *Innovation Circle* [Germany], *Globalisation Council* [Denmark]) meant that aspects were overlooked that could easily have been

*It should be noted, however, that in countries with a dual system of VET (e.g. Denmark, Germany, and Switzerland) the status of VET remains high and is unlikely to suffer from being associated with social inclusion initiatives.

corrected before full-scale rollout. The importance of pilot projects will be discussed further in Chapter 5.

These barriers take time to correct or avoid, and time is scarce if the process and needs of systemic innovation are not well understood. In VET in particular, the additional complexity of cooperation between public and private sectors adds to the time needed and enhances the need to create an atmosphere of trust. What to include and exclude from final documents of working processes, for example, is not always as transparent as could be, and can quickly generate tensions (*Innovation Circle*, Germany).

Resistance to change/innovation fatigue

Related to a lack of consensus of stakeholders but deserving of their own heading, **resistance to change** and innovation fatigue are also important barriers to systemic innovation in VET. Although resistance to change is a natural human trait, it is also one that can be avoided through targeted implementation and well-conceived incentives and encouragements. However, there is also a danger within highly stable systems that positions become entrenched and stakeholders start to resist change as a reflexive action rather than as a reasoned (and changeable) reaction. In Denmark, for example, there was a tension between the skill needs in new, emerging business areas and the stability needs of the "traditional" labour market. This tension, in fact, was described as a "battlefield" by one of the people interviewed. In fact, the *Globalisation Council* illustrated that a strong adherence to existing structures of the labour market was an obstacle in the Danish VET system, and it recommended that traditional business areas renew their business models, technologies, and processes. It also identified a need for dialogue between existing and new trade boards.

Innovation fatigue is also a natural human reaction. It is a clear and present danger in systems that do not sustain and build on innovations but rather replace one "flavour of the month" with the next. The swift succession of constantly renewed programmes is a common result of funding mechanisms that require an element of "novelty" in programmes for successful funding, It is also a common result of changes in government or political party that seek to make their unique mark within the policy sphere. It is a strong barrier to systemic innovation in that the temptation in individuals and systems experiencing innovation fatigue is to do nothing and wait, secure in the "knowledge" that sooner or later another new initiative will come along to replace the current one. In this scenario, the changes and impact of the innovation are never seen where they matter (in the classroom, at the level of impact) because they are rarely initiated. In systems that have frequent new initiatives coupled with a lack of evaluation of previous programmes, there

is virtually no incentive for a teacher (or student or employer) to start the process of change, as they know they will never be held accountable for it.

The good news is that innovation fatigue is easy to avoid. A sustainable innovation policy should be based on the evaluation of the outcomes as well as on the impact of earlier projects or programmes. New innovations should also be introduced based on solid research evidence and outcome measures, as they are necessary for sustainable development with a certain degree of quality assurance. Without integrating a dimension of sustainability, the risk of innovation fatigue increases in line with the number of new projects. Of course, there is often a tension inherent in the system in that funding is often reserved for "new" ideas and projects, with successful long-running projects losing funding opportunities because they are not perceived as innovative. In this sense, innovation can be forced to some extent because tight competition for limited funding inherently demands innovation. Although innovation can play a positive role in ensuring dynamism and change in the system, it must be carefully balanced to avoid falling into the trap of innovation purely for its own sake. The importance of balanced programme design and the use of research will be discussed more thoroughly in the following section, as well as in Chapter 6.

Political factors

A lack of funds, supportive legislation, political leadership, and willingness to champion systemic innovation are each a major barrier to the innovation process. Even the most compelling social or economic imperatives require the appropriate political context, timing, and willingness for change to occur.

Political barriers to systemic innovation in VET include issues related to governance, such as the complexity stemming from a multi-leveled system of government. This complexity can result in a lack of communication and knowledge-transfer across mandates, and can produce duplicate efforts (and thus expenditures). Political barriers also include traditions for implementing reform agendas, competing policy agendas, and the role played by timing.

Governance

In education, governance is a serious issue, and there exists a continuing trend toward autonomy and devolution. Four of the countries in our project were federal countries (Australia, Germany, Mexico, and Switzerland) in which the governance of education in general, and VET in particular, was relatively intricate. Interestingly, VET, linked as it is to both education and labour markets, often sits in a particular position in relation to governance arrangements. In Switzerland, for example, VET was the one area of education for which the federal government was responsible. Similarly in Australia, VET was one of the few areas in education over which the federal

government had some mandate. In Germany, college training and related factors are the responsibility of the Länder, while company training remains a federal responsibility. This, then, was often perceived as an opportunity to effect change on a national level for both Australia and Switzerland.

However, there were also direct barriers as a result of these governance arrangements. Divided responsibilities in federal countries can create additional difficulties when it comes to initiating and implementing innovation, in terms of a **lack of communication and knowledge transfer** across mandates. Specifically, small-scale innovative projects dealing with issues of concern to the whole system, such as permeability or transition, are often initiated on the ground, sometimes in individual schools and sometimes in groups of schools within a region. However, it is not always possible to identify such projects or to evaluate them systematically and share the findings on a larger scale. In Germany, the *SKOLA* programme, despite being coordinated centrally by the relevant Land Ministry, is an example of how a lack of a suitable coordinating body between the participating Länder and the Federal Government may result in the inadequate use of the findings of these programmes. The cancellation of the Bund-Länder Commission for Educational Planning and Research Promotion (BLK) reduced the potential exploitation of the results within a national policy.

Although not necessarily as pronounced, this potential barrier was also witnessed in other countries. There was a general weakness in knowledge management and transfer across regions and governance systems, exacerbated by practical details such as the sheer size and distance between jurisdictions. In Australia, for example, one main source of knowledge-transfer identified in the interviews was the movement of an individual from a post in one state to another, thereby carrying along his/her knowledge. This is clearly not an optimal strategy for systemic knowledge mobilization. It should be noted, however, that this is not an issue restricted to countries with federal systems of governance: knowledge transfer and mobilization across nations is also general weakness in OECD countries (EbPR OECD, 2007). This difficulty is attenuated in countries with small populations and compact geographical areas (*e.g.* Switzerland and Denmark), principally because, as we heard numerous times, "everyone just talks to each other." This, however, is clearly not a model that will work for the majority of OECD countries. This is a pity not just because it represents an inefficient use of funds and knowledge; localised pockets of innovation, such as projects at a school or community level, though of high value to the immediate participants, are likely to have little impact on overall system change without broader dissemination.

Although both Australia and Switzerland have a national coordinating and planning body for the development of VET, it is up to each region (state, canton) to decide whether to launch particular initiatives or implement the

results piloted in other regions. This individual approach makes it difficult to create a vision for system-wide innovation in VET. It can also lead to the **duplication of efforts** and inherent further expenses, because without an overall strategy regarding the content and effect of innovative measures there exists a risk of substantial overlap among numerous distinct initiatives. Given the autonomy of individual regions in VET systems within the federal countries studied, the topic is difficult to address comprehensively. The various coordinating bodies in Australia, Germany, Mexico, and Switzerland are, of course, working to resolve this issue, but the process is challenging and difficult.

Traditions for implementing reform agendas

There exist a number of political factors that traditionally form a part of implementing reform agendas and that can act as barriers to the process of systemic innovation. One is the reality of **competing policy agendas,** and the constraints that these impose regarding which initiatives get supported and carried out. In this respect, VET finds itself in a particularly complicated policy environment, sitting as it does between Education and Labour Ministries (depending on the country, and sometimes depending on the programme), the public and private sectors, and a vertical series of governance arrangements (school, region, federation, and nation – again depending on the country). The large number of different players yields a high chance of running into competing policy agendas, requiring VET innovations to present thoroughly convincing arguments to win out. An additional barrier to innovation in the system is the conceptual separation of VET from the world of work in certain countries (*e.g.* Australia), at least in the eye of the broader public. This conceptual distinction has concrete practical implications in that if VET providers, policy makers, and practitioners do not link to broader technology and economic policies, they risk being sidelined as a special "education" group (particularly in countries where VET has a low status), rather than perceived as an integral part of economic and labour market development.

A key to placing an innovation on the policy agenda is the ability to develop a sense of urgency about the need for change. This is sometimes difficult in VET for two main reasons: 1) getting VET on the agenda is a difficult process in countries where it is perceived as low status; and 2) proactive innovation requires long-term vision and strategy, and it is notoriously difficult to develop a sense of urgency about long-term agendas. These issues will be developed further in Chapter 8. Box 4.5 takes a closer look at one such situation, as well as the strategy that was developed to deal with it.

Another political factor that can act as a barrier to the process of systemic innovation is the *timing* of the political process. Specifically, the short policy cycle from idea to implementation required by accountability and competitiveness is likely to impede both the use of pilots from which to learn and the

use of evaluation as a measure for policy learning and evidence-based policy making. The *ATC programme* (Australia) and *Step One Forward* (Hungary) are examples of projects that had either their pilot phases or evaluation phases cut due to timing pressures. Alternatively, the evaluations may not be cut, but decisions about the future of a programme are likely to be taken before any system evaluation has occurred. Successful innovation cycles involve the constant use of feedback from monitoring and evaluation to shape the development of new projects – in short, there will always exist a need to learn from what has already been tried. To cut the feedback loop or omit the evaluation step is to potentially miss useful lessons on how best to further develop the system.

As mentioned above, cutting the feedback loop is not only an example of poor use of monitoring in policy decisions, but also linked to the risk of innovation fatigue. In a context in which innovation development and implementation decisions are perceived as potentially political, and in which doing a good job or successfully reaching targets is not necessarily translated into renewed funding or support, there is a grave risk of stakeholders of all levels

Box 4.5. **Germany and the Innovation Circle**

In Germany, the design of the Innovation Circle showed a certain amount of political courage by making a clear break with traditions of policy making that had typically grown out of public pressures to solve problems of immediate concern. From the point of view of voters, topics that are not of immediate concern may often gain little attention in the public discourse (with the possible exceptions of environment and climate). In the design of the Innovation Circle, the Minister and the ministerial officials had to struggle to evoke a sense of urgency on future oriented topics, for which current decisions could affect the relevance and the efficiency of the German VET system of tomorrow.

From the outset, the Innovation Circle was an innovative approach to policy making in that it opened a dialogue on plausible future developments in Germany with systemic impact on the VET system, but risky insofar that consensus on coming transformational change in the German VET system would strongly depend on the extent to which a sense of future urgency could be conjured and shared among all participants at an early stage in the dialogue. With hindsight and the evidence provided, several complex topics were brought into an open discourse for the first time, such as the topic of modularisation and transfer, but no consensus was reached during the Innovation Circle process.

The Federal Government subsequently launched a five-year funding programme that offers a window of opportunity for targeting funding strategically with a medium to long-term orientation. This new round of funding measures could be a means of inducing systemic innovation as well as for sharing and disseminating both successes and failures. This will call for clear evaluation guidelines and policy co-ordination between the federal and *Länder* level representatives beyond the current structures of governance.

losing their incentives or eagerness to be leaders of innovation. The tension between the timing of the policy cycle and the timing of a research cycle is one of the fundamental challenges for the use of evidence in policy making (OECD, 2007) and will be discussed further in Chapter 6.

A last element, which traditionally forms a part of implementing reform agendas and can act as barriers to the process, is the **lack of a leader,** or champion, of the innovation. As argued in the "drivers" section of this chapter, an individual, or set of individuals, ready to champion the cause is a key driver and a frequently the main reason given innovations reach the policy agenda. Conversely, the lack of such an individual, or set of individuals, acts as a barrier to innovation. Alternatively, if those leaders do not receive the support they need or are not in a position to make changes (*e.g.* senior policy maker or programme designer, senior management in charge of implementing an innovation, etc.), then the leadership displayed will not be capitalised upon. Thus, it is vital that systems contain mechanisms to allow good ideas to percolate up through the system to those in a position to make change happen.

Lack of stakeholder consensus

Failure to generate consensus among stakeholders acts as a barrier to systemic innovation in VET in numerous ways, though most markedly in the implementation phase. In Denmark and Germany, for example, the system is based on the consensus principle, which holds that all stakeholders, including the social partners, need to reach a common agreement when changes in policies are introduced. This is certainly a virtue of the system. However, it can also act as a barrier to radical systemic innovations (*i.e.* major changes to the ways services are provided involving and affecting several aspects of the system). The *Innovation Circle* (Germany) is an example of how an intended radical innovation failed to take place, despite effort to involve participants in a personal capacity, so as to minimise the effect that ideology and stakeholder interests play in the process.

Of course, the inclusion or exclusion of stakeholders from part of the process of innovation (*e.g.* initiation and development) is often deliberate. An element of top-down innovation is that choices are made regarding whom to include and when to include them in order to speed up the process or promote change likely to be resisted by certain groups. For example, deciding to prioritise one interest group over another to achieve a strategic goal is relatively common – see the development of *Apprenticeships* (Switzerland) and the initial development of *NVQR* (Hungary) for examples of deliberate prioritising of labour market needs over educational needs, and the creation of *NCVER* (Australia) and the *Leading Houses* (Switzerland) for the prioritisation of policy needs over the views of researchers in the field. However, such choices

must be calculated carefully with the knowledge that innovations without initial buy-in from all stakeholders can result in a **lack of ownership** and thus lead to resistance during the implementation process (see also Chapter 6). In cases such as these, it is important to think through the various incentives that can be offered to encourage compliance and reduce resistance from particular stakeholder groups, particularly if the resistance can be foreseen to some extent as a consequence of inclusion/exclusion choices made earlier in the process.

Accountability mechanisms that radically restrict risk

Throughout the last decade, there has been a push for greater accountability in educational systems in general, and a corresponding shift in focus from the inputs to the outputs of the process (*e.g.* student achievement). This rise in accountability has had a corresponding decrease in the level of risk tolerated by the system, and thus the type and nature of systemic innovations that are supported. Risk, with its implied chance of failure, is difficult to support in a policy climate that does not tolerate mistakes. VET, with its particular ties to the private sector, is an interesting example of how this plays out in a broader political environment.

The market competitiveness agenda (including competition between regions or states) that has characterised reforms in the VET sector for the last decade or so has been accompanied by a strong culture of accountability. However, this focus on accountability leaves little room for either risk-taking or failure. In the literature on systemic innovation, risk-taking is identified as a crucial factor in driving breakthrough innovations. Although there were some examples of support for riskier ventures in the case studies we observed, (*e.g.* the open category of funding for blue skies research at *NCVER* [Australia]), these were very much exceptions to a carefully audited and accountable system.

This, then, is a serious barrier to systemic innovation. If no risk is permitted, the system freezes and innovation is impossible. Moreover, there therefore exists a direct and clear tension between accountability and innovation processes. As mentioned in the introduction to this chapter, this tension is exacerbated in times of economic crisis, during which funding for riskier ventures is considered too dangerous and is often first in line for budget cuts. Our argument is not that extreme levels of risk should be encouraged and supported, but rather that policy makers need to be aware that this tension exists and that, even in times of economic crisis, it is advisable to keep the system open to innovation within an acceptable but non-trivial level of risk. In times of greater economic growth, allowing more freedom for innovative risk and possible failure is consistent with long-term planning and vision, and is a basis for a strong innovation system.

It is worth noting, of course, that these are institutional as well as political issues. Institutional choices are made regarding how people responsible for governing institutions deal with change, the risks involved, and the level of acceptable (institutional and personal) risk. On a day-to-day level, the institution is the level of the system involved in implementing change and innovation, and the success or failure of initiatives can depend on the accountability mechanisms involved to a very large extent.

Lack of research evidence and consistent evaluation

Our project has looked closely at the role of evidence and research in the process of systemic innovation. The lack of such evidence has been identified as a barrier to systemic innovation in most, if not all, of the case studies we looked at. This final section, then, focuses on this analysis. For a more comprehensive discussion of the role of research and evidence in systemic innovation, see Chapter 6.

The question of how to ensure an adequate and sufficient flow of information during the process of policy reform is extremely challenging. There are questions concerning who is considered qualified and reliable enough to provide the information and the types of information that are considered useful and relevant to decision makers. The role of different knowledge sources (*e.g.* formal/academic, semi-formal, popular/media knowledge, general tacit knowledge) in identifying and developing innovation policy is an essential component to the understanding of the processes underlying systemic innovation. When we speak of "evidence", it is important to note that this includes both formal research from academic and other bodies as well as information from other, less formal, sources, including tacit knowledge from field-level stakeholders involved in implementing the innovation.

The initiatives chosen as case studies for this project address two central issues that all countries must tackle in their knowledge societies: *(i)* how to increase the responsiveness of the VET systems to current and future labour markets as well as individual needs; and *(ii)* how to avoid social exclusion of unskilled and low skilled workers. Many of the case studies nominated by participating countries were of extremely large scope (*e.g.* affecting the entire VET sector): Hungary's reform of *NVQR*, the Danish *Globalisation Council*, and Mexican reform of the *Technical Baccalaureate*. It is imperative that projects with such wide scope and deep impact on VET systems and labour markets be supported by solid data and rigorous research analysis during their design, monitoring, and evaluation phases. Such data should be open to the public and presented to the main stakeholders.

However, discussions with stakeholders in the countries suggested that there exists only a weak research base in VET and in systemic innovation in

VET in general. This is true for the knowledge base drawn on for the development of the innovation, including a lack of reliable and robust outcomes data for students taking VET. Across all countries, with the exception of Switzerland, we observed an overall:

- Lack of evaluating and piloting, which had
- Implications for scaling up and implementation, which in turn had an
- Impact on the timing and impact of the innovation.

For the first bullet point, it should be noted that the majority of innovations proposed for case studies were new, and have not yet had a completed evaluation. Therefore, it remains to be seen if some of the planned evaluations will prove adequate. Overall, however, even the planned evaluations did not appear to be designed by independent experts and did not necessarily address the most important topics (see Chapters 6 and 7 for further detail). Using poor or partial evidence to guide and implement systemic innovations in VET may lead to the failure of initiatives due to poor planning, and cause longer delays in implementation. It is also more expensive to correct errors during a full-scale implementation than during a pilot study.

Conclusions

The need to respond in a timely manner to the socio-economic challenges that all VET systems are facing in an increasingly globalised and rapidly changing world seems to be driving most of the systemic innovations that this project analysed. The lack of available skills in economies undergoing constant transformation, the need to enhance and enlarge the work possibilities of the trainees, and the need to include students in difficulties comprised a main engine in most innovations presented to us as case studies.

The innovation process also requires a number of enabling factors that can make the difference between a successful and unsuccessful innovation. More precisely, political leadership and capacity to steer and manage the innovation, the availability of resources, and/or the existence of regulatory mechanisms supporting the process seem to play a crucial enabling role in most systemic innovations. Equally, the availability of evidence and a good consensus among stakeholders also play crucial roles during the design and implementation of the innovations. Their roles seem to be so fundamental that these two dimensions have been treated separately in two chapters of this report (Chapters 6 and 7).

While these conclusions tend to have general validity for all VET systems, a number of particularities can also be identified to provide a more nuanced picture on these drivers, enablers, and barriers. Our research

suggests that the role of innovation enablers and barriers are not universal, but rather context-specific. This is particularly true for three variables: the role of evidence, consensus among stakeholders, and political leadership. The analysis of the case studies has shown that the innovations were often not initiated or guided by research evidence, but rather based on tacit knowledge and beliefs or an urge to change the *status quo*. While the lack of sound research and statistics in VET clearly contributes to these phenomena, the overall weak use of evidence in the development of systemic innovation is troubling given the key role that research plays in standard innovation models as well as the need to build evaluation feedback into system development so that success or failure can be meaningfully measured.

Similarly, while in all systems consensus among stakeholders can facilitate decisions to innovate and facilitate the implementation process, in dual tripartite VET systems consensus becomes crucial. These systems count on a long tradition of consensus building in the introduction of change, and although political leadership can encourage stakeholders to negotiate, a lack of consensus is often fatal for both the process and the innovation itself. In VET systems not based on a consensus model, political leadership could make up for this lack of consensus and allow the process to start and to move forward throughout its different phases.

Based on these findings, it would be difficult to suggest that any specific combination of driving and enabling factors would guarantee the success of any given innovations. Although it seems clear that systemic innovations may require specific enabling factors to be successful, the particular combination of these factors is apt to vary depending on the specific nature and scope of the innovation as well as on the context in which it is introduced. Moreover, depending on the specific stage of the innovative process, the combination of enabling factors may also be different. As a result, governments and stakeholders should be aware of this dynamic process so that they can identify the necessary enabling factors to foster for each stage.

Conclusions regarding barriers to systemic innovation are clearer, in that a lack of key drivers and enabling factors (*e.g.* lack of consensus of stakeholders, use of evidence, political leadership, etc.) clearly translates into barriers for the initiation, development, and implementation of systemic innovation. However, it cannot be forgotten that the process of systemic innovation involves numerous stages, and so barriers/drivers at one stage (*e.g.* development) may or may not play the same role at another stage of the process (*e.g.* implementation, evaluation). Both the fluid nature of systemic innovation and systems and the dynamic among contextual factors further this complexity. This chapter sets out examples in which positive enablers/drivers had unintended barrier effects, as in the role of European funding and resulting time constraints. Another example is a system-wide observation

on the tension between increasing accountability and restricting risk. In highly accountable systems there exists very little room for risk-taking, as the possibility of failure is too high. Although not a deliberate outcome or strategy, this tension between accountability and risk as well as other known unintended barriers must be monitored by governments and policy makers to allow systems to operate at the desired level of innovation.

Overall, a key theme of this analysis is that it is particularly perplexing to see both a lack of research evidence and cuts in the feedback-through-evaluation process in conjunction with the push for greater accountability and increased assessment of the system, teachers, and students. This is an incoherence in the system that needs to be addressed. Logically, if a system requires high levels of accountability, it should also require the use of evidence – including a genuine understanding of what the available evidence means, how it must be used, and how it must flow through the system to be taken up and used by other stakeholders. Such a system should also require the use of pilots and evaluations for learning and accountability purposes. Yet, in the systems we observed, this was not often the case.

A final note: in times of economic crisis the capital and margin of risk required to fund innovation and systemic change often results in such projects being considered disposable luxuries. Funds earmarked for innovative projects, or funds set aside to enhance and support innovative processes, often find themselves radically trimmed in leaner budgets. This is true of innovation as a whole and systemic innovation in the public sector in particular (see Chapter 2). In the VET system, the dual contribution of public sector (education) and the private sector (employers, firms) means that systemic innovation in VET risks getting cut twice, as both sides seek to rein in expenditures. In contexts in which employers need to be coaxed into entering into apprenticeship agreements, these programmes are difficult to justify if the firm is not convinced there exists a net financial gain to be had. Relevant and strong research on these questions, for example the cost/benefit analysis of apprenticeships for particular systems (Dionisius *et al.*, 2008), therefore takes on particular importance. Moreover, during financial crises, a number of enabling factors can start disappearing due to financial constraints and thus become limiting barriers for innovation. For example, a political urge to adopt rapid measures to show responsiveness can sacrifice the need for knowledge and/or consensus among stakeholders. Nevertheless, as in the previous cases mentioned, this would be contingent upon the specific context in which the innovation takes place.

Policy implications

The analysis of drivers and barriers in this chapter puts an emphasis on rational thinking and processes, while the discussion returns again and again to the observation that systemic innovation operates in a highly fluid dynamic. Decisions about when and how to support innovations may not derive from such a linear process, and, as laid out in the barriers section, barriers that arise may be unexpected outcomes of a seemingly positive enabler. The question for policy makers, then, becomes: what are the key ingredients for success in systemic innovation and VET? Moreover, how amenable to change are the foundations that create/contribute to barriers? The following set of policy implications seeks to identify and discuss these crucial factors:

- Governments must better understand the socio-economic drivers affecting the effectiveness, efficiency and equity of VET systems, and be better able to include this knowledge in their decision-making regarding innovation. Better tracking and research allows for both a greater understanding of the evolution of these drivers and, crucially, could allow for the identification of opportunities as well as greater ability to foresee unintended consequences of system change. The development of dedicated research institutes or analysis units specialised on VET issues is thus recommended. Some VET systems already have such institutions (*e.g.* Australia, Germany, and Switzerland). Other systems could learn from their experiences.
- Governments should identify enabling factors that could help implement specific innovations and develop their own successful "recipe" particular to their national or regional contexts. In addition, however, two specific framework conditions seem to be important across all regions and VET systems: fostering dialogue with all stakeholders, and encouraging the use of research evidence to initiate and/or guide the process.
- Specific policy recommendations could be suggested for tripartite dual systems, in which a long lasting and well-established research and consensus building culture seems already in place. In these systems, consensus building could transform into a barrier for the introduction of innovation. To avoid this impedance for change, innovation milieu should be created as experiments, in which the role of the necessary innovation enablers should be tested. The nature and scope of the innovations should also be taken into account.
- Government must not forget to focus on the dissemination and transfer of good practices. This means planning and funding specific knowledge transfer initiatives on the governmental level, and must also include means to reach schools, learning places, and professional

fields. From a middle or long-term perspective, the dissemination of the results from programmes and projects with a high potential for innovation is vital for maintaining a sustainable innovation culture and stimulating innovation policies.

- Also in terms of knowledge transfer, there needs to exist a mechanism for bottom-up feedback to be cycled back into the innovation framework and design (including, but not limited to, evaluation). This would also include ideas for the identification of needs and the genesis of innovations. Not only does this increase the possibility that good ideas will emerge from the field, including the private sector, it is also a way to increase the mutual trust between people with central responsibility and individual teachers and centres.
- Following from the barriers to innovation presented earlier, there is a need for political leadership in terms of creating an appropriate and supportive climate for innovation in the VET system. This includes the courage to establish a long-term strategy for the sector. In particular, it is recommended that there be an emphasis on creating the climate to foster:
  - An understanding of the process required for the development, implementation, and evaluation of innovations, as well as the political leadership to support the necessary processes and time required for innovations to yield results; and
  - An adjustment of the public management paradigm to allow room for risk-taking without being penalised for possible failure. This includes innovation of programmes and services, processes, and outputs.

Key messages

Drivers and barriers play different roles at different stages of the innovation process and can be thought of as direct determining factors that operate within contextual preconditions. These are distinct from enablers, which are influencing, but not determinant, factors.

Enabling factors that could help implement specific innovations are often context and system specific. Thus each system must develop its own successful "recipe" particular to its national or regional context. However two specific framework conditions seem to be important across all regions and VET systems: fostering dialogue with all stakeholders, and encouraging the use of research evidence to initiate and/or guide the process.

Major barriers include: innovation fatigue, competing policy agendas from different departments and Ministry stakeholders in VET (education, labour), and accountability mechanisms that radically restrict risk. The lack of strong empirical research is also a major barrier to the identification of needs and the successful implementation of innovations.

The key role of research in the process of systemic innovation cannot be overstated. This includes the dissemination and transfer of good practices. This requires planning and funding specific knowledge transfer initiatives on the governmental level, and must also include means to reach schools, learning places, and professional fields. From a middle- or long-term perspective, the dissemination of the results from programmes and projects with a high potential for innovation is vital for maintaining a sustainable innovation culture and stimulating innovation policies.

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Chapter 5

Process and Dynamics of Systemic Innovation: Initiation, Implementation, Monitoring, Evaluation and Scaling Up

Understanding the different stages and factors influencing the innovation process is of central importance in identifying needs for change in the system and guaranteeing successful innovation design and implementation. This chapter presents the empirical findings on the initiation, implementation, monitoring and evaluation and the scaling up of systemic innovation. In each of these phases, the chapter highlights the importance of stakeholder involvement and the crucial role that knowledge should play. The chapter closes with a number of policy implications that emphasise the need to create trust among stakeholders, develop and use knowledge to guide the process and ensure that the information generated in the monitoring and evaluation exercises is fed back into the system to enhance the existing knowledge base and to identify future innovations.

Introduction

The examination of the different stages of the innovation process is of central importance to the study of Systemic Innovation in VET. The process of introducing systemic change in education systems, especially VET systems, is not always clear-cut. Systems with different histories and traditions, including starting points and configuration of stakeholders, will not follow identical paths in this process, nor will every step of the way necessarily be deliberate and calculated, as the urgency of the drive for change will often affect the timing and planning of the process. This exploratory study does not aim to make definitive claims on what is "right" and "wrong" in the different stages of the process of systemic innovation in vocational education and training, but rather to provide an analysis that might allow countries to learn from the experience of the fourteen cases selected for study. Understanding the dimensions and possible implications of the different phases of the process of innovation should help policy makers and innovators reflect on how to best encourage adaptation to their changing environments. This chapter on the process and dynamics of innovation should be seen as complementary to the previous chapter on drivers and barriers in the process of systemic innovation.

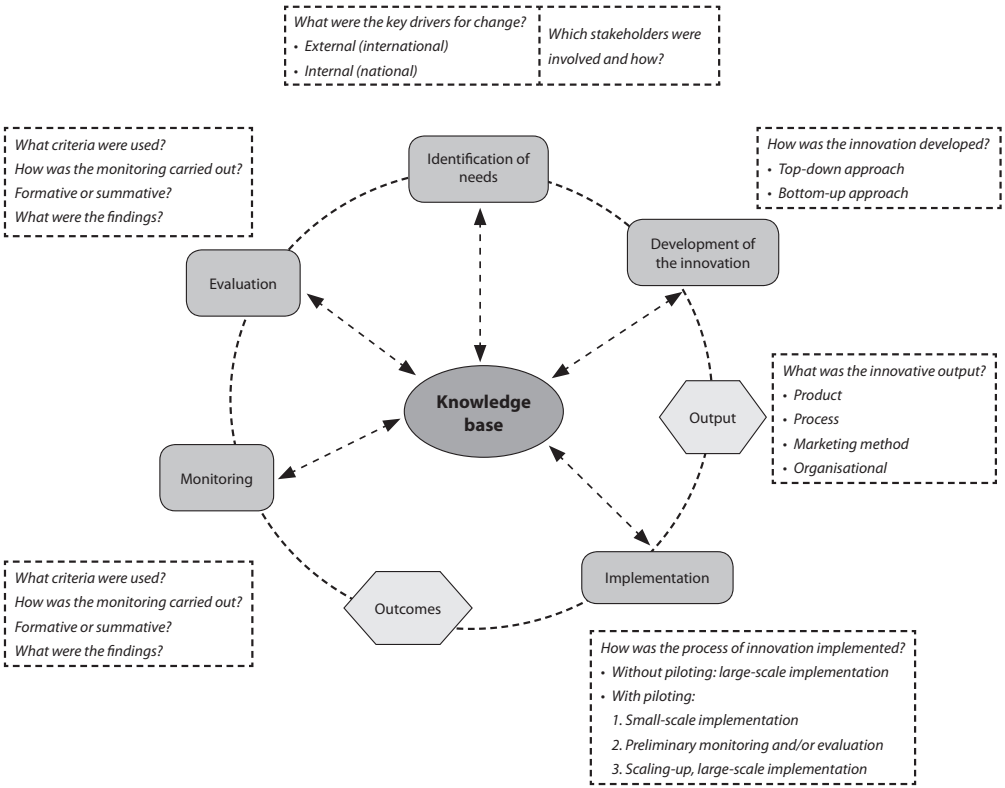
For the purposes of this study, systemic innovation is defined as *any kind of dynamic system-wide change that is intended to add value to the educational process*.[1] Utilising the framework outlined in the model of innovation (Figure 5.1.), this chapter will first attempt to situate the empirical findings in the initiation phase, from the identification of needs to the design of the innovation, and then lead into an analysis of the implementation phase. This section will be followed by an examination of the monitoring and evaluation, followed by the implications for scaling up.

Defining the stages of the process

The model of innovation in education from a systemic perspective was designed for this study to provide a structure for analysing the underlying components and stages of the process of systemic innovation in VET. This model provides a background to the analysis of the case studies, and includes the potential stages and elements of the innovation process in education. The square shaped boxes contain a number of key questions (with some typical options) that arise in the systemic analysis of innovations.[2]

The model takes as its starting point the identification of needs in the initiation stage, within which it will be important to observe the drivers of change. In the development of the innovation, which can be viewed as the second

Figure 5.1. **Model of innovation**



component of the initiation phase, the focus will be on the use of knowledge and the role of stakeholders involved in the innovation. In the implementation stage, the knowledge used and the stakeholders' involvement as well as the scale of the implementation of the innovation will be examined. Attention will also be paid to the role of incentives and motivating factors for implementation.

The role of knowledge and involvement of stakeholders will constitute a central focus throughout the analysis of the different stages of innovation and across the entire report. The use of the knowledge base can be seen, for our purposes, as central to the process of generating systemic innovation. As such, the use of different types of knowledge will be examined, including explicit knowledge (*e.g.* academic/research evidence, professional or practitioner knowledge, and administrative data/statistics) as well as general tacit knowledge, defined here as "*knowledge in the head"* (*i.e.* knowledge that

individuals have but that has not been codified or spelled out).[3] The role of stakeholders in the stages of the process will also be viewed critically. Here, it will be important examine issues such as the inclusion of relevant stakeholders, the timing of their inclusion, the degree of their participation, and the incentives for stakeholder involvement.

Initiation

The process of systemic innovation usually begins with the recognition of a problem or need, which in turn can stimulate research activities and further attention. A problem or need may rise to a high priority on a system's agenda through an agenda-setting process. As such, public institutions and policy makers as well as other stakeholders in the field can play a crucial role initiating and guiding the adoption of innovations in VET systems through, for example, funding, legislation, and leadership within regional, national, and/or international spheres.

Involvement of stakeholders

In examining the involvement of stakeholders in the selected systemic innovations, it is important to analyse the extent of stakeholders' involvement in the design and development of the innovation. In doing so, it will also be essential to look at the approach taken in initiating the innovation (top-down or bottom-up) and the way in which context of the system may affect the process of innovation as well as the existent supporting measures.

Although a common implicit assumption is that systemic innovations are often initiated at the top by governments, this is not always true, as innovations driven from the bottom also exist. This can be seen as comparable to the notion found in innovation literature, referred to as innovation initiated by the lead-user(s), who essentially develops an innovation and then convinces the system of its utility.[4] The empirical evidence in this study reveals some instances of systemic innovations that are not started at the top of the hierarchy and instead follow a bottom-up approach, such as *Case Management* (Switzerland) and *the Mayan Riviera* (Mexico). The remaining twelve cases were deemed to have followed a top-down approach in identifying the need for an innovative initiative. Taken together, this suggests that due to the scope and nature of systemic innovation as defined in this study, such top-down approaches are more common.

It should be noted that the way in which cases were selected for this study may have also led to a somewhat biased over-representation of top-down led initiatives, as the selection was made by government officials in participating countries who might be less familiar with smaller-scale, bottom-up

projects. Furthermore, it must be acknowledged that the distinction between a top-down and bottom-up approach is somewhat artificial and used for our purposes to denote that the innovation was initiated at the top – though the distinction can become blurred throughout the different phases in the cycle of innovation. Still, the empirical evidence suggests that systemic innovations seem more apt to be top-down, given that their wide scope encompasses by definition multiple components of a system. However, more bottom-up initiatives do exist in the field of VET.[5] Further discussion on finding ways of addressing this fragmentation and ensuring that findings from different types of initiatives can be disseminated or scaled up can be found in the second half of this chapter.

The role of the different stakeholders in the initiation phase appears to depend to a large extent on the scope and nature of the systemic innovation. System-wide innovations, as defined for this study, appear to be more likely to follow a top-down approach due to their nature and scope, regardless of the type of system. The significance of relevant groups' involvement and the degree to which they could be implicated also varies, depending on the context in which the systemic innovation takes place. VET systems with long and rich traditions, such as those in Denmark, Germany, and Switzerland, tend to enjoy a higher status, measured in terms of student enrolment rates. As VET is highly regarded, it may be easier for a problem or need to rise to the top of a political agenda to initiate the process of innovation. As such, public actors in these traditional systems can play a crucial role in initiating and guiding the adoption of innovations in VET systems through funding, legislation, and leadership in the regional and national spheres.

The empirical evidence available suggests that many innovations initiated by governments in countries where VET enjoys a high status have aimed to respond to pressing economic challenges, such as adjusting training supply to the economic needs of a productive structure. This adjustment could involve core transversal competencies, such as managerial skills in the reform of *Basic Commercial Training* (Switzerland), or the entire system, as in the *Globalisation Council* (Denmark). A further advantage of initiating innovation through a top-down approach in these countries is the crucial role that public institutions and politicians have played in initiating the innovation process. For example, strong political leadership and will to bring the different stakeholders together were key forces behind the creation of the cases studied in the *Innovation Circle* (Germany) and the *Globalisation Council* (Denmark).

However, the advantages of political will and support in innovation driven from the top is not necessarily limited to systems in which VET enjoys a high status. A variety of public institutions and figures played a fundamental role in initiating the *Reform of the Technical Baccalaureate* (Mexico), a country with a relatively short tradition of VET, where the field also suffers

from low status. Also, political legislation and funding from the European Union drove and supported the systemic changes initiated in Hungary with the creation of a *National Vocational Qualifications Registry* (NVQR), though VET in Hungary is also a relatively recent and under-appreciated phenomenon. Although less traditional systems can in some ways be more open to change than those with a longer tradition, the importance of political will in initiating and supporting innovation cannot be underestimated.

Although there may not be ample evidence to fully explore this dimension here, there would seem to be a relationship between innovation in workplace/continuous training and a bottom-up approach to the initiation, as seen in the only two cases considered to have followed this type of approach: *Case Management* (Switzerland) and *the Mayan Riviera* case (Mexico). This may be due in part to the role of the private sector in identifying needs and initiating innovation directly relevant to training provision, resulting in a swifter process than initiatives begun in the public sector, where the governance structure is often more complex to navigate. However, the more challenging aspect for bottom-up cases such as these may appear in involving the public sector in later stages and in scaling up, as will be further discussed in this chapter.

Regardless of whether an innovation is initiated from top or bottom, the question of which stakeholders to involve in the design and development of the innovation becomes crucial. In systems that adhere strongly to the consensus principle, such as Denmark, Germany, and Switzerland to varying degrees, an agreement among all stakeholders, including employers' associations and trade unions, is necessary. This could generally be seen as a virtue of the system, particularly because it should promote a situation in which the views of all are taken into account, leading in principle to the development of an innovation strengthened by the knowledge inherent to each stakeholder group. Furthermore, the inclusion of relevant stakeholder groups during the design and development components of the initiation generally increases sentiments of ownership from stakeholders affected, a crucial element in the implementation phase and often relatively challenging to achieve in top-down innovations (as discussed below).

However, it is important not to overstate the merits of consensus-building in a system, as it carries its own challenges if consensus becomes a necessity. When all stakeholders must agree on the development of an innovation there is a risk that the principles eventually agreed upon will reflect the lowest-common denominator. In addition, VET systems, unlike education systems in general, include the public and private sectors as well as employers and social partners, whose various interests can in practice be difficult to reconcile. The bottom line is that the interests of the various stakeholders can result in risk-avoidance if they can only reach agreement on a common denominator. Avoiding risk will not generally be conducive to the process

of systemic innovation, which often involves an inherent element of risk. As time is necessary for all parties to agree, the consensus model often requires a lengthy process, which may well result in a compromise less likely to be as far-reaching. This practice may tend to lead to the design of more incremental innovations. While this is not in itself negative, it must be kept in mind that if stakeholders hold the view that incremental innovations are continually arriving, those stakeholders may experience innovation fatigue either in the development or implementation phases and subsequently develop the sentiment that it may not be worth the effort to co-operate in the process, as another initiative will surely follow.

Limited stakeholder involvement may in some cases be seen in top-down innovations as facilitating a swifter process with less resistance encountered along the way. In the *Technical Baccalaureate* reform (Mexico), it appears that while building consensus and involvement among a broad range of stakeholders is worthwhile, this may not always be necessary to initiate a systemic change. The strong leadership of the Secretary of Education allowed for designing the reform and moving it forward in a relatively short time span, although it should be noted that this course of action did not resolve the implementation gaps later experienced that could have been foreseen and resolved had a wider involvement of stakeholders been developed. Furthermore, the teachers and teacher unions were contacted, though not fully consulted. This lack of consultation led to knowledge shortages as well as implementation challenges (as will be discussed in the section on implementation).

Because they run wide and deep, systemic changes can generally benefit from the involvement and experience of a wide range of relevant stakeholders, as there exist larger numbers of actors who could be potentially affected. However, smaller-scale initiatives and those initiated from the bottom-up tend to involve a wider range of stakeholders on a deeper level, even though the scale of the innovation may not require it as such. In the two case studies featuring bottom-up innovations – the *Basic Commercial Training* (Switzerland) and the *Mayan Riviera* case (Mexico), both of which were essentially pilots – many relevant stakeholders across the public and private sectors were implicated in the initiation phase. Furthermore, that the former case has featured an interactive piloting system should help promote the current and continued consideration of monitoring and evaluation during the scaling-up process. In the latter example, for all practical purposes an unintended pilot, an evaluation is already underway to analyse how the components of the process functioned and could benefit from a focus on the role of stakeholders, especially as many of those involved were brought into the equation more through personal contacts than through a formalised solicitation. The sections in this chapter on monitoring, evaluation, and scaling up will discuss these phases of the process for these Swiss and Mexican cases in more detail.

While this study has been examining the process of generating innovation, it is worth mentioning empirical evidence on processes, which involve inherently innovative components and can in this case be seen in the way stakeholders were brought into the equation (which could be viewed as process innovation). In the German case study of the *Innovation Circle*, consensus-building was very much the norm – albeit in an unusual way. Stakeholders involved in designing the innovation were invited to the negotiations based on their personal demonstrated interest and experience in VET. This novel method helped to ensure that the actors would be less likely to merely represent institutional interests, and more likely to represent the interests of the VET system in its entirety. Box 5.1. take a closer look at this innovative process in an otherwise largely traditional system.

Box 5.1. **Germany: the Innovation Circle**

The Innovation Circle was from the outset different from the regular policy space of the tripartite German VET system in its design. The typical procedure in the German VET system governance is that each stakeholder selects a representative to bring forward their interests in a negotiation process; in contrast, participants in the Innovation Circle were appointed by the Minister as individuals with insights into different aspects of the VET system rather than as system representatives, though indirectly it included representation of all system stakeholders at a high level of formal influence. The Minister's aim was for the Innovation Circle to take a systemic view of the VET system through a broad definition of the agenda under four main headings, rather than focusing on specific policy topics. Implicit in this design was the Minister's intent to spur a process of informing and opening the mindsets of all involved in its governance of medium- and long-term challenges.

The Innovation Circle was chaired by the Minister, and included representatives from the Federal Ministry of Labour and Social Affairs, the Ministry of Economics and Technology, the Federal Employment Agency, and the Federal Institute for Vocational Education (BIBB). It also included representation from the Standing Conference of the *Länder* Ministers of Education (KMK) and the Conference of *Länder* Ministers of Economic Affairs (WiMiKo), as well as employers' representatives, part-time vocational school head teachers, and researchers. The sense of urgency imparted and high formal status of many involved made it important to frame the work and deadlines so as not to lose momentum through endless discussions.

Although this was not a the first time that such an *ad hoc* group or task force was set up directly by a Minister to address a particular policy issue, the design of the Innovation Circle included innovative elements, such as the fact that members were appointed in a personal rather than institutional capacity to foster debate free from institutional interests. However, several stakeholders pointed out during their interviews that such "unbiased" points of view were not always possible during the debates, particularly since stakeholders knew each other and the points of view they each represented rather well.

The lines between the role of stakeholders and the role of the knowledge base are often blurred, as it is also possible for stakeholders to be approached not so much for their formal involvement or approval as for the knowledge they possess, which might be useful in the design and development of the innovation. In this approach, actors and stakeholders are often consulted or communicated with rather than fully implicated in the design and development of an innovation. It should be noted that the definition of "consultation" can widely vary in depth and degree. If the consultation or communication is seen as superficial, it is possible that stakeholders who see themselves as potentially affected by an innovation may feel marginalised by such an approach, which, though designed in part to be inclusive, may give the impression that these stakeholders' opinions are less important than those of the people who are more fully implicated in the process. Conversely, true consultation with stakeholders tends to increase sentiments of trust. It can be gleaned throughout a number of the cases that short time-spans may have been largely responsible for cutting short the consultation stage with some key stakeholders. This can result in resistance during the implementation phase, a topic discussed in the next section.

The empirical evidence also indicates a number of other cases that could have benefitted from a more inclusive approach to stakeholder involvement in the design phases, for example regarding the involvement of social partners and trade unions in the *Case Management* (Switzerland) or school representatives in the *NVQR* (Hungary). This was to some extent the case in the Mexican *Technological Baccalaureate* case study, in which representatives from teachers' unions received information from the Ministry of the changes afoot in technical education on everything from curricular content to organisation. Though the teachers' unions were presumably contacted precisely because of the knowledge they, as practitioners, possess in the field, they were left seeming miffed that their voices had not been more formally solicited during the design and development of the process, feeling instead that they were simply being informed of the changes. It should be noted that the Mexican VET system, as a relatively new system, underwent in this case study a wide and deep change that benefitted from strong leadership and contextually differed from a number of the other case studies.

Use of the knowledge base

An adequate and sufficient flow of information during the process of systemic innovation is critical to the perceived relevance by users, both to build trust and increase the uptake of outcomes and to inform scaling up at a later stage when applicable. Evidence can contribute to the design of the innovation process, the identification of potential difficulties during the subsequent

stage of implementation, and reduce resistance to change among stakeholders if there exists evidence regarding the benefits the change may bring about.

For the purposes of this chapter, the use of the knowledge base is regarded in the broad sense to comprise: explicit knowledge, such as academic or research evidence; professional and practitioner knowledge; administrative data and statistics; and general tacit knowledge. Thus, "knowledge" here includes both formal research from academic and other bodies and information from other, less formal sources. Although these different types of knowledge in stages of the process will be examined in turn, the terms "knowledge" and "evidence" are also used in this chapter to comprise any/all of the above. The use of knowledge will be discussed as a main topic in greater detail in Chapter 6, as will the research agenda in Chapter 9.

The typology framework contained in Chapter 7 reveals that there appears to be no clear pattern emerging regarding the types of knowledge used in the different stages of the process. However, overall it became apparent in the cases studied that a large number of initatives were triggered by tacit knowledge or small-scale responses to imminent problems faced. Despite the important role that formal research might be expected to play in the initiation of systemic innovation, a review of the case studies undertaken seems to suggest that this was not always central to the process. Several of the innovations were seen as initiated largely because of agreement on the need to innovate, prompted by small-scale responses to impending problems, such as economic or social challenges.[6] Perhaps due to the urgency of such needs, the opportunity to take evidence into account was not always present. Aside from statistical figures of labour market development and unemployment situations that were sometimes utilised in initiation phases to illustrate the need for the innovation, the use of regular, relevant, and objective data feeding into the process was often missing or considered secondary.

The use of international evidence and statistics in initiating innovation was relatively scarce in the cases studied, and with the exception of two of the countries with more recently-established, less-traditional VET systems, there was little evidence of attempting to learn from international experiences. International benchmarking and funds from an EU initiative these cases were not necessarily based on formal research knowledge. In the case of the *Technical Baccalaureate* reform (Mexico), the innovation explicitly drew on the experiences of Latin America and Europe as well as results of international benchmarking.

In this case from Mexico, an interesting aspect is that the systemic innovation studied followed a previous reform effort. This effort, largely acknowledged as unsuccessful, attempted to replicate international evidence from the United Kingdom but lacked adequate adaptation to the Mexican context. However, in the *Technical Baccalaureate* reform, the Secretariat for Public

Education and academics from local institutions surveyed international curricula and norms regarding different professions at the time when the new curriculum for the reform and new potential entry-points into the labour market were being designed. What is encouraging in this case is that although the previous attempt at innovation did not succeed, the less-than-positive experience did not discourage subsequent innovation; instead, it served as a lesson learnt on the importance of gathering evidence on the local context in detail and of avoiding straight replication of international evidence in the process of initiating innovation. Further discussion on learning from initiatives through the feedback loop of evaluation will be covered in the evaluation section of this chapter.

Aside from the use of international evidence or statistics, the use of administrative data and statistics on a national, regional, or local level was also used in the initiation phases of several cases studied. This was seen in the *Case Management* study (Switzerland), as it was the data indicating high dropout rates among certain groups of youth that led to the initiation of the case management model to support the transition into VET. The use of similar administrative data and statistics in the initiation and development of innovations was seen in as many as half of the cases studied. That this type of knowledge was solicited more frequently in the initiation phase than any other type and across all systems suggests that it may be the most straightforward and readily available type of knowledge from which to draw upon.

However, administrative data and statistics, especially if taken in isolation as they sometimes are, do not necessarily tell the "whole story" in the way that other types of research, such as academic research, can. Academic research and evidence can be especially beneficial in the process of initiating innovation, and can serve to inform the process of innovation in VET, particularly in the initiation and development stages. In addition to contributing to the design of the innovation process, research evidence can also facilitate the identification of potential subsequent barriers in the process. This can prove especially useful during the implementation phase, and may reduce resistance to change among stakeholders if there exists sufficient evidence on the benefits that the change may bring about. A prime, albeit rare, example of this in the cases studied was that of the *Skola Project* (Germany), initiated by researchers who convinced the Länder authorities to undertake the initiative and select the necessary schools to participate. It was informed by relevant academic research and literature on the effects of self-regulated learning on education and on educational psychology. The role of academic research and academic evidence was crucial both in persuading the different stakeholders to participate in the innovation and in facilitating the design and implementation, as it provided the content for the design of the training programme as well as the necessary measures to be adopted for a smooth implementation that would minimise the resistance to change among stakeholders.

Research evidence of improved teaching or learning processes or of the provision of new services or organisational methods in VET can be considered an essential element that should inform the innovation process, but it can also play a role in driving the initiation of new innovations. The perceived need to bridge the gap of national research evidence largely drove two of the systemic innovations in the initiation phase: *Leading Houses* (Switzerland) and *Research and Statistics in VET-NCVET* (Australia). That the leaders of these innovations, mostly with ample experience and research backgrounds, were able to proactively bridge these perceived evidence gaps instead of simply viewing them as a handicap is a positive development of how a perceived weakness can become an enabler of innovation.

In a number of cases in the more well-established VET systems, the recognised dearth of codified formal knowledge has led to the conception of new knowledge for the purpose of developing innovations. This includes *Case Management* (Switzerland), *Innovation Circle* (Germany) and *Globalisation Council* (Denmark), in which new surveys, studies, or reports were commissioned specifically to gather evidence for the purposes of initiating the new innovation. These findings suggest that in tri-partite systems with well-established traditions there may be greater recognition of the importance of specific knowledge generation. The evidence suggests that it is not, however, exclusive to such systems, as can be seen in the *National Vocational Qualifications Framework* (Hungary), in which an analysis of tasks, skills, and competences for close to five hundred different skills and trades was undertaken. Though the process of generating this knowledge may not have been as organised as it could have been, the result was a new body of formalised professional knowledge.

Implementation

Oftentimes, it becomes clear during the implementation phase that some of the challenges experienced have at their foundation components that could have been better planned during the initiation or design phases. The following section will outline some of the characteristics of the implementation of systemic innovation and will include discussions on different paths that could affect hurdles and implementation gaps, paying attention to the role of stakeholders and knowledge in the process.

Role of stakeholders

Whom to involve and when to involve them in a systemic innovation are two of the most important elements of the process of systemic innovation. However, there are not always deliberate decisions taken in this vein, as some must be involved by default, and groups of stakeholders, such as

interest groups, may get involved in the process whether formally invited or not. As it is not always possible to plan ahead for such occurrences, the importance of clear objectives and guidance plans for stakeholders likely to be directly affected cannot be underestimated. Under this same heading of clarity of roles is the importance of the presence of a strong leader, often in government, to champion the systemic innovation and whose vision will be important to keeping momentum.

Essential to the smooth implementation of systemic innovation is a clear set of roles of the players involved, drawn up beforehand by the group or groups leading the design and development of the innovation. Clear guidelines can help the intended users of an innovation to understand and to effectively put the new features of the innovation into practice. For example, in the *Innovation Circle* (Germany), a key recommendation was the development of a communication plan as well as a specific methodology. Strategies to communicate new roles were part of the development of the innovation in other case studies and intended to encourage smooth implementation, though they were not always successful, such as in the cases of *NVQR* (Hungary) and *Case Management* (Switzerland).

As in the initiation phase, the importance during the implementation phase of assessing which stakeholders to involve along the way proves crucial. Although this is not always an active decision in practice, stakeholders who view themselves as highly affected by innovations, such as teachers, may demonstrate resistance if their views are not implicated in the design and development stages. This should not be confused with a more general resistance to the particular innovation, a possibility that may not be directly linked to the events of the initiation phase.

The empirical evidence suggests that oftentimes the decision of whom to involve can be based around practical issues, such as time and ease. In cases with particularly tight schedules for implementation, it appeared as though the key stakeholders most willing to co-operate, sometimes including those involved during the design phases, were solicited. Other times, priority seemed to be given in earlier phases to one group of stakeholders over another, such as labour market representatives over school representatives in the *NVQR* (Hungary). While this may be indicative of the inherent tension in VET between the education sector and the labour market, the empirical evidence suggests it is important to weigh such decisions extremely carefully.

Other cases suggested that even when it was seen as undesirable to involve all stakeholders in the initiation and design phases, efforts could be made to build bridges among the different groups. For example, in *Step One Forward* (Hungary) stakeholders were not actively involved in the design of the innovation, but efforts were made to forge links among the various levels and groups involved. This case also provides examples of successful

links among different levels and stakeholder groups (at the national, regional, municipal and individual level) as well as interaction with at-risk target groups. There were also innovative attempts made to include diverse stakeholders through less traditional means, such as mentors. The bridges and connections established through these efforts seemed crucial in ensuring a smooth implementation process with opportunities for continuous feedback.

It is important to highlight the important roles of political leadership and funding in the implementation stage. These are of particular importance in bottom-up innovations, which may not have public sector support from the outset. In cases in which innovation is initiated by an actor outside of the public sector, public actors can play an important role in providing an enabling environment that allows these innovations to thrive by bringing stakeholders together, providing funding, or eliminating potential legislative barriers that could hinder the implementation of the innovation. This type of capacity is especially important when the innovation is destined for scaling up. The *Mayan Riviera* case (Mexico) provides an example of how government, at both Federal and State level, can capitalise on an initiative started in the private sector and the crucial role public authorities play when an initiative is intended for replication in other sectors of the economy or geographical areas.

When reflecting on implementation, it is important to look at what factors can help to enable a smooth implementation of a systemic innovation. One type of inherent incentive for stakeholders and/or users to continue to co-operate in implementation may be the sense of ownership for those who have been involved or at least consulted in designing and developing a systemic innovation.

The presence of pre-existing extrinsic incentives may also be useful in smooth implementation. An example of this in the cases studied would be in the *NVQR* (Hungary), in which students had a pre-existing extrinsic incentive to utilise the qualifications framework, as it was the only one nationally recognised. When a systemic innovation features an incentive of this nature, it is likely to facilitate smooth implementation and take-up by users. Incentives of this nature are, by definition, pre-existing, but to recognise and use them when possible can prove advantageous.

Stakeholders and users may also perceive disincentives for implementation. The context of the system hosting an innovation can largely affect the take-up of the innovation by users and stakeholders affected by the innovation. In a relatively young system open to innovation, if stakeholders hold the view that a series of incremental innovations are continually arriving, they may experience innovation fatigue (*i.e.* the sentiment that it may not be worth the effort to participate in the implementation as another initiative will surely follow). Disincentives such as this must not be ignored and continual

"innovation for the sake of innovation" will usually not encourage participation and co-operation in implementation.

Use of the knowledge base

Overall, the empirical findings suggest that many of the top-down, far-reaching initiatives tended to be the most likely to systematically take the knowledge base into account in its different forms, though it is impossible to make this claim across the board. Notable examples of this include the *Globalisation Council* (Denmark) and the *Flexible Learning Framework* (Australia). While this finding on the whole is positive, it remains somewhat surprising that there was not further empirical evidence regarding the central role of the knowledge base in systemic innovations in VET. Tacit knowledge was used throughout the implementation of nearly all of the systemic innovations, in the sense of know-how exchanged through discussions and consultations. This type of knowledge is valuable but can be difficult to capture and may pose a challenge for VET practitioners and researchers, as will be discussed in Chapter 6 on the knowledge base.

The nature of the existing knowledge base in a system, as well as whether the system has a long VET tradition, certainly holds part of the explanation. One of the farthest-reaching initiatives, the *Technological Baccalaureate* (Mexico) was implemented with comparatively minimal formal knowledge or research. However, as mentioned in the section on initiation, the Secretariat for Public Education and local academics surveyed international curricula and norms for different professions during the innovation's design, and this helped to make the implementation process smoother. Though the use of knowledge was not extensive, it was well targeted and served the innovation in this relatively young VET system well.

How to ensure an adequate and sufficient flow of information between different groups of stakeholders during the implementation of systemic innovation is also of interest. Stakeholders affected along with current and potential users of an innovation can prove a valuable source of information. Stakeholders may be approached for their knowledge, blurring the lines between the two axes analysed throughout this study. Such actors may have a great deal of knowledge, specifically tacit knowledge, to share, and can be some of the best sources of expertise relating to implementation of systemic innovation. A good example is the case is the *Flexible Learning Framework* (Australia). During the implementation, there was extensive use of tacit and informal knowledge of stakeholders at all levels. This included the use of reviewers from industry, students, trainers and teachers, as well as multimedia program developers. Often, a systemic innovation in which the stakeholders with knowledge to contribute have been approached for their knowledge

can experience a smoother implementation process, perhaps more so than when formally implicated in the decision-making process.

Some cases were almost entirely based on such semi-formal knowledge sources, such as the *National Vocational Qualifications Register* (Hungary), which featured minimal inclusion of formal knowledge sources. However, care should be taken not to include only semi-formal knowledge from a large number of one group of stakeholders (in this case, more than 9 000 labour market "experts"), as it becomes unclear both to what extent such vast amounts of semi-formal knowledge could be used and why other affected stakeholder groups, such as teachers, were not consulted in depth when another group of stakeholders provided such vast feedback.

Capacity building, or the sharing of relevant knowledge with the stakeholders involved in the implementation of systemic innovations, is crucial to smooth implementation. The empirical evidence suggests that this support is especially important in the cases in which there was a more limited involvement of stakeholders in the earlier stages. For example, in the *Technological Baccalaureate* case (Mexico), teachers, who were contacted but not fully implicated in the design phases of the reform, had trouble understanding the objectives of the far-reaching reform as well as how to implement them, due to a capacity-building initiative that was insufficiently comprehensive. Similarly, before the implementation of the *NVQR* and *Step One Forward* (Hungary), efforts were made to train the teachers and mentors, but this undertaking proved neither adequate nor timely. These illustrate a need for more careful capacity building for the stakeholders involved in the implementation of innovations, and also suggest a challenge for the system. These cases also further raise the issue for systemic innovation of how, in a top-down system, capacity building of professionals in the field can be adequately developed.

The use of formalised knowledge and analysis on outcomes of previous systemic innovations reforms can facilitate the implementation process by providing more continuity between past and current changes of policy, especially when closely related. For example, in the *Globalisation Council* case (Denmark), more data on how the previous associated reform had functioned would have been useful for stakeholders in the implementation phase. There had been difficulties in the implementation phase of the previous reform as well; identifying these difficulties would have been important in learning from past experiences and putting users at ease. This illustrates the importance of monitoring and evaluation, which will be further discussed in the next section.

Monitoring and evaluation

Introduction

Monitoring the implementation and progress of any initiative is key to ensuring that the process is following the planned path, identifying any divergences between that path and reality, and, if necessary, defining any corrective measures. Systemic innovations are no exceptions, and their monitoring represents a crucial phase. Monitoring exercises allow not only assessment of the ongoing results of the innovations but also identification of implementation gaps and potential barriers that were not foreseen, thus providing the opportunity to define measures to overcome these barriers. The information gathered from these exercises is therefore crucial.

Evaluation is "an assessment, as systematic and objective as possible, of [an] ongoing or completed project, programme or policy, its design, implementation, and results. The aim is to determine the relevance and fulfilment of objectives, developmental efficiency, effectiveness, impact and sustainability. An evaluation should provide information that is credible and useful, enabling the incorporation of lessons learnt into the decision-making process." (OECD, 1998) As such, evaluation is a main phase of the innovation process, as it can help improve the innovation process and assess the achievement of the objectives intended with the introduction of the innovation. It is also intended, through the use of a feedback loop, to guide both the planning and the implementation of further innovations of a similar nature.

The evaluation of systemic innovations can be complex exercises, because in many instances these initiatives may bring about many different, and sometimes unexpected, results, depending on the degree of novelty of the adopted measure. Nevertheless, evaluations are necessary exercises that can be carried out at different periods of time with different objectives. *Ex ante* evaluations identify the potential benefits that the innovations could bring about before their actual implementation, and are fundamental to gathering information about the potential benefits and informing the process of making decisions. They are also instrumental in facilitating *ex post* evaluations, as they identify the potential final benefits that would need to be investigated in these *ex post* evaluations. Interim evaluations are usually undertaken at mid-term to review progress and propose alterations to project design during the remainder of the implementation. They are complementary to the monitoring exercises, and can be instrumental in analysing and assessing the process of implementations of the innovations and also warn of potential barriers that may need to be overcome. Finally, *ex post* evaluations are carried out after the innovation has been fully implemented, and focus mainly on assessing their impacts. In the case of systemic innovations, depending on the nature and scope of the changes

envisaged, their impact can be quite broad and may require a substantial time to accrue and become visible. The information gathered in these evaluations is crucial not only for assessing the success or failure of the innovation but also for feeding the innovation policy cycle. Due to this importance, sufficient resources should be available to ensure that evaluations are properly carried out and achieve their objectives.

Empirical evidence

Most of the innovations from our case studies had gone through a monitoring exercise. In some cases (*e.g.* the *Innovation Circle* [Germany]), no monitoring was foreseen due to the relatively short life of the project and its rapid dynamism, which did not allow for significant monitoring. This exercise would have delayed the project and would not have provided any meaningful recommendations for the correction of the implementation.

In general, the monitoring of the implementations was commissioned by the governments and carried out by independent research centres with the aim of ensuring the impartiality of the results. This was the case in Hungary, with the National Institute of Vocational Education and Adult Training; in Australia, with the Flexible Learning Advisory Board; and in Denmark, with the Danish Evaluation institute. Moreover, the inclusion and interview of stakeholders during the monitoring exercises was common, providing relevant stakeholders with the opportunity to be actively involved in projects throughout the process.

The results of the monitoring were generally considered and in many cases determined whether funding of the initiative would continue, as in the case of the *VPET Case Management* (Switzerland). To ensure that the results of monitoring are properly taken into account and fed into the implementation process, in many cases monitoring committees composed of different stakeholders were created. In particular, *Leading Houses* (Switzerland), *VPET Case Management* (Switzerland), *Step One Forward* (Hungary) created Research Steering Committees; this can be regarded as good practice. These committees ensure that proper and timely monitoring is in place and that the results of these exercises are fed back into the initiatives. In some other cases, external and internal monitoring groups were developed *ad hoc*.

In terms of evaluation, however, the situation is less rosy. Neither *ex ante* nor interim evaluations were foreseen or implemented in most cases. As mentioned in the introduction, the knowledge generated through these exercises could be valuable in informing the overall process from the beginning of implementation. Furthermore, these evaluations could provide a framework for a closer engagement of the concerned stakeholders from the beginning to the end of the innovation.

Box 5.2. **Monitoring and evaluation of the Australian Flexible Learning Framework**

The Australian Flexible Learning Framework aims to develop a national e-learning infrastructure and delivery for VET. In doing so, it aims to maximise national connectivity between all participants in the VET sector, develop greater choice and flexibility in both the range of training and models of delivery available, and increase cost effectiveness by developing a united strategy.

The Framework, which began officially in 2000, is a collective agreement on priorities supported by contributions from each state and territory. The first phase of the Framework ran from 2000-04, and focused on investing in capacity-building and raising awareness of e-learning in VET. The second phase ran from 2005-07, and in addition to capacity building it also engaged in client engagement, including industry.

For monitoring and evaluating the outcomes of its various activities, the Framework has a complicated and relatively intense design, which is overseen by an advisory board composed of the National Centre for Vocational Education and Research (NCVER) as well as academic researchers. More precisely, in terms of monitoring, internal and external reviews of operations and impacts are regularly carried out, and a yearly business plan is produced. Moreover, it is required to provide twice-yearly progress reports on both the business plan and the activities of the framework.

The main evaluation initiatives include:

- An annual benchmarking survey (in 2005, 2006, and 2007) on the uptake and use of e-learning by VET providers, teachers and trainers, students, and employers (for this survey, every two years). The 2007 survey showed that the use of technology in VET quadrupled in the three years since the first (2005) survey, and now comprises 29% of VET activity, broadly defined. The survey also provides information on how technology is used by teachers and trainers, how it is perceived by students and employers, and allows for comparisons by state and territory.
- An impact statement that uses the results of the Benchmarking surveys along with qualitative data on impact and snapshots of practice, as well as an analysis of financial benefits.

Future commissioned research will look at the impact of champions, the spread of e-learning, e-learning and employability, the role of e-learning in basic skill formation, and the provision of advice on copyright issues.

In addition, most of the cases had not followed a formal *ex post* evaluation at the time of the visit; however, in most cases such an evaluation was foreseen and scheduled. Most of the innovations are ongoing or have been recently concluded, and therefore *ex post* evaluations to assess all the impacts are difficult. As a result, as will be presented in Chapter 6, this information has not been made available yet for further policy design in most cases.

However, a couple of the analysed innovations had already gone through an evaluation process. In Switzerland, the Reform of the Basic Commercial Training, an innovation that began in the late 1990s, went through a cost-benefit analysis in 2004 that proved that the benefits of the reform in terms of better-qualified students outweighed the costs. Evaluations between 2004 and 2007 were also carried out. These evaluations dealt with three central fields, namely the acceptance, feasibility, and effectiveness of the individual innovation and processes that formed the backbone of this reform. All relevant stakeholders, including those responsible for VET in firms, vocational schools, and apprentices agreed that the new basic commercial training programmes prepared apprentices adequately for their future professional lives.

In addition, the Australian Flexible Learning Programme, which began in the year 2000, also followed a formal *ex post* evaluation exercise. This exercise is described in Box 5.2.

This example illustrates the wealth of information and knowledge that can be generated in evaluation exercises. This type of information can be used not only for accountability purposes but also for engaging more stakeholders, facilitating the dissemination of a successful experience to other geographical areas, and improving policy learning. This exercise provides valuable knowledge for the future formulation of activities.

Other informative evaluations could also expand the current focus on impacts, and expand it to analyse successful processes that could inform future systemic innovations.

Piloting and scaling up

Introduction

Systemic innovations in VET are those that bring about change across either the whole VET system or a substantial part of it. As presented earlier in this chapter, these innovations can be either planned and centrally directed, following a top-down approach, or emerge from specific institutional or geographical parts of the system (*e.g.* schools, municipalities, and regions) and then spread across the system.

In the first case, top-down initiated and implemented innovations, the leading actor, often the government, may first desire to test the initiative in small pilot projects to observe the expected and unexpected effects of the proposed changes in a limited controlled area. In addition, these pilots can serve to identify the contextual factors that may act as catalysts or barriers for these innovations. Based on the results of these pilots, a widespread implementation may then be decided. Equally, discrete innovations may accrue in a particular setting without initially intending to cover the whole system. However, after observing the potential benefits that these innovations may generate, the extrapolation of these initiatives to other areas of the system may be explored. This extrapolation could be done to other geographical contexts, other economic sectors, and other institutional settings, depending on the specific innovation.

The scaling up of pilot projects and of particular initiatives to the overall system is always a complex process, and may reveal further difficulties in the implementation or replication of the initiatives. These may be highly context-specific, and their pre-conditions of success may be difficult to recreate in other contexts. This section analyses the empirical practices that have been placed in the analysed case studies of this project.

Empirical evidence

The empirical analysis of this project has revealed that most systemic innovations in our study tend to follow a top-down approach. According to our evidence, centrally steered and planned innovations seem to be more numerous when system-wide impacts are intended. There may be many reasons for this. The identification of an overall perceived need in the system may be easier at a central level, as the focus of governments' study and activity may be better suited for this type of innovation. Moreover, systemic innovations tend to involve a large number of stakeholders at many different institutional levels, and therefore centrally located organisations (mainly governments) may be more capable of reaching and coordinating with these stakeholders. Also, in many cases, the systems may not count on the necessary conditions to identify and disseminate bottom-up individual innovations across the system.

In any case, this finding should be handled with care, as our research focused only on a limited number of cases, and therefore it would not be possible to draw a definitive conclusion. In the context of the case studies analysed in this project, only one project showed the potential of geographically localised initiatives being scaled up to other areas of the VET system. *Mayan Riviera* (Mexico) illustrates the potential benefits and specific challenges to scale-up a local initiative. Box 5.3 below describes the case and scaling up process in more detail.

Box 5.3. **Scaling up the Mayan Riviera Initiative to the VET system**

The Mayan Riviera is one of the most important touristic destinations in Mexico. The region has undergone a dramatic transformation in the last decade or so, with the birth of numerous all-inclusive resorts and boutique hotels a testament to its flourishing tourist industry and thriving economic growth. Projections made by the Association of the Hospitality Sector in the region show that the sector is estimated to grow from 35 000 rooms in 2007 to 80 000 rooms in 2020. This increase puts a great deal of pressure on VET suppliers to provide the necessary training that this growing demand requires, both in terms of quantity and quality.

To satisfy this growing and more qualified labour demand, VET suppliers in the Mayan Riviera are aligning its training courses to the needs of the employers, becoming more responsive to industry needs. More precisely, after consulting local employers, the training centres in the region are changing the educational curricula pedagogy, providing new training, expanding the location and course schedules to adapt to the industry and employees' needs, and upskilling the trainers.

This initiative, which emerged from the dialogue between the local employers and the VET suppliers under the guidance and support of the Federal and State governments, is currently geographically circumscribed to the Mayan Riviera. However, a wider project has now been put in place due to the relative success of the initiative. It aims to replicate this experience in other touristic regions and in other economic sectors, such as automotive, with high growth potential.

To do so, an impact evaluation on the Maya Riviera project is underway. This evaluation will probably inform decisions as to whether to continue investing in training reforms of this kind. In addition to this project, other types of evaluations identifying not only the outcomes of the innovations but also the processes would provide valuable insights on lessons learnt about specific factors for success and for the transferability of the initiative to different contexts.

Mayan Riviera (Mexico) shows the importance of identifying the key elements that make an innovation successful and can help to identify and assess the potential of its scalability to other areas and sectors of the system. Although the scaling up of the initiative is still in progress, the role of evaluations for knowledge gathering about the outcomes and the process of the initiative were already highlighted. More precisely, in terms of potential scalability of the initiative, the role of context specific factors, such as the role of the employers or the favourable economic context, were identified as necessary for the success of the initiative. Moreover, the case also depicted the importance of counting on political support, guidance, and leadership to overcome potential barriers in the scaling up, such as the identification of appropriate industry counterparts and establishing necessary institutional arrangements between federal and state authorities.

In addition to bottom-up innovation, understanding and learning from the scaling up of pilot projects is also crucial. In our empirical study, many of the innovations analysed did not experience pilot testing or ulterior scaling up. On the contrary, they were directly applied system-wide.

There are different reasons why pilots were not used in many of the analysed cases. In general, piloting has a cost in terms of time and resources. Pilots require resources for their design and implementation, as a sample needs to be selected and its specific characteristics analysed in order to evaluate the results of the applied initiative. The process also requires time to be fully designed, implemented, and evaluated, and this represents a delay in the implementation of the initiative system-wide. These costs need to be compared and contrasted with the expected benefits accruing from these pilots. Many of the innovations reviewed in this project were incremental (see Chapter 7), and not aimed at achieving a radical alteration of the system. For most of these cases, the need for piloting was deemed unnecessary, especially

Box 5.4. **The reform of Basic Commercial Training – Switzerland**

Basic commercial training is a vocational pathway that annually prepares 30 000 young people to enter the job market in trade – and commerce-related occupations. In the late 1990s, the decision to reform basic commercial training came from the notion that firms perceived previous teaching methods to be too scholastic, and that students were not being trained according to their professional needs. As a result, a new basic commercial training programme was introduced aimed at allowing apprentices to understand the complexity of working processes in firms and to develop those skills necessary for future lifelong learning.

The implementation of the reform was carried out according to a simultaneous engineering process. This meant that new training provisions were simultaneously developed and tested as part of a broad-based, scientifically monitored pilot trial involving two cohorts. Participants included 12 of the 26 cantons, 16 vocational schools, and 15 different commerce sectors. Overall, approximately 2 000 people took part in the pilot, including apprentices. In 1998, as part of the test pilot, the first cohort, consisting of around 150 apprentices and their training firms, embarked on the new basic commercial training. A second cohort, comprising 750 apprentices in 400 companies, adopted the new training in 1999.

During these pilots, a number of implementation difficulties were revealed. The need to train and re-train thousands of trainers to adapt to the changes of the new programme was one of them. To resolve these difficulties, a task force including representatives for the Swiss Federation, the cantons, professionals' organizations, and a number of common interest group was created.

As the difficulties were progressively resolved, the full implementation of the programme took place, and since the summer of 2003 all first-year commercial courses throughout the country adopted the programme.

when compared with the projected associated cost and time. In other cases, the innovation itself could be regarded as a pilot (*e.g.* the *Innovation Circle* [Germany]), and therefore there was no need for piloting. In other cases, where substantial changes were expected to accrue, the urge to introduce the innovation immediately precluded the running of pilots. In these cases, however, some problems during the overall implementation arose, and this delayed the final process and took a toll on the final success of the innovation.

In the cases in which innovations were initially piloted before being implemented system-wide, the process revealed the importance of evaluating and understanding the specific characteristics of the environment where the pilot was tested. Box 5.4 introduces the example of the Reform of Basic Commercial Training in Switzerland, in which an interactive piloting system was used before introducing the reform in the whole system.

This example illustrates the importance of pilots in identifying barriers in the implementation of the innovation and designing alternative solutions. It also shows the importance of selecting similar groups to the population for the pilots or the need to take similarity into account when scaling the pilot to the overall system. In other words, it is necessary to bear in mind the specific characteristics of the pilots and to adapt the details of the implementations to the particular characteristics of other groups, or of the system, more broadly.

Conclusions and policy implications

This final section attempts to summarise some of the main empirical findings on the process of systemic innovation in VET systems – not a simple task given the complexity and interconnectedness of the themes explored. The section concludes with policy implications for systemic innovation derived from the analysis above.

Conclusions

The analysis of the process of systemic innovation reveals a number of issues regarding the role of stakeholders and the way that knowledge feeds into the stages of the process. Most of the systemic innovations in this study were initiated by governments from the top down. However, the way that in which initiators brought in other stakeholders during the design and development of the innovation varied largely, depending on the system and context. Some of the innovations from systems with a strong culture of consensus struggled to find the right balance between fully implicating all stakeholders and getting stuck at the lowest common denominator. The way that the knowledge base was used in the initiation stage varied widely. Explicit knowledge was not always taken into account, and in most cases it was observed that an urgent need for change and solutions to pressing problems, along with tacit knowledge, prompted the innovations.

A smooth implementation phase was often largely dependent on the clarity and foresight of the planning from the initiation phase. Stakeholders who had been invited to become actively involved tended to be more co-operative than those who had been involved in a more passive manner. Political leadership, adequate funding, and incentives proved instrumental in helping to facilitate smooth implementation of systemic innovations. The way that knowledge was used in the implementation also varied, with the farthest-reaching initiatives generally drawing the most on the knowledge base, depending on the nature of a given system. Communicating knowledge to stakeholders and users in the form of capacity-building proved crucial to smooth implementation and to avoiding implementation gaps.

Moreover, the current analysis of the monitoring and evaluation processes has revealed a number of important lessons for the analysis of systemic innovation. At present, *ex ante* and interim evaluations are still rather scarce, and seem to exist outside the policy process in the most innovative initiatives throughout most VET systems. In many cases, urgency for change and the novelty of a given approach may have precluded the use of these exercises. As a result, the valuable information that these exercises could deliver is missing. On the contrary, monitoring and *ex post* evaluations are normally planned and accepted as integral parts of the innovative process.

The empirical evidence also suggests that the importance and role of these exercises may depend on the importance and objectives of the innovations themselves. When the innovation does not seek deep or long-lasting effects in the VET system, the role of evaluation may be less in-depth in order to maintain a principle of proportionality. However, when the intended innovation seeks large-scale impact, these exercises become even more important for two reasons: first, because monitoring the actions undertaken and assessing whether those actions are achieving the intended goal is important; and second, exercises provide valuable information to all relevant stakeholders, whose commitment is crucial at all stages of the innovation, from the decision-making to the design and implementation. Both *ex ante* and interim evaluations also become more important for the same reasons, and the knowledge generated that spurs beyond the particular innovation could spill over to other systemic innovations.

The knowledge generated in the monitoring and evaluation exercises must feed back into the system to keep the learning process going and to capitalise from previous experiences.[7] Mechanisms that ensure this policy learning are crucial, and time as well as both financial and human resources need to be assured for this purpose. At present, these mechanisms are not always properly defined in some VET systems.

As previously mentioned, the analysed empirical evidence, showing very few cases of bottom-up initiated systemic initiatives, suggests that the existing

VET systems may have difficulties identifying and scaling up discrete innovations. It is not always easy to identify the barriers that may prevent this process from happening, but more specific research could shed brighter light on it. However, a number of potential factors, such as the lack of dedicated institutions analysing systemic innovations, the unavailability of specific resources to test and experiment initiatives, lack of political attention to these initiatives, and the complexity of the governance system hindering knowledge transfer and learning across different authorities may contribute to it.

The one case study that followed a more bottom-up approach suggests that potentially there are substantial benefits to be gained from scaling geographically localised innovations. However, identifying the successful factors of the local initiative and transferring them to other locations may not be easy or resource-free. Planning and developing interim evaluations, assessing the processes of the particular innovations – including the relationship between the different agents – and using knowledge are encouraged. The sharing of knowledge from these evaluations also seems to play a crucial role. Pilots fulfil a crucial role in those systemic innovations that seek to deeply affect the system. While they are costly in terms of time and resources, they have proved vital in avoiding implementation problems and innovation fatigue. Their use should be encouraged, and their design and sample selection should bear in mind the characteristics of the context to ensure their future scalability.

Policy implications

This section suggests a number of policy implications that could help improve the innovative process of different initiatives. Although it is difficult to provide generally applicable concrete policy recommendations due to the importance of the contextual factors surrounding VET systems, the following can be regarded as a checklist for policy consideration. This section will start by highlighting the importance of stakeholder involvement and the crucial role of knowledge in the different phases of the innovation process:

- Create trust and build bridges within and between sectors and main stakeholders through transparency and communication throughout the stages of the process of systemic innovation, taking into account the different expectations of the key actors and sectors.
- Collaboration: find the right balance between fully implicating all of the various stakeholders in the system, which can be difficult to manage, and settling for the lowest common denominator, which can result in risk avoidance.
- Consider the available knowledge and evidence base when designing an innovation, as this can serve to guide the initiation and implementation phases.

- Identify factors and incentives that could help facilitate the implementation of the specific innovation and avoid implementation gaps, keeping in mind the specificities of the particular regional or national context.
- Communicate knowledge to stakeholders/users through capacity building, which is crucial to smooth implementation.
- Determine additional policy implications to ensure that both monitoring and evaluation enhance the design and implementation of future systemic innovations, to wit:
- Evaluations should gather enough information to assess the degree to which innovations are achieving the intended goals, and be capable of feeding this knowledge into the policy process for the design of future innovations.
- *Ex ante* evaluations, whenever possible, should be fostered during the design of any systemic innovation and before beginning its implementation. These *ex ante* evaluations could serve as a baseline to guide monitoring and final evaluation of the objectives achieved, as clear, measurable objectives and targets could be defined.
- Monitoring should be an integral part of the innovation process and should be carried out at different moments of the implementation phase. The results of this process should be fed into the continued implementation of the innovation.
- Interim evaluations can and should be encouraged not only to learn about possible barriers during the implementation but also to gain knowledge about the processes in place to assure a smooth implementation and successful outcomes.
- Independent research centres for the monitoring and evaluation exercises should be used to ensure the impartiality and independence of the exercise. Moreover, a relevant range of stakeholders should be consulted to gain different insights, maintain a fair vision, and increase commitment and information about the innovation.
- The necessary time and resources for proper monitoring and evaluation exercises should be foreseen prior to the implementation of the innovation. This may not be equally applicable for bottom-up or spontaneous innovations, as they may be less conducive to a formal planning exercise.
- It is necessary to create and develop the necessary mechanisms/institutions that ensure the knowledge generated in the evaluation of specific systemic innovations is fed back into the system to assure policy-learning.

- Finally, in order to improve the introduction and use of pilots and render the process of scaling up discrete initiatives more efficient, additional policy implications can be suggested:
- Piloting of innovations is advisable in any systemic innovation, particularly those aiming to introduce radical changes into the system. Time and resources will be required.
- Carry out further research to understand the reasons for the lack of bottom-up innovations being scaled up, and to explore new avenues of collaboration.
- Devote human and financial resources to identifying and evaluating bottom-up innovation with the potential to be scaled up.
- Support better bottom-up innovations and create islands of experimentation and innovation.
- Create bridges over the different governance structures to facilitate communication and knowledge-sharing, enabling the diffusion of bottom-up initiatives.

Key messages

In developing an innovation, concerted efforts to find the right balance between fully implicating all stakeholders, which can be difficult to manage, and settling for the lowest common denominator, which can result in risk avoidance, are crucial.

Stakeholders invited to be actively involved early on in an innovation tend to be more cooperative and have greater sentiments of ownership throughout the process than those involved in a more passive manner or at later stages.

Communicating knowledge to stakeholders and users through capacity building is crucial to smooth implementation and avoiding implementation gaps.

Monitoring the implementation of the innovation is important to identify implementation gaps and design actions that overcome barriers to successful implementations.

Evaluating systemic innovation can be difficult as systemic innovations may aim at achieving a wide range of objectives that may be difficult to trace back to specific policies or activities. Nevertheless, evaluations are crucial not only to identify the results of the innovation but also to generate key knowledge to feed back the policy process and the identification of future innovation needs.

The use of pilots should be encouraged in order to identify potential implementation problems in large-scale deep impact innovations. However, many of the innovations analysed in the case studies did not experience a proper process of pilot testing and scaling up, and they were directly applied system-wide.

Notes

1. For more information, see the introduction to this study in Chapter 1.
2. For a more detailed discussion on the development of a model of innovation in education conceived for this study, see the final section of Chapter 3.
3. For a more in-depth discussion of conceptualizing the different forms of knowledge use in the context of systemic innovation in VET, see Chapter 6.
4. Loosely based on the research carried out by Von Hippel and others, the notion is that lead users have needs for innovations ahead of the general market, and play an important role in the innovation-decision process. A lead user develops an innovation and convinces a manufacturing company to produce and sell the innovation, after the lead user has created a prototype of the new product (Von Hippel *et al*., 1999).
5. For a more in-depth discussion on innovation in education and innovation in vocational education and training, see the literature review in Chapter 3.
6. For a fuller discussion of these, see Chapter 4 on drivers of innovation.
7. Please see Chapter 6 for further information on this aspect.

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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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Chapter 7

Towards a Typology of Systemic Innovation in VET

This chapter presents a new typology framework that aims to capture aspects of the process as well as the substance of systemic innovations in VET. The aim of this exercise was twofold: (i) *to map the case studies along certain important dimensions; and* (ii) *to serve as an analytical tool in the future for exploring some of the issues related to the processes and dynamics of systemic innovation. Three dimensions were considered important in the development of a holistic typology of systemic innovations: process, output, and contextual framework, each consisting of several variables. Using these three dimensions, as well as drawing on insights developed in the course of this study, a number of hypotheses are put forward regarding the possible types of systemic innovation in VET. In this context these are proposed merely as hypothetical types, and would need to be validated through empirical data in further research. Finally, the annex to the chapter presents a mapping of the fourteen cases studies along the variables of the typology frameworks.*

Introduction

This chapter explores issues around the development of a typology of systemic innovation in VET. The aim of this exercise was twofold: *(i)* descriptively, to help map the case studies; and *(ii)* analytically, to contribute to the generation of hypotheses regarding the initiation, development, and implementation of innovation initiatives in VET.

Chapter 2 discusses in some detail several typologies for innovation that have been proposed in the literature; these tend to focus on the following three dimensions:

- Area in which the innovation is applied or type of output
- Level of the innovation
- Impact produced

It is clear from this overview of the literature that the typologies proposed so far have largely focused on the substance rather than the processes or dynamics of innovation. In addition, the focus is on innovation rather than systemic innovation in the way it is defined and examined in the context of this study. As such, although some of the existing material available was useful for the purposes of this study, it also became clear that a new typology framework was necessary if process dimensions – the main analytical focus of the study – were also to be included. The work presented in this chapter tries to address this gap by bringing together elements of different typologies to arrive at a more comprehensive framework, capable of capturing aspects of both process and substance in systemic innovation.

The proposed framework for classifying the case studies used in this project consists of three dimensions: *(i)* output/level of innovation; *(ii)* process of innovation; and *(iii)* contextual factors. These three dimensions and their constituent variables are discussed in the main part of this chapter; Annex 7.A1 at the end of this chapter presents a tentative classification of the cases in terms of output/level and process as an illustration of how the typology can be applied to real cases of innovation.

A typology framework for systemic innovation in VET

Drawing to some extent on the existing literature, but also on insights and knowledge developed in the course of the present study, three dimensions were considered important in the development of a holistic typology of systemic innovations: *process*, *output* and *contextual framework*. Process is of course the focus of this study, so its inclusion in a typology framework for the case studies was considered essential. In addition, as pointed out

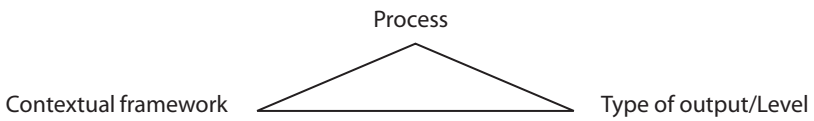
above, the lack of focus on process was a gap identified in the existing literature on innovation types. However, examining process in isolation was not meaningful. Firstly, the type of output may well have an impact on the process adopted (see below). Furthermore, it was considered useful to try to incorporate existing typologies on innovation outputs to make the proposed framework as comprehensive as possible. Both processes and outputs are, however, situated within and influenced by a host of contextual factors, such as the characteristics of a particular VET system or the governance structure of a country or region. A three-dimensional approach was therefore adopted to capture these additional elements.

Although it is assumed that these three dimensions are inter-related and interact with one another, at this stage no detailed description is provided of the way these relationships operate in practice, for two reasons: *(i)* this strand of work is still at an early stage in its development and needs to be further refined and tested in future research; *(ii)* the empirical evidence available as a result of the present study of systemic innovation is rather limited. No specific claims are therefore made here regarding the specific ways these three dimensions influence one another, and this question remains open for further investigation. For example, one possible hypothesis that could be explored in future research is that type of output and contextual framework act as explanatory variables for the types of process. In other words, it would be interesting to explore to what extent particular characteristics of processes (*e.g.* top-down innovations involving few stakeholders) tend to be associated with particular types of innovation, such as the introduction of a new curriculum, and particular contexts (*e.g.* countries with long-established, dual VET systems).

The three dimensions of the framework can be visualised as the triangle in Figure 7.1.

Each of these three dimensions consists of several variables, which are discussed in more detail in what follows.

Figure 7.1. **Dimensions of typology framework**



Output and level

This dimension refers to the output of the innovation. In operationalising this dimension, the existing literature on typologies was used extensively, as previously discussed. Specifically, two variables that seemed particularly pertinent in the context of educational innovations were focused on: *i*) the type of output the initiative sought, whether a new service or product, a new organisational method or a new marketing method; and *ii*) whether the innovation was radical or incremental.

As this aspect of the typology draws on existing work, existing definitions of the variables were used, drawing on the Oslo manual and the 2003 United Kingdom Strategy Unit paper, as outlined in Chapter 3; they are provided again here for ease of reference. The Oslo manual typology was developed with the business sector in mind, and so some of the terminology used does not apply directly to the VET or education sector (*e.g.* firms or packaging); however, it can still be meaningful in the context of this study. For example, new packaging could refer to new ways of presenting or communicating information. An equivalent to a business firm could be a training provider or a research organisation.

The first three variables refer to output types, the last two to the level of innovation:

- *New product/service*: The introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses (OECD and Eurostat, 2005).
- *New organisational method*: A new method of organising the firm's business practices, workplace organisation, or external relations. New organisational methods deal mainly with people and the organisation of work (OECD and Eurostat, 2005).
- *New marketing method*: A new marketing method involving significant changes in product design or packaging, product placement, product promotion, or pricing. It aims better to meet customer needs, open up new markets, or newly position a firm's product on the market (OECD and Eurostat, 2005).
- *Incremental*: Minor innovations to existing services, processes, or methods. On their own, they rarely change how organisations are structured or the relationships and dynamics within or between organisations. However, they form the majority of innovations and are essential to an organisation's pursuit of improvement (Mulgan and Albury, 2003).
- *Radical:* Innovations that involve new services or fundamentally new ways of organising or delivering a service (Mulgan and Albury, 2003).

Annex 7.A1 at the end of this chapter presents a mapping of the case studies according to the above variables.

Process

This second dimension refers to the process of innovation, and the variables identified below stem directly from the model of innovation in VET (see Chapter 3):

- *Top-down/bottom-up*: Refers normally to the initiation of the process of innovation. Examples of systemic innovations developed in a top-down fashion would include those developed by government or employer organisations. Bottom-up innovations in VET would include those developed by teachers, schools, or regional authorities.
- *Range and types of stakeholders involved*: The importance of the roles of different stakeholders within the process of innovation is discussed in Chapter 5. Important stakeholders may vary depending on the nature as well as the stage of any particular case (*e.g.* policy makers may not be important at the implementation stage of a classroom-level innovation). To operationalise this variable for the purposes of this typology, it was decided to define a core set of stakeholders and classify the cases according to whether this core set was consulted and involved in decision-making in the development and implementation phases of the initiative. Although this criterion may appear strict, it was considered necessary to proceed in this way to capture the variance found in the case studies given the rather small sample. Based on knowledge gained through the analysis of the case studies, the following groups of stakeholders were considered central in the VET sector, and therefore constitute the core set for the purposes of this typology: government (federal, regional, or local), social partners, trade unions, school leaders, and/or teachers.
- *Types of knowledge used*. This includes the following categories of knowledge:
    1. Academic or research, *i.e.* formal knowledge produced by academic researchers within universities or independent research institutes and disseminated through standard academic channels, such as peer-reviewed publications;
    2. Professional and/or practitioner knowledge, *i.e.* knowledge developed and shared by professionals or practitioners in the VET field, such as policy makers or teachers. This knowledge would typically be disseminated through policy papers or in practitioner journals;

3. Administrative data and statistics. Many countries, regions, or local authorities routinely collect information on enrolments, drop-out rates, qualifications completed, etc., and these data are sometimes used by external researchers or policy makers, for example when planning or evaluating initiatives. Some of our case studies draw on administrative data both at the initiation and evaluation stages;

4. Tacit knowledge. All three types of knowledge described above can be defined as explicit, *i.e.* formal, codified knowledge that is also often documented and that the learner is conscious of. 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 (see, for example, Polanyi, 1967).

- *Monitoring/evaluation*: Refers to whether a monitoring and/or evaluation process was planned or carried out. Although such processes can be of different types and their findings used in different ways, it was decided that for the purposes of the typology we only identify whether they were present or not in order to keep the framework as simple as possible. However, the analysis in subsequent chapters also focuses on the different types of monitoring and evaluation, as well as the extent to which findings and results were fed back into the process.

Contextual framework

In addition to examining the case studies themselves, a variety of factors external to the cases also need to be taken into account to form hypotheses regarding different aspects of the innovation process, such as the involvement of stakeholders or the way innovation is initiated or implemented. A process that may work in one country or region may not be as successful when implemented in another, and this may be due to factors such as the country's governance structure (for more on policy borrowing, see Phillips and Ochs, 2003; 2004).

It has been decided to call this group of variables the contextual framework, and ways in which they have been included in the analysis are discussed below.

The existing innovation literature could be used less when drawing the list of contextual factors, as it appears that this is the first time that a typology of educational or VET systemic innovations is being proposed. The members of the research team have instead drawn on their general knowledge of the VET sector, as well as on more specific information gained as a result

of the analytical work carried out in the context of the country visits. The list of contextual factors provided below may not be exhaustive; however, a balance had to be struck between being comprehensive and avoiding the inclusion of too many variables for the model to have any explanatory power. The contextual framework variables and their definitions used in the analysis are presented below:

- *Dual or non-dual VET system:* A dual VET system is one in which trainees receive part of their training while on the job in paid apprenticeships. Educational institutions, such as further education colleges, provide the rest of the training. Generally speaking, dual VET systems tend to have a longer tradition and enjoy a higher prestige than non-dual ones.
- *Importance of the VET system in the country*: VET systems are classified in terms of high or low importance, based on the proportion of the student population choosing a vocational path.
- *Governance system:* Refers to the governance structure of the country as a whole. Countries are distinguished depending on whether they have a federal or a non-federal system.
- *Existence of a consensus-building culture among relevant stakeholders:* Refers to the level of commitment to consultation and shared decision-making that exists among relevant stakeholders, such as government officials, social partners, and trade unions. Although a difficult concept to define and measure accurately, this commitment to consensus varies from one country and/or region to the other, and can easily affect the innovation process.
- *Level of commitment to innovation (innovation culture) within VET or education*. Evidence for this could be, for example, financial commitment to innovative approaches or the existence of specific units, departments, or institutes devoted to the study and implementation of innovative initiatives. However, the existence of the above could equally signal a lack of innovation capacity and an attempt to counter this, so one needs to be careful when referring to innovation culture as to whether it signifies either existing capacity or a commitment to encouraging or increasing innovation.

As stated earlier, many other contextual variables could be potentially relevant when examining the success or lack thereof of specific initiatives. These variables include a country or region's geography, demographic or economic characteristics, funding mechanisms available, and the existence of an accountability culture. The ones listed in bullet points above are those that were considered the most salient during the course of this study, particularly given the rather limited amount of empirical data gathered. In fact, mainly

due to this shortage of data, it was decided not to attempt a formal classification of countries or regions according to contextual factors similar to the ones presented above with regard to the first two dimensions (see Tables 7.A1.1 and 7.A1.2. in Annex 7.A1). It was judged that such an attempt would have been hasty and unwise, due to both the small number of countries involved in the study and the fact that the main focus of the data collection was on the cases themselves rather than on their contexts. Instead, the importance of these factors in the process of innovation is pointed out, and the factors are included in the analysis when necessary. Developing a more comprehensive typology framework that takes into account contextual variables in a more systematic way is one area in which further research is required.

Towards a general typology framework

Using the variables described above for the three dimensions of output/level, process and context, as well as drawing on insights developed in the course of this study, a number of hypotheses may be put forward regarding the possible types of systemic innovation in VET. It is important to stress that at this stage these are proposed merely as hypothetical types, and would need to be validated through empirical data in further research. When possible, examples drawn from the case studies are used tentatively to illustrate particular types; however, given the limited number of the cases, there are several types that are not covered by the empirical evidence of this study. In addition, this is not an exhaustive list of possible types based on every possible combination of variables available. Instead, it is a selection that builds on knowledge developed during the course of the empirical phase of the study, and its use is intended to be exploratory rather than prescriptive.

Type I: This type would include initiatives that are radical rather than incremental, involve the development of a new product or service initiated in a top-down manner with the consultation of all or most stakeholders, draw on a wide range of knowledge sources, and include a formal monitoring and evaluation component. In other words, these are large-scale initiatives, often initiated by Governments, seeking to introduce a radically new product or service (*e.g.* a new curriculum). Due to their large scale and therefore possibly longer timeframes, these initiatives are more likely to involve all stakeholders, and make use of many available knowledge sources. An example of such an innovation from this study would be the *Flexible Learning Framework* (Australia).

Type II: This type would include radical, top-down innovations involving few groups of stakeholders, and drawing on little formal knowledge. This is therefore a rather authoritarian, non-inclusive model of innovation.

Type III: This type includes new organisational or marketing methods that may be radical or incremental, driven in a top-down way, involving a wide range of stakeholders, and drawing mostly or professional/practitioner knowledge, administrative data, and/or tacit knowledge. The *Globalisation Council* (Denmark) could be an example of such an innovation in this study.

Type IV: This type includes incremental, bottom-up driven innovations involving a small number of stakeholders and drawing on a limited amount of knowledge, most often professional/practitioner or tacit, and has no systematic monitoring or evaluation or scaling up.

Type V: This type includes radical or incremental, bottom-up driven innovations involving a large number of stakeholders, drawing on formal knowledge, such as academic literature and including a systematic evaluation component that often leads to a scale-up. The *Playa de Carmen* (Mexico) case study is an example of such an innovation.

A number of hypotheses could be developed and tested through empirical research regarding issues such as the chances of success of different types of innovation given particular contextual factors. For example, it would be interesting to investigate whether Type I and II innovations are more likely to take place and be successful in systems that are centralised in terms of governance, and in which a high level of commitment to innovation is indicated through the presence of specific funding streams and institutional structures for increasing innovative capacity. Similarly, decentralised systems may be more open to bottom-up innovations, although the extent to which such innovations are successfully evaluated and scaled up may depend on variables such as co-operation among stakeholders.

Conclusions and policy implications

This chapter presented a new typology that aims to capture aspects of the *process* as well as the substance of innovations in VET. As the process was the focus of this study and the existing literature did not provide any suitable models, it was considered essential to provide a first attempt at developing such a tool, both for the purposes of the current study and for future research. The framework as presented here has limitations, many of which were discussed at length in this chapter. One major shortcoming is the limited empirical base available for testing it more thoroughly. A larger and more diverse group of cases would have provided more evidence in support for or against it. Nevertheless, it is hoped that it serves as both a useful way of mapping the case studies along certain important dimensions and a useful analytical tool in the future for exploring some of the issues related to the processes and dynamics of systemic innovation along the lines outlined above.

Key messages

A new typology framework is presented that aims to capture aspects of the process as well as the substance of systemic innovations in VET.

The proposed typology consists of three inter-related dimensions: process, output and contextual framework. Each of these dimensions includes a number of different variables.

The variables that make up the process dimension stem directly from the model of systemic innovation described in Chapter 3. They are: bottom/up vs. top-down imitation, range and types of stakeholders involved, types of knowledge used and the presence or not of monitoring and evaluation.

A mapping of the 14 systemic innovation cases examined in this study following the typology framework is presented in the Annex of the chapter.

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Annex 7.A1

Typology of Case Studies

Table 7.A1.1 below presents the case studies by type of output, following the framework discussed in this chapter. An explanation of the abbreviations used to refer to the cases is given in Annex 7.A2.

Table 7.A1.1. **Classification of case studies by output and level of innovation**

Cases	New product/service		New organisational method		New marketing method	
	Radical	Incremental	Radical	Incremental	Radical	Incremental
AUS1		X				
AUS2		X				
AUS3						X
CH1		X				
CH2		X				
CH3		X				
DK1				X		
DK2						X
GER1				X		
GER2				X		
HUN1		X				
HUN2		X				
MEX1		X				
MEX2				X		

The majority of the case studies involved a new product or service, while a few involved new organisational or marketing methods. Although this is a small sample of cases, which may not even be representative of innovation

initiatives in the six participating countries or more widely within the OECD member states, it is interesting that there were not more initiatives within the new marketing method category, given that a widespread concern regarding VET among governments is its perceived lack of prestige and parity of esteem compared with more academic qualifications. In terms of the level of innovation, whether radical or incremental, the case studies are split almost equally. In addition, there does not seem to be a clear pattern in the way the two variables interact, as it does not appear that a particular type of innovation is more likely to be radical or incremental – although there are no radical new marketing method cases, the existence of only two marketing method cases makes it difficult to draw any reliable conclusions.

Table 7.A1.2 presents a classification of the case studies following the process framework discussed above.

It is clear from the table above that no salient pattern emerges with regard to the different variables or how they interact with one another, but given the limited number of cases available this may not be surprising. However, it is interesting that, with the exception of the top-down *vs*. bottom-up variable, there is a large variance in the configuration of cases with respect to the different categories. This could be an indication that the model is – at least partially – successful in capturing the different aspects of the innovation process, although in the future some of the variables may need further elaboration as well as more rigorous empirical testing through a larger and more varied sample of cases.

The vast majority of cases used in the study were initiated in a top-down manner, with only two examples of bottom-up innovations, the *Reform of Basic Commercial Training* (CH2) and the *Playa de Carmen* project (MEX2). Categorising a case as top-down or bottom-up is not always a straightforward process; in some cases the boundaries between the two are not clear, either due to lack of relevant information or because the roles of different stakeholders are not clearly defined. An example of such as a case was the *SKOLA* study (GER2); although this was a project developed by academic researchers and teachers and implemented in a small number of colleges in a few German *Länder*, it was initially driven through the availability of a regional funding scheme. It was therefore decided that in terms of initiation it was led by the regional government in a top-down manner, although a large part of it originated in and was led by local end-users such as college teachers.

The way cases were selected for this study may have also led to a rather biased over-representation of top-down initiatives, as the selection was done by government officials in participating countries who inevitably may not always be familiar with smaller-scale, bottom-up projects. In addition, systemic innovations are probably more likely to be top-down, given that their scope encompasses by definition multiple components of a system. However,

it is certain that such initiatives exist in the field of VET, as discussed in the review presented in Chapter 3, and one of the challenges in the field may be finding ways of addressing this fragmentation and ensuring that lessons learnt or findings from one project can be disseminated and/or scaled up.

Table 7.A1.2. **Classification of case studies by process**

Cases	Top-down or bottom-up	Involvement of core set of stakeholders during development and implementation	Type of knowledge used during initiation and development	Monitoring and/or evaluation
AUS1	TD	N	Academic/research	Y
AUS2	TD	Y	Professional/practitioner Administrative data/statistics	Y
AUS3	TD	N	Professional/practitioner Administrative data/statistics Tacit	N
CH1	TD	N	Administrative data/statistics Tacit	Y (planned)
CH2	BU	Y	Professional/practitioner	Y (embedded)
CH3	TD	N	Academic/research	Y (planned)
DK1	TD	Y	Academic/research Professional/practitioner Tacit	Y
DK2	TD	Y	Administrative data/statistics Tacit	Y
GER1	TD	Y	Professional/practitioner Administrative data/statistics	N
GER2	TD	N	Academic/research Professional/practitioner Tacit	N
HUN1	TD	Y	Professional/practitioner Administrative data/statistics	Y
HUN2	TD	Y	Professional/practitioner Administrative data/statistics Tacit	Y
MEX1	TD	N	Professional/practitioner Academic/research	N
MEX2	BU	Y	Administrative data/statistics	N

Although in most cases a core set of stakeholders was involved, there were still a few in which it was judged that this was not the case. Once more, the decision on how to classify each case was not simple and straightforward. Firstly, the stakeholders that could be considered essential may vary from case to case; for example, the importance of the role of VET students may vary depending on whether the case in question is a classroom-based intervention or the introduction of a new national curriculum. The set of stakeholders defined here as core was decided upon to provide a certain level of abstraction needed in the model. In addition, this is an area in which the contextual factors discussed above can be very important. Specifically, the extent to which decisions are a result of negotiation and based on a consensus among all stakeholder groups varies with a particular country or region's political and social context or history.

The 14 case studies vary widely in terms of the type, or combination of types, of knowledge used. In fact, this is the one variable for which there is the largest amount of variance among cases, signalling the knowledge base's important role in the process of innovation as well as its ability to draw on a variety of sources irrespective of other factors, such as the type of output or whether it is top-down or bottom-up. Issues and questions related to the use of the knowledge base in the process of systemic innovation are discussed in more detail in Chapter 6.

Although the majority of cases included a monitoring and/or evaluation component, a rather surprisingly large minority (three) did not. Further, there were instances of case studies in which the evaluation component, although present, was not of the highest standards – (see also Chapters 5 and 6). As many of the cases studied had not been completed at the time of the study visits, those with a planned evaluation component were also taken into account, although it is difficult to judge how successfully such evaluations may be carried out. Once more, an adequate monitoring and evaluation process needs to fit the aims and characteristics of the innovation at hand, and also to ensure that any results are fed back into the process and thereby inform a potential scale-up or other future initiative. In other words, having an evaluation component in place is not in itself sufficient, but it is a necessary condition for the process of innovation; the model above attempted to reflect this. The use of monitoring and evaluation is discussed further in Chapter 5.

Annex 7.A2

Abbreviations for Case Studies

GER1	Innovation Circle
GER2	SKOLA
DK1	Globalisation Council
DK2	Reduction of number of school-based places
AUS1	NCVER
AUS2	Flexible learning framework
AUS3	Raising the status of VET
HUN1	NVQR
HUN2	Step One Forward
CH1	Case Management
CH2	Commercial training reform
CH3	Leading Houses
MEX1	Technical Baccalaureate reform
MEX2	Playa de Carmen

Chapter 8

Government, Policy and Systemic Innovation in VET

This chapter looks at the governance, policy, and development and support of strategies for systemic innovation in VET. The governance of VET is distinct from that of other education sectors due to the complexity in the role of stakeholders, the connections to the private sector and the labour market, and the networks of public and private providers. This distinct governance plays a role in enabling, driving, and (at times) hindering systemic innovation. Key tools that can be used to promote and support systemic innovation are: building trust and bridges between stakeholders, encouraging local initiatives and mechanisms to allow innovations to percolate up from the field, capacity building of key stakeholders, gathering of appropriate evidence, and a focus on knowledge transfer. Despite the importance of strategies for systemic innovation in VET as useful and powerful tool for improving the system, very few countries/regions have actually developed a clearly elucidated approach. Without such strategies VET systems risk moving from one short-term response to another, never developing a proactive vision for longer-term development.

Despite the importance of strategies for systemic innovation in VET as useful and powerful tool for improving the system, very few countries/regions have actually developed a clearly elucidated approach. Without such strategies VET systems risk moving from one short-term response to another, never developing a proactive vision for longer-term development.

This chapter focuses on the role of government in encouraging and aiding innovation in education and VET. The focus is on policy priorities and policy making as well as the ways in which government can, by creating the appropriate climate, influence the planning, implementation and sustainability of systemic innovation in VET and education more broadly. In this and subsequent chapters we move from our empirical and comparative work based on case studies to more general recommendations and a look at the pending agenda.

Introduction

As a starting point it should be noted that the term Government is not a unitary concept and can refer to many different entities and mandates. In the highly decentralised world of education and VET in particular, government can refer to international bodies (the EU), national systems, federal level governance, state/provincial systems, and local school authorities and school boards. Depending on the country and the sector, it can also refer to traditional departments of education, social affairs, and (especially in the case of VET) departments of labour and employment.

In the study of systemic innovation the system and the functioning of the system is the level of analysis. In this sense the system is a group of stakeholders and their relationships organised in a coherent and unitary level of governance, with Government only one of the key players that play a role in governing the system. In education, other key players are practitioners (teachers, school leaders and principals) and teacher unions, parents, students, and the communities in which they live. They must all be considered when analysing the system and system dynamics.

There are several particularities about VET that make its governance distinct from other sectors of education. Although VET also generally comes under the mandate of ministries of education in most OECD countries, there is a closer connection to employers and the labour market. Members of the private sector (employers, firms, business representatives) thus play a key stakeholder role in VET policy and practice that they do not usually play in other types of education. This has consequences on the level and kinds of funding available for programmes and additionally influences the design and development of curricula, training and selection of teachers and trainers, evaluation of accreditation and outcome measures, and requirements

for students. It also and most obviously has a role in the numbers and kinds of students that are able to find placements and apprenticeships during their schooling, as well as the number and types of graduates that are employed in the particular field for which they trained.

Similarly, while the traditional educative space of schools is still central to VET, much of the training takes place in other environments, both on the job and in specialised training institutions for particular skills. The networks of public and private providers of VET training are multiple and varied throughout the systems. Trainers in VET systems are thus not necessarily teachers, nor have they necessarily gone through the same kind of teacher education that is required in other sectors of education. This is not a judgement but a reality, and often a strength, as VET educators are experts in the practical skills that they are teaching. They are thus tied in to the evolution of the work place and, if they are still active, the emerging skills, technologies, and instruments of their profession. In addition the students in VET systems are also much more diverse than those in other areas of education, even if the analysis is restricted to initial VET programmes. In the study of systemic innovation in VET then, these key differences mean that the governance and regulation of VET systems is thus a highly complex and fluid process.

Government and innovation

The role of the government in planning, implementing and encouraging innovation can be seen through the lens of the "political economy of reform", that is, the role of the government in setting the innovation agenda through policy and an analysis of the challenges of implementation on the level of policy and practice. However this term actually contains two discrete roles: first, the role of government as part of a larger system that contains other key actors (*e.g.* private sector, individual stakeholders) and the key role the government can play in terms of enabling a supportive systemic innovation climate. Secondly, there is also the role of government as the leader of innovation, in terms of setting innovation policy agendas and using legislative and funding mechanisms to support systemic innovation. In the terms of Chapter 4 (drivers and barriers), this is the distinction between government as an enabler of innovation versus a driver of innovation. This is a partially artificial distinction as the two generally act in concert and, except in very authoritarian systems, the strongest political driver of innovation will not work without the appropriate enabling conditions for implementation. However it is worth making this distinction as the mechanisms used in each process are different. The following section will look at each of these in turn.

Government as enabler of systemic innovation

Government (at whatever level of the system) can enable a climate of systemic innovation in VET, which involves the creation or promotion of a climate or culture supportive of systemic innovation. Political leadership and capacity to steer and manage the innovation system, the availability of resources, the promotion of systemic innovation and/or the existence of regulatory mechanisms supporting the process are crucial elements required for this enabling environment. By a focus on the various enabling factors specific to the country or regional context, government can actively work to promote and sustain a culture of systemic innovation that can be thought of as a knowledge-based systemic innovation ecosystem. This last bit, sustainability, is a key aspect of an effective and functioning system that is often overlooked. Too often innovations are perceived as discrete initiatives which are then replaced by another discrete initiative with little thought given to the links between them and the dynamics of the system. As discussed in Chapter 4, this is not only a costly option that risks losing knowledge and opportunity, it also brings with it the risk of innovation fatigue among the stakeholders. It is the very nature of a learning and evolving ecosystem that it builds on previous cycles and uses the momentum generated to continue to grow and learn.

In VET, a key element of creating this enabling ecosystem is the transformation of the relatively unconnected communities of VET practice, institutions of education and training, research, and local agents of innovation into a coherent and dynamic learning ecology. This has as a challenge the task of changing the current culture and ways of functioning, and of bringing together diverse social partners and bridging the public and private sectors. More specifically, it requires:

- creating trust and building bridges among and between sectors (public and private) and key stakeholders (public, private, parent, teacher, student representatives) through transparency and open dialogue. This requires juggling the different expectations and needs of the key actors and sectors and, as in any similarly complicated process, it is impossible to please all of the people all of the time. Still, a commitment to sharing information and responsiveness to the concerns of the various stakeholders allows for greater trust;
- encouraging local innovation and supporting mechanisms that permit bottom-up innovations to percolate up from the field;
- designing accountability systems that do not unduly punish for the risk involved in innovation or possible failure – this also implies that knowledge gained from failure is used appropriately to inform the development and design of subsequent initiatives;

- encouraging uptake of systemic innovations through capacity building of key stakeholders (in the case of VET, teachers, students, and employer representatives, this could entail training and professional development opportunities, exposure to research or helps with understanding research results and applying them to the local environment);
- supporting the gathering of knowledge and evidence and highlighting the need for a good quality, reliable research base on VET and the country/regional context through the establishment of a dedicated centre for VET research and statistics (*e.g.* NCVER [Australia]).
- enabling knowledge transfer of innovative practice and systemic innovations across stakeholders and across mandates through brokerage agencies or communication services (*e.g.* from school to school, region to region, or from country to country in an international setting).
- In addition, as a relatively traditional public institution, governments and ministries have often been criticised for talking the talk but not walking the walk. The factors listed above could be modified to apply to these institutions and ministries can challenge themselves to support systemic innovation in their own service, as such:
- creating trust and building bridges among and between departments (education, labour, justice) and key stakeholders (civil servants, local staff, and representatives of other services in the vertical hierarchy of local/regional/national);
- encouraging and supporting mechanisms that permit bottom-up innovations to percolate up from junior staff. This includes both mechanisms to make sure the suggestions for innovation have a channel to reach senior staff and decision makers, and the requirement that the junior staff be challenged and recognised for this sort of contribution;
- designing accountability systems that allow for the possibility of failure in innovative projects. Although this needs to be tightly controlled for both political and financial purposes, the accountability regime should not be so tight as to strangle innovative capacity. These systems should also have a mechanism to learn from failure (honest reporting and assessment of outcomes, and knowledge gained used appropriately to inform the development and design of subsequent initiatives);
- encouraging uptake of systemic innovations through capacity building of key staff (in this case, having appropriate training for both senior staff and junior staff to make the above bullet point possible);
- supporting the gathering of knowledge and evidence and highlighting the need for a good quality, reliable research base in public policy making. This includes having the rigour to sit down and address thorny

questions such as: what counts as evidence? What is the acceptable level of certainty/risk in the kinds of evidence that will be considered? And how can formal research knowledge be augmented by the expertise and practical experience in the field?

- enabling knowledge transfer of innovative practice and systemic innovations across departments, ministries, and staff through brokerage agencies or communication services.

The overall goal of creating this rich enabling environment is moving from a system planning culture well suited to an economy with stable occupations to a policy framework which is capable of much faster detection of changing skill and knowledge requirements, particularly in rapidly advancing and converging areas of technology, but also in mature sectors which remain crucial to the economy. This proactive cultivation of innovative capacity would seek to keep systems actively dynamic and more able to detect and map on to emerging skill sets and occupations, crucial for the VET sector.

VET operates within a larger social and cultural context. We have discussed this already in terms of the kinds of expectations systems and stakeholders might have. But there is another element that cannot be forgotten. In general (in all countries participating in the project) we must improve our knowledge of the relationship between the specific innovations and other social systems related to them. We can call this a Contextual Systemic Framework that should be defined specifically in each case. The contextual systemic framework of each innovation can have an international dimension, as clearly observed in the Hungarian cases by the conditional relationship with the EU's programmes framework. In other cases or other contexts it could be less important or simply other international frameworks (the role of Asia for Australia or the North American free trade agreement for Mexico, for example).

Government as driving systemic innovation

In addition to its role in creating a supporting climate to enable systemic innovation in VET, government can also act as a leading actor of systemic innovation. It can do this through setting the innovation policy agenda and establishing priorities for innovation in the system. It can also do this by setting out long term planning and strategies for the sector and creating a roadmap for change. Ideally, it can also actively encourage proactive attempts to embrace emerging trends and issues. In VET, this would mean educational issues and knowledge as well as allowing flexibility in training in order to be able to capture emerging skills needs and occupations.

Yet setting the agenda for systemic innovation in VET is a highly complex, dynamic process. Creating political willingness to support systemic innovation requires agreement between education and labour market priorities

and planning, as well as local, regional, and national priorities and needs (especially in federal systems). The role of a leader, or champion of innovation is an essential component to any systems change and has already been discussed in the drivers section of Chapter 4. Effective leadership requires vision, strategy, and the power to effect change. Two of the innovations proposed as case studies (*The Innovation Circle* [Germany] and the *Globalisation Council* [Denmark]) emerged due to the role of a strong political leader with the influence to by-pass the standard process of agenda setting to make the case for the need for more urgent systemic change.

Yet even extremely powerful leaders need to develop or capitalise on a common sense of urgency from other stakeholders and key actors in the system in order to set the agenda and push for systemic innovation. This sense of urgency is best developed in response to a crisis of some kind – the recent economic crisis is a good example of this – where the underlying message is that VET systems need to be rethought in the light of new and emerging economic and global constraints. In this sense the sense of crisis can be harnessed as a window of opportunity to effect change. In addition, there are a number of other ways that this sense of urgency can emerge during relatively stable economic and political climates. These include:

- the issue is likely to have wide impact (*e.g.* the scope of the innovation and the corresponding need for improvement);
- the issue is fashionable in some way (*e.g.* climate change and the need to develop more environmentally friendly practices in training for natural resource jobs);
- the issue has a human interest aspect which attracts media attention and thus alerts community and parents to the importance for innovation and change (*e.g.* young entrepreneurs who do not fit in the system, an influx of older workers requiring retraining to the VET system and the need to devise new teaching and training methods, etc).

Strong leaders can use this sense of urgency to help them build bridges and shape the innovation in their VET system. However there is always a risk that the sense of urgency will result in swift (and sometimes superficial) actions at the expense of the longer-term development of a vision and the use of research knowledge to build, pilot, monitor, and evaluate the system. The tension between the perceived need to act and timeline for policy reform and the requirements of using evidence to guide and develop the system are always evident (and discussed more thoroughly in Chapter 6).

Policy mechanisms for governments for supporting innovation in VET

There are a number of different levers that can be used by policy makers to achieve their policy goals and implement their innovation agendas. These traditionally fall under the headings of a) legislation and b) resources. Depending on the level and location of the system, funding and resources come from a variety of different sources, including international, European, national, and regional allocations.

Drawing on our limited evidence from the case studies, it seems clear that there are different policy approaches to SI in VET. Some of the countries in this study (*e.g.* Switzerland, Australia) have a specifically elaborated strategy for innovation in VET. Others (Mexico) appear to be completely missing this aspect. Still others (*e.g.* Denmark) are focussing more on creating the right climate rather than the development of a specific strategy. This then begs the question: What are the respective values and shortcomings of innovation policies in VET? Is it necessary to have an elaborated strategy for innovation in VET? If so, what is the most appropriate and efficient strategy to develop?

In answering these questions we are limited by a lack of research. Even among the countries that participated in this project there were no explicit strategies guiding systemic innovation of the VET system at either regional or national level, with the exception of Switzerland. Australia is also proposing to reward states that have been deemed to create a culture of innovation in their VET systems, an interesting initiative that will be important to observe as it develops. Due to the lack of explicit examples, we cannot at this point compare approaches and glean lessons from country experience. One clear answer, then, is that in many countries a clear shortcoming is the lack of explicit policy discussion and direction on this topic. Without such strategies VET systems risk moving from one short-term response to another, never developing a proactive vision for longer-term development.

In this work we have argued that the development and elucidation of a specific strategy for systemic innovation in VET is both a useful and powerful tool for improving the system. The main benefit of a systemic innovation strategy is that it can help governments and other stakeholders to have a comprehensive vision, strategy, and capacity building plan over the long-term. From a policy perspective it makes transparent what information gaps exist, and particularly where, in the lifecycle of the development of policy in the sector, a good evidence base might be more useful. It also could help reduce innovation fatigue and implementation gaps by creating a continuously renewing process that builds on itself rather than introducing discrete changes that may or may not capitalise on the innovation and reform that has preceded it. As the discussion of innovation fatigue makes clear, there are

diminishing returns to continuous innovation that does not build on previous change. Excessive or contradictory innovation has unintended consequences that can outweigh the intended benefits. As part of the process of systemic innovation is the capacity for self-regulation, that is, a monitoring of the system such that the costs of innovation (in both financial and time terms) are weighed carefully with the expected benefits.

In this respect it is important to consider also the possibility of strategic complementarities between various types of changes and transformations. Mutually complementary innovations can be introduced deliberately to add value by adopting them together. When properly managed, such strategic complementarities among innovations can account for the emergence of a persistent pattern of change and feedback into the ecosystem, thus strengthening the cycle of sustainability of the process. In short, a well-elucidated strategy for systemic innovation contributes to the sustainability and functioning of the innovation system and to the identification of policies that are capable of leveraging the innovative potential of the VET system.

There is thus a need for governments to improve their overall system management and capacity for systemic innovation in VET. This requires the tools and skills to measure inputs, track outputs and outcomes, and measure the costs and benefits of the various policy choices and initiatives that have been taken. As this is a systemic process, this includes analysis on the level of the individual (training, outcomes and transition measures, longer-term career progression) as well as the networks and organisations (type of training and outcomes, inputs of firms and employer representatives, etc). It is only through a careful process of monitoring and evaluation can the real impacts of innovations be understood and assessed for the various user groups involved. This is necessary to promote the incentives for systemic innovation, and necessary for the development of a culture of innovation in this sector.

Context influencing policy mechanisms

As policy making is generally a serial process requiring the agreement of the various stakeholders (except in rare case where reform is imposed unilaterally), the speed of change and the kind and type of innovation proposed depends on the context in which it is embedded. The type of VET system (dual with a long tradition, newer with less historical base and possibly status issues) and the type of governance (federal system or national governance, the level and type of autonomy in the system, the role of private sector), and country traditions (consensual process versus not) all play a role in the types of levers and mechanisms government can use. The kinds of options available for change are thus directly influenced by the context of the system, just as

kinds of responses to barriers are heavily dependent on context and traditions. The various types of systems and options for innovation that emerge from the analysis of systemic innovation in VET include:

1. In highly stable systems with long traditions, there will tend to be incremental adjustments to existing policies rather than radical changes (see, for example, the role of consensus building in Denmark and Germany and the resulting nature of systemic innovation – it is no accident that it was in these countries that bodies were established specifically to step away from the standard pattern and to allow for a fresh perspective and more radical rethinking of the nature of national VET systems). The levers available to government in these contexts are thus generally incremental and consensual in nature;
2. In systems in transition, or at times of change in government (recent elections), there is an opportunity for more radical systems change. This opportunity must be carefully nurtured and used as there is a risk of disenchantment with the changes made by incoming government. The perception can be that they are pursuing their agenda of innovation for innovation's sake, rather than through a long-term strategy for the development of the sector. However in this context the government has more room to use levers of change that are more radical and less consensual.
3. Regardless of the kind of system, when there is a high amount of conflict regarding the proposed innovation the changes made will be less radical (for example, improving an apprenticeship programme (low conflict and general stakeholder agreement) as opposed to imposing tuition fees or restructuring qualifications for teachers and trainers (higher conflict and less stakeholder agreement). The levers available to government thus depend also on the type of innovation proposed and the amount of perceived resistance;
4. Of course, when there is a high amount of conflict regarding the proposed innovation the changes are more likely to fail in implementation if pushed through without stakeholder agreement. This is generally true though it must be noted that this variable interacts with the variable in (ii) above, with more leeway given to systems in transition or following a change in government.
5. Again, regardless of the kind of system, when there is general agreement on the proposed innovation there is more room for sweeping changes and the levers available to government reflect this (broader opportunities for legislative and funding shifts).
6. In all systems and for all kinds of innovations, the stronger the argument for the innovation the more leeway available. Clear data on

declining employment and increasing drop-outs and other systems measures make a more compelling case for the need to innovate than general arguments or politically motivated decisions. Part of the strength of this argument lies in the capacity of the system and stakeholders to absorb this evidence, and the expectations regarding the use of evidence in policy making. In contexts in which policy making is not generally dependent on formal academic evidence and there is little expectation or literacy among the stakeholders (including the media) for the use of evidence, there is much more leeway to introduce levers or policy without strong corroborating research. In countries with a culture of evidence-informed policy making, the inverse is true.

Setting the policy agenda can thus be thought of as an interaction between the kinds of systems and the level of stability in the systems, the type of innovation proposed (radical/incremental), the knowledge base upon which the arguments for change are based, and the culture of using knowledge and evidence in policy making in the system. In using evidence to inform policy making, the strength and availability of relevant research has an impact on the kinds of evidence available. In many cases (and most of the case studies in our work), the best available evidence was far removed from a rigorous academic standard.

This discussion has up until this point assumed a rather logical and linear process of policy making, and the various nuances introduced do not quite capture the dynamic involved. It is self-evident that policy makers adjust to one another through bargaining and compromise and must think seriously about the costs and possible resistance to various courses of action. In planning systemic innovation agendas and implementing them, the agenda set may not necessarily be the best policy option but rather the option upon which most people can agree. As part of this process, an honest assessment must be made to identify who (within the government and within the broader group of stakeholders) is going to gain or lose from particular systemic innovations. These assessments can then be used to incentivise participation and, in the case of clear losses, help consider whether and to what extent compensation might be reasonable.

Conclusions and policy implications

Systemic innovation in VET has the capacity to reshape systems to improve learning outcomes, cost efficiency, and labour market alignment. But they can also be costly – financially and politically. In order to act on ideas for systemic innovation in VET, governments need to be convinced of the need for the innovation. As a leading actor in the process, this entails the leadership and strategic vision to guide the sector and the persuasive skills

to create a sense of urgency about what needs to improve. It also entails the political clout to manage resources and develop legislation to guide innovation, the commitment to designing and developing systemic innovation that will address this, and maintaining the momentum from the development and design cycle through the implementation and evaluation phases. It also requires close links to employers, firms, and businesses, which are often major sources of innovative ideas and pressures in the VET sector.

As an enabler of systemic innovation, the government also has a role to play in creating the appropriate context and supporting other actors pushing for systemic innovation. As part of this process, an honest assessment must be made to identify who is going to gain or lose from particular systemic innovations. These assessments can then be used to incentivise participation and, in the case of clear losses, help consider whether and to what extent compensation might be reasonable. In this role the government can also seek to reduce barriers to innovation and seek to build capacity in the system. In order to achieve this it needs to be realistic about capacity constraints and carefully manage the scaling up of projects. This includes planning for capacity building, piloting before scaling up to system levels, and building in sustainability measures to keep the system percolating ideas and innovations from the bottom up as well as from the top-down.

Although the reality of policy making is that it evolves out of a combination of rational choice and design, structural factors and traditions, and policy contexts and stakeholder expectations, there are still elements that can be identified as key to supporting the innovation dynamic. In enabling systemic innovation government can use certain key tools, such as: building trust and bridges between stakeholders, encouraging local initiatives and mechanisms to allow innovations to percolate up from the field, capacity building of key stakeholders, gathering of appropriate evidence, and a focus on knowledge transfer. Knowledge transfer across stakeholders and across mandates can take place through brokerage agencies or communication services (*e.g.* from school to school, region to region, or from country to country in an international setting) and is an oft-overlooked but crucial element of the process. Although relatively rare in VET, there are a number of examples of international education brokerage institutions that could usefully be applied or copied for use in this sector.

In order to enable systemic innovation in VET and transfer knowledge effectively, there must be a solid evidence base upon which to base arguments and assessments of strengths and weaknesses in the system. Although a central argument of much of this publication, it bears repeating here, especially in the context of the role of government in commissioning and supporting research and the use of evidence in policy. Strong research can help make the costs of inaction clear, both for the VET system and for the economy and

labour market. This is also a useful tool in obtaining the backing of relevant stakeholder groups, a necessary requirement for the successful implementation and acceptance of a systemic innovation.

The work from this project is bridging the strong gap that exists between innovation studies and public policy formulation. Most innovation studies in the public sector are not analysing processes, and when they do they tend to replicate (scientific-technological) approaches to identify environments that could be conducive to (in general bottom-up) innovations. However, this project shows that many of the innovations with deep impact, that is, changes aimed at adding value, follow a top-down approach. Standard innovation models seem to fail in explaining this process; in fact, they relate more to the reform policy literature. A key value-added of this analysis is the work to bridge both strands of this literature and propose a model of innovation (see Chapter 3) that can incorporate also elements of policy reform.

Key messages

The governance of VET is distinct from that of other education sectors due to the complexity in the role of stakeholders, the connections to the private sector and the labour market, and the networks of public and private providers.

Government can both enable and drive systemic innovation. Enabling entails government as part of a larger system that contains other key actors all working together for a supportive innovation climate. Driving innovation places government as the leader in terms of setting innovation policy agendas and using legislative and funding mechanisms to support systemic innovation.

Key tools that can be used to promote and support systemic innovation are: building trust and bridges between stakeholders, encouraging local initiatives and mechanisms to allow innovations to percolate up from the field, capacity building of key stakeholders, gathering of appropriate evidence, and a focus on knowledge transfer.

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Chapter 9

The Research Agenda

This chapter identifies knowledge gaps in the study of systemic innovation in the VET sector for which further research might be beneficial. The benefits of such an effort could be (a) *the improvement of the innovation capacity of national VET systems, particularly by identifying which drivers and barriers are operating in relation to systemic innovation; and* (b) *an increase in the quality of the processes and the outcomes of VET, by raising awareness of the necessary links between innovation efforts and system performance. The chapter also suggests that the main emphasis of research on systemic innovation in VET shall be put on the systemic factors that can foster innovation, on the processes taking place, and on the impact of systemic innovation on VET quality and outcomes. Additionally, the chapter discusses what could be the most suitable methodological strategies and requirements for systemic innovation and the corresponding policy implications for governments. In this latter respect, four seem to be the most urgent. The first is related to the need to develop national agendas on research on VET and more specifically on the processes of systemic innovation. The second is to incorporate systemic innovation in the national agenda. The last is that governments should benefit from the opportunities being offered by international comparative research in this domain, by way of benchmarking initiatives and developing policy lessons among peers.*

To foster the required additional research[1] emphasis on systemic innovation in VET countries will have to develop national agendas on research on VET and more specifically on the processes of systemic innovation; to incorporate systemic innovation in the national agenda; and finally invest on international comparative research in this domain, by way of benchmarking initiatives and developing policy lessons among peers.

Defining research on systemic innovation in VET

There is an intrinsic difficulty with the concept of systemic innovation, partly because of the ill-defined and quasi-intuitive nature of the concept and partly because of the prevalent culture dealing with innovation in the education sector at large.

From the vast literature devoted to researching innovation in education, it can be derived that there are three major approaches:

- *Innovations as discrete initiatives*: Following this approach, innovation is the product of individual learning throughout the system and ultimately of learning by the system itself, and this may be the result of some form of social contagion or natural dissemination. Accordingly, the study of educational innovations is focused on how innovations emerge, are successful, and become widespread.
- *The dynamics of innovation*: This approach emphasises the implementation process, at either the institutional level or the policy level, and how a local and discrete initiative is set to handle particular contextual circumstances, players, or forces.
- *Innovation policies and strategies:* This approach looks first and foremost at how innovations can be sustained, including both the actual support in terms of financing, training, and technical advice, and how the innovation effort is backed with evidence throughout the process of policy design, implementation, and evaluation. The latter concern regarding evidence is the focus of this project, and the one that has received less research attention so far, even considering its potential impact on policy making and systems development.

Systemic innovation is a new concept, both in the general context of education and in VET in particular. Because it is a new concept, there is a high risk of confusion: for instance, whether systemic innovation encompasses the way in which VET systems support small-scale, local, and discrete innovations – which all VET systems do – or whether it comprises the way in which VET systems, particularly from a policy perspective, manage innovations intended to have an overall systemic impact, and how the processes involved function. The latter description of system innovation is the focus of this project.

Moreover, throughout the education sector (and not only in VET) the prevalent school and teacher culture regarding innovation considers the idea of innovation good as such, with much more emphasis and efforts put into the processes than on the evaluation of the outcomes. Innovation is often seen as a process that should be inherent to the professional work of teachers, and consequently much of the educational research dealing with innovation focuses on the processes at the classroom and school levels, with little or no interest in the impact on the learners' results. So, in the prevalent teacher culture, innovation is linked primarily to either the individual teacher or the establishment, and hardly ever to the system itself.

Not surprisingly, these intrinsic difficulties have contributed to a strong bias in educational research on innovation toward qualitative methodological approaches that support this prevalent culture, and to approach innovation in VET as has been done in other education sectors.

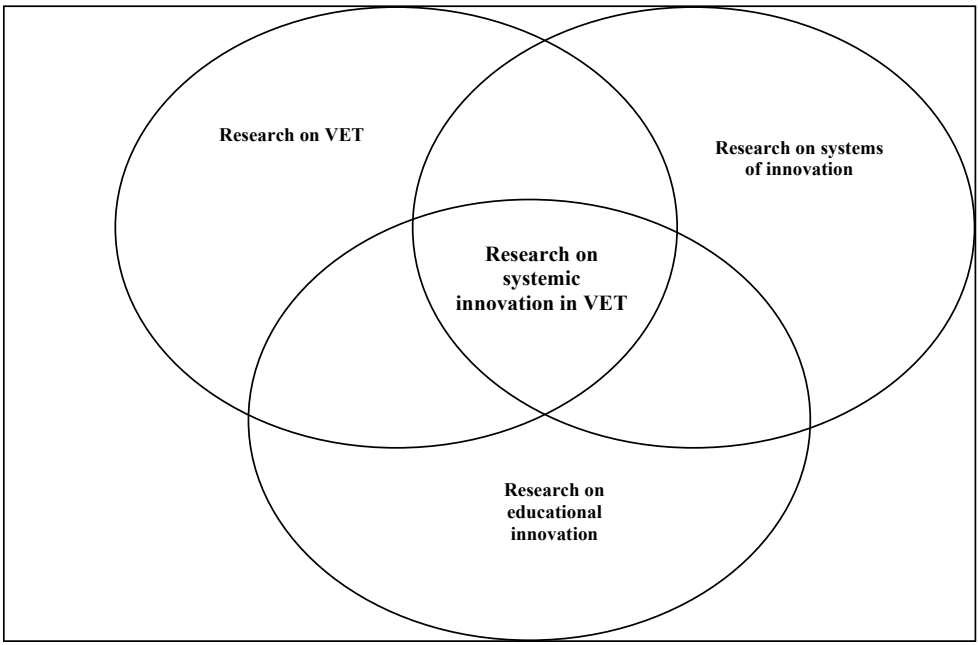
The view taken throughout this report is that research on systemic innovation should focus on the structural and policy factors that influence the development of innovations seeking to have a system-wide impact. This research is systemic in two different ways. First, it focuses on the system level: it takes into account how a particular system deals with highly specific kinds of innovations. Second, it addresses only system wide innovations, those which are expected to have a system-wide impact). Therefore, it is systemic because looks holistically at the system while focusing on its ability to change through system-wide innovation. Not surprisingly, most of the cases considered in this project could be said to be top-down initiatives for a number of reasons. However, at least in theory, systemic innovations could be also bottom-up, provided that the system allows them to scale up.

There are thus intrinsic and extrinsic difficulties with research on systemic innovation. The intrinsic difficulties come primarily from the very nature of the concept, which is not only new but elusive. At the same time, there also exist extrinsic difficulties mostly related to a prevalent teacher culture and approach to innovation that tends to focus on discrete innovations, often avoiding issues related to scaling up.

Converging fields

Research on systemic innovation in VET can be seen as taking place in a shared space in which three different research domains converge, as depicted in Figure 9.1: research on systems of innovation, research on innovation in education, and research on VET. Each of these three domains has a distinct methodological tradition, with a given set of concepts and tools not easily transferable.

Figure 9.1. **Research on systemic innovation in VET as a shared research space**



Research on systems of innovation has been a highly fruitful research area and will probably increase its policy value in the near future, as the OECD Innovation Strategy indicates.[2] There are obvious connections between a knowledge economy and the way countries deal with the production and management of new knowledge, as well as how that knowledge is transformed into new processes or products with added economic value. It is also a promising perspective for the education sector, but not without its controversy and weaknesses. Nevertheless, it is important to consider what conceptual frameworks and methodological approaches have been successfully developed and applied so far in other sectors where the concept of innovation is also elusive. In particular, as has already been pointed out in Chapter 6 ("The Role of the Knowledge Base"), the work done by the OECD in the domains of technology, firm-based innovations, and public governance can be instrumental for future research on systemic innovation in VET.

Compared to research on systems of innovation, research on innovation in education tends to be far more focused on the dynamics of innovation in educational settings, mostly from an organisational perspective. So far, it has had a very strong qualitative approach, mostly studying discrete or local innovations with a view to help overcome the existing difficulties located

in the institutional context or in the relationships among local stakeholders, although some examples of research on innovation turn out to be the expression of a particular policy context as well. Also, a general understanding that the quest for innovation should be part of either a responsible exercise of the teaching profession or the institutional behaviour of a school has supported this approach.

This is why action-research, intended to involve practitioners in research, has been so widespread and popular in educational research – and probably, in some countries, the dominating paradigm in educational research. This is also the case of research in VET, where apparently the dominating research methods are action research, accompanying research and evaluation research (Kämäräinen, 2004). Although neither of the three would comply with classical scientifically-based research standards, they can be useful to develop theory. The problem lies more in the lack of balance between qualitative and quantitative approaches in VET research. For instance, a recent literature review, restricted to the articles published in the *Journal of Vocational Education Research* between 2001 and 2005 lead to the conclusion that a majority of published articles in the sample was either descriptive or qualitative in nature; whereas, only 6% employed quasi-experimental designs (Gemici and Rojewski, 2007).

As has already been stated, there is a general impression that VET is not the best served educational sector in terms of research in most OECD countries. In fact, research on VET is difficult to overview for a number of reasons (Lauterbach, 2001). First, there is the problem with defining what should be considered as research on or of relevance for VET. Second, its multidisciplinary approach, as research related to VET is conducted within various scientific fields including psychology, sociology of work, sociology of education, industrial sociology, organization theory, education and economics with an impressive variance of methodological approaches. Third, the heterogeneity among researchers, institutions and organizations that pursue this type of research. Fourth, the wide range of areas covered, which in a recent overview included: the development of occupations: the vocational disciplines; comparative and historical analysis (Rauner and Maclean, 2009) of VET systems; planning and development; costs, benefits and financing; occupational work and competence development; didactics of teaching and learning in VET: and the impact of technology on VET.

There are indications that the lack of attention to VET research might be slightly remitting, at least partly because of the resurgent interest in VET for political, economic and social reasons (Wolter, 2009). It is against this context of resurgence that a few indications emerge. For example, at European level VETNET, a European Research Network in vocational education and training, part of the European Education Research Association (EERA), has

been operating since 1997, and the number of researchers associated with it is steadily growing. The international network of VET centres sponsored by UNESCO (UNEVOC) goes also in a similar direction. A new international peer-reviewed journal, focused on empirical research on VET, *Empirical Research in Vocational Education and Training*, has been recently launched. All this adds to the sustained work being carried out by a number of dedicated research institutes and some international organisations. However, the research review conducted in 2008 by CERI in the context of this project failed to find any empirical work done in the area of systemic innovation in VET (or related concepts). In this respect, ongoing research on innovation in VET seems to be an extension of what is going on in the wider arena of educational research on innovation: mostly qualitative research focused on institutional innovations and the organisational aspects of innovations, with a preference for action research.

Links between research and innovation in VET

The effectiveness and sustainability VET is closely related to the capacity for learning and innovation in institutions which carry out VET research, influence it politically and make use of its results. When this triangle of influence loses its impetus, the development of VET stagnates (Bundesinstitut für Berufsbildung [BIBB], 2000). In regard to the potential benefits of linking research and innovation efforts in VET, a number of factors have prevented VET systems from strengthening those links, at least to the extent that they seem to have done in other sectors – although not necessarily in education. Drawing on the cases studied in this project, these factors include:

- The reduced effort devoted to VET research, both from a government investment perspective and from the research community as already discussed, resulting in a very small evidence base. VET research is scarce in some countries. In others, there is much development work that is identified as research but has trouble accumulating relevant evidence in a meaningful way. Still in others, VET research is mostly a domain for economists and policy makers, and less for educationalists. But whatever the situation, there exists a need for both practitioners and policy makers to address common challenges regarding the relevance of (sometimes dubious) research, the dissemination of results to stakeholders, and the actual use of those results by them.
- The lack of adequate communication channels or brokering tools between the community of VET researchers and the potential users of research. This may be a problem of language (researchers not using the appropriate tools to communicate results in a meaningful way) or of communication channels (research journals not being read often by VET policy makers and even less by practitioners).

- The lack of interest in dissemination from researchers, and the lack of incentives to publish in journals other than scholarly ones.
- Shortcomings of training of potential users, particularly VET teachers whose training in many OECD countries does not incorporate any specific training on how to use or understand research.
- The limited usability and impact of existing VET research, both for policy makers and for practitioners. As happens in other education sectors, it may well be that the research conducted on VET does not touch upon the issues that potential users might expect to be addressed by VET research specialists.

With the exception of the first factor, these are not specific to VET research, as previous CERI work on educational research and development, through five country reviews, has pointed out repeatedly.[3] So, from a knowledge management perspective, the entire issue reflects a situation that many countries have to face: a disconnection between educational research and impact on policy making or practice. However, it is interesting to point out that some countries seem to have already addressed the issue. In a comparison between VET research in Australia and the United Kingdom (Bailey, 2003) it was clearly shown that the two countries not only had different levels of investment in VET research (Australia investing double than the United Kingdom in relation to the overall expenditure on VET), but also different strategies to contribute to raising the standards of VET research and to building a sustainable research community.

The argument over the relevance of VET research can be taken further by examining the absence of links between research and innovation in this domain. As it has already been claimed, although there are severe doubts nowadays about the impact of educational research on innovation in educational practice, the idea they should be interrelated is still unquestioned (de Bruijn and Westerhuis, 2004). From a knowledge-management perspective, it would be reasonable to expect that, other than drawing on research on ongoing innovations or assessing its effects, VET systems could count to a certain extent on research as an eventual source or pump for innovation. This is not the case. Although some of the cases examined here do present some use of the existing evidence base, in a way that has to be considered at least promising, the overall picture presented in Chapter 6 ("The Role of the Knowledge Base") is rather discouraging.

It could be argued that there is an absence of links between research and innovation in VET, or that the traditional relationships within which experts and researchers develop new concepts and schools and teachers implement them have been challenged and contested. As already stated, VET research is not given the support it needs to effect change and promote innovation.

Despite the potential key role of knowledge-based innovation in education, VET systems typically have low levels of investment in educational research; low levels of research capacity; and weak links between research, policy, and innovation. A great deal is still to be done – through effective brokerage and promoting collaborative forms of professional development, for instance – to ensure that the research occurring directly informs the practice of practitioners in VET institutions and in the workplace. And also that practice informs research and pushes forward relevant research questions.

It is often said that what makes innovation substantially different from change is that change brings novelty, but innovation adds value. However, it would be interesting to test whether the prevalent teaching culture is ready to accept a sharp distinction between discrete innovations (*e.g.* changes in classroom practices), which are often not documented in their effects or impacts on learning, and real innovations whose effects on learning can be backed with evidence. Without an operational definition of innovation in education, it will be impossible to progress toward benchmarking innovation by using dedicated indicators. If the difference between an innovation and any discrete change is unknown or unclear, governments will not be in a position to assess how well spent the money and the resources invested in educational innovation are, or which policies are genuinely successful in promoting significant innovations – and thereby bring better educational processes and results. If the missing link between innovation in VET and better quality or results remains to be seen, there will be a persistent risk of fostering innovation in education as such, just for the sake of it.

Research gaps in systemic innovation in VET

Needless to say, research on systemic innovation in VET does not include all the aspects and issues related to innovation in VET, and there is plenty of room for different alternative approaches and emphasis. VET research has always kept an eye on innovation, particularly in areas such as (Bähr and Holz, 2005): identifying, specifying and operationalising innovation needs; generating and collaboratively shaping innovations; testing and evaluating them; implementation, transfer and dissemination; and summative evaluation of the product and the process as well as impact analysis. In particular, the organisational analysis of innovations in VET is extremely useful in providing insights about readiness for change at the institutional level, its levers, and its barriers. Another well-documented research area is the use of technology in teaching and learning in VET, as well as the emergence of technology-enabled innovations. However, the need of a higher involvement of VET research in generating and supporting innovations was already signalled almost ten years ago (Laur-Ernst and King, 2000) in view of the growing pace of change, and the globalisation of the economy, the labour market and of education.

To supplement existing research on innovation in VET, which usually praises qualitative approaches, a full research line on systemic innovation has to be developed. In so doing, countries may get a double benefit, since this research has the potential to contribute to:

- The improvement of the innovation capacity of national VET systems, particularly by identifying which drivers and barriers are operating in relation to systemic innovation; and
- An increase in the quality of the processes and the outcomes of VET, by raising awareness of the necessary links between innovation efforts and system performance.

Despite its exploratory nature, this project has highlighted how such benefits are resulting from research on systemic innovation. In so doing, the project has unveiled both knowledge gaps in this domain and areas that are clearly in need of further research, and which have only been tackled initially in this report.

Since the complete list of issues would be extremely long, the following paragraphs present only a short selection of the themes that have an intrinsic interest from a research perspective, a policy perspective, or both. This is why, in this selection, the main emphasis of research on systemic innovation in VET has been put on the systemic factors that can foster innovation, on the processes taking place, and on the impact of systemic innovation on VET quality and outcomes. As the last of these is clearly a requisite for the other two, it is presented first below.

The assessment and measurement of innovation as a requisite

Measuring innovation activity becomes crucial not only for governments to understand the effects of their investments in innovation in VET, and therefore inform policy, but also to raise awareness of the benefits of innovations among teachers, students, families, firms, and other stakeholders, as well as compare and assess the impacts in relation to alternative investment opportunities. In fact, if innovation in VET is not expected to produce important consequences for the effectiveness of learning/teaching, equity, and the cost efficiency of VET systems, what is it worth?

However, as has been previously stated, innovation in VET, as in many other public service sectors, is an elusive concept. Most of the literature on innovation in education defines innovation as the implementation of new or improved ideas, knowledge, or practices with a positive impact. In the case of the provision of education, the positive impact can be defined in multiple ways, and relate to either the learner's results, the quality of the teaching/learning process, a reduction in the cost of delivery, or an increase in the

accessibility of the service. This definition increases the complexity of identifying innovations in education, as it is difficult to know when something is an improvement, and of what type, over the previous situation. This is obviously also the case in VET.

At present, due to this complexity, there has been little effort to overcome these difficulties and to define a conceptual framework capable of defining innovation in education and thereby pave the way for improving the measurement of innovation and its assessment. But in this context it is also important not to be constrained by the traditional metrics used in other sectors, which would preclude from capturing "hidden innovation" (NESTA, 2006) or new trends in open and user-led innovations which are clearly also relevant in the education sector – as they are in the public services sector in general.

The research questions are extremely simple in this respect:

1. How much innovation is taking place in a particular VET system? Or, how innovative is a particular VET system comparatively?
2. What kinds of innovations are taking place?
3. How much of this innovation effort can be assessed as being successful? What are the criteria qualifying an innovation as "successful"?

To do this, it is imperative to come up with:

- A consensus on an operational definition of what counts as innovation in education, which may or may not compete with the prevailing one in teacher culture;
- A conceptual framework, related to the context, the inputs, process, and outputs of innovation in education, from which to suggest possible indicators for benchmarking innovation policies in education; and
- A set of methodological strategies and tools to gather the required information, and process it in a meaningful way for policy purposes, including comparable indicators.

The systemic factors affecting innovation

These systemic factors can be either structural, related to the structural characteristics of the VET systems, or policy-related – namely, related to public policies, both explicit and implicit, intended to address issues related to innovation in education, ranging from support and funding to monitoring and evaluation.

There exists a need for a model that defines the structural factors that can affect systemic innovation in VET. The attempt to provide a typology

drawing on the case studies analysed here constitutes a first step toward designing the tools for approaching the relevance of systemic factors (see Chapter 7, "Towards a Typology of Systemic Innovation in VET"). Such a range of factors has only been explored in this project. Drawing on this, an initial list would include:

- Models of governance of VET systems, *i.e.* whether they are centralised, federal, local, or industry-based; the level of involvement of private firms and industries at all levels; and whether this is organised around consensus-building or drawing on strong government leadership.
- Structural characteristics of the provision of VET systems, *i.e.* whether they are dual, school-based, or mixed models, as well as levels of participation.
- Dominant VET culture in the country, *i.e.* whether there is public esteem or consensus-building around VET issues.

With innovation policies in VET the picture becomes less clear, since in many cases there exists no explicit policy. Most education ministries or other public authorities responsible for VET have units dealing with innovation and improvement and implement a more or less explicit innovation strategy in education, but others do not. Regardless, there are a few issues worth investigating further, such as:

- Investment in VET innovation (*e.g.* public calls, dedicated centres or staff, investments made by private companies and firms, etc.);
- Investment in VET research (same as above, with the added difficulty of mapping efforts made by universities); and
- Monitoring and assessment procedures (including dedicated government or independent units) for both innovation and research.

The research agenda in this domain could largely be organised around two main issues:

1. Which structural factors have an influence on innovation policies in VET?
2. Which policies are more effective in promoting successful innovations in VET and why? How universal are these policies? Which are the factors affecting the effectiveness and efficiency of innovative initiatives in VET?

The process of innovation from a systemic perspective

This is the area that has received the most attention in this project. Given the exploratory nature of the work done so far and the limited range of available evidence, some issues remain pending. In particular, there are two areas that deserve additional attention: the processes and dynamics of systemic innovation, and the role of the evidence base.

With respect to these two areas, the development of a typology of systemic factors can be considered an initial point of departure. However, a higher degree of definition would be required, as suggested above.

Once again, the scope of potential research opportunities is immense. However, there are three particular domains that should be put forward: the model of innovation suggested here, the dynamics of systemic innovation, and the role of the evidence base.

This project started with the design of an innovation model (see Chapter 2). Such a model is largely based on the assumption that systemic innovation in education can be approached as a rational cycle, as it has been applied to policy analysis. Throughout the development of cases, the innovation model was applied to VET and became refined but not formally validated. It was extremely useful as a tool to organise the analysis, but the question remains open as to whether such a model allows for a full account of systemic innovation. Therefore, other models not based in the rational approach might also be explored.

The dynamics of systemic innovation in VET remain by far the issue that has received the most analytical attention in this project. One of the main benefits of the work in this domain has been the identification of sets of drivers and barriers, which contribute to a better understanding of the dynamics of systemic innovation. However, the issue of which factors and interventions can result in successful innovations remains unsolved, due to the lack of tools to assess the success of innovations.

The last issue is the role played by the evidence base in the process of systemic innovation. As with the dynamics of innovation, the lack of opportunities to assess the success (or failure) of the cases prevents one from addressing properly whether a more rigorous use of the evidence base always results in better processes and outcomes of systemic innovation in VET.

On the whole, the pending research questions are:

1. Can the model of innovation be validated?
2. What particular factors in the processes or dynamics of systemic innovation are the most critical for producing successful innovations?

3. Can particular uses of the evidence base be related to more efficient ways of designing, implementing, and assessing systemic innovations?

Implications for research in innovation in other education sectors

At a first glance, much of the work done in this project could be scaled up to education as a whole as well as certain other sectors and, in particular, to schools and universities. Probably, the same applies to the research agenda described in this chapter; its value and relevance for a better understanding of how education systems work in relation to innovation, as well as the implications, is well worth exploring.

However, such a value may not be obtained by simply scaling up to education at large or by automatically transferring the findings and the pending issues identified here. As has been clearly stated in Chapter 3, the processes of systemic innovation in VET have particular nuances that may make them unique in many respects. Just consider the range of stakeholders involved or the role played by developments in the economy and the labour market, particularly in times of crisis (as is the case right now), that can demand quick responses from the VET side. Therefore, in many respects systemic innovation in VET may be far more relevant and strategic than, for instance, in schools.

Therefore, it is possible to think of a similar research agenda in other education sectors. However, it would be better to start with a grounding work, which does not exist yet in the rest of the education sectors, than to transfer automatically the issues identified here.

Conclusions and policy implications

There are four clear policy implications. The first is related to the need to develop national agendas on research on VET and more specifically on the processes of systemic innovation. The second is to incorporate systemic innovation in the national agenda. The last is that governments should benefit from the opportunities being offered by international comparative research in this domain, by way of benchmarking initiatives and developing policy lessons among peers.

1. **Setting up national research agendas for VET.** It has been widely recognised that the entire field of research on VET has failed to attract the intensity of interest from researchers that other education sectors, such as higher education, have had in the past decades – for instance, the number of international peer-reviewed journals on this research field is quite small. Limited public funding and a lack of esteem as a research field can explain at least partly the current situation. However, there are not many OECD countries with a national

research program for VET, and even fewer are the countries that realise the strategic value of VET research for the development of the VET system and the economy at large. Only two of the countries examined here, Australia and Switzerland, seem to have realised the potential of VET research, and they support its development in different ways and with different approaches. This report has proved to some extent that the support for VET research, particularly when done in the context of a well-defined set of national priorities, is an indication not only of real policy endorsement of VET as a sector but also of a more mature development in the research community. The development of a national agenda for VET research, and the accompanying measures intended to support both research capacity building and, in the long run, evidence-based research seeking to inform policy making or to improve practice, must therefore be seen as a governmental priority. In short, VET research needs an additional impulse because VET systems could greatly benefit from a national system of VET research that combines the following elements:

- Funding opportunities for researchers according to national priorities with international standards of quality. Such a research agenda could be negotiated by some, if not all stakeholders in VET and include also an innovation agenda, as anticipated by Westerhuis (2009) for instance;
- Capacity building with the cooperation of research centres and universities, if possible in view of cooperation with international networks;
- Building networks to foster ongoing dialogue not only between stakeholders and researchers, but also networks to stimulate dialogue between researchers themselves, building supportive communities of researchers, as already suggested by Kearns (2004). Furthermore to deepen the impact and diminish the scope of action, research centers or networks should focus on strategic areas of development for policy and practice.
- Dissemination activities, particularly by means of tailored publications, intended to engage a large range of stakeholders, who in some cases may require some additional capacity building, in the discussion of the implications of research evidence;
- Mechanisms for the involvement of those institutions or programmes responsible for initial and continuous VET teacher training.

2. **Supporting research on Systemic Innovation in VET.** Continual improvement of the tools of innovation – in a theoretical and a methodological sense – is as necessary as revision of the funding rules

(greater differentiation, more flexibility, greater share for research) (van Wieringen, Selling and Schmidt, 2003). In the context of such a national agenda, there must be room for research on systemic innovation in VET. As this report shows, VET systems have intrinsic characteristics that make them particularly complex compared to other education sectors. These include: the extremely close link with both quantitative and qualitative variations in labour market, the context derived from the emergence of knowledge economies, the varied range of stakeholders with diverse agendas, and the competition with other forms of postsecondary education, particularly university education, to attract students. Policy efforts to support systemic innovation – lying somewhere between fostering the emergence of local innovations and developing reform agendas – would greatly benefit from the improved knowledge about the processes of systemic innovation that only evidence-based research can provide.

3. **Scaling up to education.** Attempts to transfer the lessons learnt from the work done on VET to other education sectors, such as schools as universities, even considering important limitations, might be worth the effort. Designing a specific research agenda – even if it is intended only to promote exploratory studies – will not only have its own direct benefits but also contribute to creating opportunities for the emergence of synergies.

4. **Adding research value through international comparative analysis.** Although much of this work could be undertaken at the national level, there is a potential economy of scale to approaching this issue from an international and comparative perspective. As in other sectors, OECD may prove to be a particularly well-equipped organisation to provide opportunities for co-operative international work in the VET sector and, in the coming years, particularly in the domain of innovation.

Key messages

VET research needs an additional impulse. VET research is scarce in some countries. In others, there is much development work that is identified as research but has trouble accumulating relevant evidence in a meaningful way. Still in others, VET research is mostly a domain for economists and policy makers, and less for educationalists.

In particular, there is a need for an additional research emphasis on systemic innovation in VET, which could throw light on the systemic factors that can foster innovation, on the processes taking place, and on the impact of systemic innovation on VET quality and outcomes.

The resulting knowledge base may lead to:

- The improvement of the innovation capacity of national VET systems, particularly by identifying which drivers and barriers are operating in relation to systemic innovation; and
- An increase in the quality of the processes and the outcomes of VET, by raising awareness of the necessary links between innovation efforts and system performance.

Notes

1. Chapter 1 in this report provides definitions for *research* and *development* in the particular context of education.
2. Further details on the OECD Innovation Strategy at *www.oecd.org/innovation/strategy.*
3. Five country reviews of the national systems of educational R&D were conducted by CERI between 2000 and 2007. The countries involved were Denmark, England, Mexico, New Zealand, and Switzerland. There is a dedicated website where the corresponding reports can be downloaded at *www.oecd.org/edu/rd*

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Chapter 10

Conclusions and Policy Implications

This chapter presents overall findings for enhancing the innovation capacity of the VET systems. First, it elaborates the overarching conclusions obtained throughout both the theoretical and the empirical phases. These conclusions complement those covered in the different empirical chapters, which focused on analysing specific aspects of the innovation process. Second, implications for policies that can better support and foster the development of systemic innovation in VET can be drawn from these conclusions and will be presented here. In addition, a final section in this chapter discusses the opportunities for transferring the main findings of this project to other education sectors and the benefits of doing so.

It is important to remember the exploratory nature of the analysis carried out throughout the project and the limited range of variance contained, both in terms of countries involved and the nature of the cases examined. Therefore, both the conclusions and the policy recommendations should be handled with care and should be regarded as a starting point for discussion that would benefit from further research. As the evidence base on systemic innovation grows, it will be important to refine these conclusions and policy recommendations and possibly transfer them, at least in part, to other sectors in education.

What are the lessons learnt?

This project takes the view that a better understanding of how innovation works in VET requires a focus on the processes from a systemic and knowledge management perspective. Understanding these processes is crucial to the design of policies that facilitate or enable innovations.

For this purpose, the project has intended to bridge the existing gap between innovation studies and public policy formulation, particularly apparent in education. Most innovation studies in the public sector do not analyse the processes, and those that do, tend to replicate existing approaches (mostly drawing on the model of innovation in a scientific-technological framework) to identify environments that could be conducive to innovations, usually bottom-up initiatives. However, this project has shown that many of the most deep-impact innovations (*i.e.* changes aiming to add value) follow a top-down approach, in which the innovation models that draw on the literature about policy reform seem to fail to explain processes.

In addition, this project shows that this field is in its infancy and that although there are widely claimed assumptions of innovations in VET (and education more broadly), it is difficult to show how they are diffusing across the system. In other words, there may be a high rate of invention but a low rate of diffusion or uptake of knowledge or the innovation itself, reducing overall innovation. A systemic approach, as it will be argued below, may contribute both to identifying what prevents innovation from having a system-wide effect in VET and to drawing clear policy implications from this analysis.

In this respect, there are five major areas in which this project has improved the understanding of how systemic innovation works in the VET sector. The first one highlights the validation of systemic innovation as a powerful conceptual and analytical framework for examining how countries approach innovation in this particular education sector. The second area of interest concerns the identification of a number of drivers and barriers that operate in the process of systemic innovation. Similarly, the third area includes lessons on the different phases of the process of systemic innovation,

ranging from design to evaluation, from which important policy implications are to be drawn. The limited but promising role of the knowledge base in regard to systemic innovation constitutes the fourth area. Finally, alternative government roles and policy approaches have been explored. These broad areas of conclusions, which are presented below, help to identify the pieces of the puzzle that constitute VET innovation systems and explain their innovation capacity.

Systemic innovation is a useful analytical framework for assessing innovation policies in VET

In the VET sector, as in other education sectors and in certain other areas of public service provision, the concept of innovation is difficult to concretise and is used most often to refer to discrete changes at local or institutional level. As a result, there is a very limited knowledge regarding the process of innovation, particularly in those cases in which system-wide changes are envisaged.

This is where a systemic and comprehensive approach to innovation in VET can make an important difference. When looking at innovations in VET through the analytical lens of systemic innovation, a number of issues that go beyond discrete innovations can be brought into the picture, particularly how countries initiate innovation, the processes involved, the role of drivers and barriers, the relationships between main actors, the knowledge base drawn on, and the procedures and criteria for assessing progress and outcomes.

All these areas have been explored empirically in this project, using a number of case studies chosen under the assumption that they were developed to have a system-wide impact. As initially defined in the project proposal, the cases were considered *examples of dynamic system-wide change that is intended to add value to the educational processes*. This proved to be a difficult strategy. However, it was the only one appropriate for investigating the behaviour of the VET system when a scalable innovation occurs, identifying which drivers are most relevant and which barriers emerge, and determining, overall, how the concerned stakeholders operate in the system when an innovation with the potential or ambition to introduce system-wide change challenges the existing equilibrium. The dynamic and reiterative nature of the ongoing cycles of the innovation process blurs conceptual distinctions between, for example, top-down and bottom-up initiation, and adds complexity to the analysis.

Moreover, this project has highlighted the importance of taking into account the policy process cycle when dealing with systemic innovation. Many of the profound changes introduced into the system may have deep effects on a number of stakeholders, whose support of proposed innovations

must be won to guarantee successful implementation. This report also analyses the process of stakeholder involvement, including when various stakeholders may or may not be involved as well as the resulting implications of this involvement (or lack thereof).

The main benefit of the systemic innovation approach is that it can help governments and other stakeholders to have a comprehensive evaluation of how the system works and how they can enhance their innovation capacity. It is thus relevant from a policy perspective because it elucidates both existing information gaps and points in the lifecycle of the innovation at which a good evidence base might be more useful. In the end, the systemic approach to innovation contributes to the assessment of how the innovation system works and to the identification of policies that are capable of boosting the innovative potential of the VET system.

A coherent targeted system to promote and support innovations

The need to respond in a timely manner to the socio-economic challenges that all VET systems are facing in an increasingly globalised and rapidly changing world seems to be driving most of the systemic innovations that this project analysed. Political leadership and capacity to steer and manage the innovation, the availability of resources, and/or the existence of regulatory mechanisms supporting the process seem to play a crucial enabling role in most systemic innovations. Equally, the availability of evidence and a good level of consensus among stakeholders also seem to play a crucial role during the design and implementation of the innovations. A coherent targeted system should be in place to promote and support innovations that would develop successfully in VET and induce system-wide change. Such a system is still infrequent at country level.

Nevertheless, innovation enablers and barriers are not universal but rather context specific. While it is true that their presence or absence will facilitate or hinder the innovation processes in any VET system, their importance seems to vary depending on the case and the context. This is particularly true of the role of consensus among stakeholders, of evidence, and of political leadership. In particular, evidence can facilitate the adoption of innovation and inform the process – although the evidence from the case studies suggests that innovations are mostly drawing on tacit knowledge and beliefs or a sense of urgency to change the *status quo*. Moreover, in some cases, some factors may have unintended implications for innovation, *e.g.* inappropriate accountability mechanisms that may hinder innovations.

Although efforts to develop a systemic approach to innovation in VET are still rare, they have the potential to develop better processes and contribute to an incremental improvement of the VET system. In the context of this

limited investigation, countries with a well developed systemic approach to innovation in VET are the exception. It was difficult to find indications of it, such as a formalised structure to promote and support innovation, capacity building to enable it, and a coherent set of knowledge management mechanisms linking innovation with research, in both directions. Only Switzerland and, to a lesser extent, Australia, can be said to have designed a systemic approach to innovation in VET.

The need for a formalised, coherent, well-sustained and up-to-date knowledge base

VET systems need a formalised, coherent, well-sustained and up-to-date knowledge base to increase their innovation capacity, to address knowledge gaps, and to benefit fully from systemic innovations. Unfortunately, decisions to introduce changes in the VET system are not always based on solid empirical evidence but rather on a sense of urgency to modify a *status quo* perceived as unsatisfactory. Innovations are seldom the result of an embodied set of knowledge or empirical evidence accumulated over the years from which stakeholders nourish their decisions and to which they contribute with their feedback. Moreover, countries do not seem to pay enough attention to monitoring and evaluating how innovations, particularly those whose realisation requires a large amount of policy commitment and financial investment, evolve in the context of the VET system. In addition, little has been done to assess when a particular innovation can be said to be a success or a failure and what lessons can be learned as a result.

There is clearly a lack of a critical mass of codified, formal, and research-based knowledge on VET, both at national and international levels. Even in the scenario in which a consistent and coherent knowledge base on VET was available to improve systemic innovation, good communication among stakeholders, along with channels for disseminating the knowledge base at stakeholders' request, is critical. Knowledge brokerage institutions supporting the genesis and diffusion of innovations are still scarce, and therefore the necessary knowledge based linkages between stakeholders are weak.

Only in a limited range of cases, and clearly in only a minority of countries, did this project find clear evidence of any use of research-based knowledge in the innovation process. This is not to say that VET research has not been carried out in these countries or contexts, but rather that there are clear problems regarding its relevance and rigour and equally importantly, its dissemination and uptake among stakeholders. All of these elements require a certain degree of capacity – both systemic and individual – and strong links between research producers (universities, academies) and research users (policy makers, practitioners), links and capacities that have been identified as weak or in need of improvement in previous CERI work (OECD, 2004, 2007).

Even in the scenario in which a consistent and coherent knowledge base on VET was available to improve systemic innovation, good communication among stakeholders, along with channels for disseminating the knowledge base at stakeholders' request, is critical (see the capacity and links argument above). Knowledge brokerage institutions supporting the genesis and diffusion of innovations are still scarce, and therefore the necessary knowledge based linkages between stakeholders are weak.

Moreover, VET systems tend to be relatively closed and inward-looking. Open innovation models that encourage linkages with other VET systems could generate valuable knowledge that could be fed into the system. The transformation of the relatively unconnected communities of VET practice, institutions of education and training, research, and local agents of innovation into a coherent and dynamic learning ecology would be an important step in the development of a truly systemic innovation system. Part of creating this ecology would be a strong connection to more effectively harness the innovative capacity of the private sector (firms, employers).

Although our case studies have not empirically validated the assumption that a better knowledge base results in more successful innovations (due to the lack of both empirical evidence and evaluations of the innovations), the existing paucity of links between research and innovation efforts in VET is remarkable. This is reflected mostly at government level, with a general lack of attention to the issue of bringing together both activities to result in a coherent knowledge base. However, it is also clear that innovation and research seem to appeal to different profiles of professionals in education. In the case of VET and its strong connection to the private sector, this dichotomy is further emphasised.

Finally, it is particularly perplexing to see both a lack of research evidence and halts in the feedback loop of the evaluation process in conjunction with the push for greater accountability and increased assessment of the system, teachers, and students. This is a clear incoherence in the system that needs to be addressed.

Why VET systems may be losing innovation opportunities

Despite its potential, the evaluation of innovations seems to be a missing feature of VET systems. This applies equally to local and discrete innovations as to top-down innovations, including those aiming to have a system-wide impact. VET systems may be losing innovation opportunities due to a lack of evaluations and knowledge feedback into the system. A number of reasons may explain this, including the lack of sustained VET research efforts, the disconnection among practitioners, researchers, and policy makers, the lack of mechanisms dedicated to gathering relevant information, and even the prevalent culture of the sector.

A particular situation in which the relevance of evaluation becomes even clearer is piloting. Pilots fulfil a very important role in those systemic innovations that aim to have a deep impact on the system. While they are costly in terms of time and resources, they play an important role in the prevention of implementation gaps and innovation fatigue. Piloting may be useful for technical and organisational purposes, but unless a monitoring and evaluation procedure is carefully implemented, its benefits may be lost.

Investing in VET innovations without carefully planning their evaluation should not be an option. To increase the innovation capacity of a system is a function not only of the level of investment but also of the importance attached to assessing the results obtained. Informed, and eventually evidence-based, decisions about sustainability or scaling up of innovations cannot be made if mechanisms intended to assess their effects are not in place. The innovation-related policies aiming to foster innovations in VET cannot be assessed in the absence of feedback. Whether a given policy is successful at promoting innovation in VET cannot be determined if the evidence about the results obtained is missing. The same applies to opportunities for international peer learning.

Furthermore, without such mechanisms it is virtually impossible to generate any lessons of general interest, avoid repetition of mistakes, and accumulate knowledge. If a system lacks them, it becomes unclear who will benefit from increased investments in VET innovation.

Policy implications

Drawing on the previous conclusions, it is possible to develop a set of policy implications whose aim is to create the conditions for the emergence of a real system of innovation in VET. As much of the analytical framework and country visits took place in 2008, the analysis and findings do not have as a central focus the role and impact of economic crisis. However, it is a topic that in the current climate cannot be ignored because in times of economic crisis, the capital and margin of risk required to fund innovation and systemic change often lead to such projects being considered disposable luxuries. Funds earmarked for innovative projects or funds set aside to enhance and support innovative processes often find themselves radically trimmed in leaner budgets. In the VET system, the dual contribution of public sector (education) and the private sector (employers, firms) increases the risk that systemic innovation in VET will get cut because both sides may seek to rein in expenditures. Moreover, during financial crisis, a number of enabling factors can start disappearing due to financial constraints and can therefore become limiting barriers for innovation.

Precisely in times of economic crisis, a systemic approach to innovation in VET is even more urgent. Most countries are now facing difficult times and OECD member states are no exception. The immediate programs launched, sometimes in a co-ordinated way, by many governments seeking to face the financial crisis have also been coupled – in many cases – with an in-depth reflection about how our economies work and strategies to promote longer-term development and vision. In the context of this reflection, it becomes apparent that in the medium and long-term, innovation will increasingly be a key factor not only to economic growth but also to social welfare. The VET sector should be no exception. Two particular issues need to be addressed:

- While in the current economic climate there might be a general pressure to cut or reign in expenditures, innovation should not be considered an unnecessary expenditure but rather the essential ingredient that would differentiate resistant VET systems from those hardest hit by the crisis. Therefore, innovation should be protected to the extent possible.
- Using the elements of the innovation process (*e.g.* planning, monitoring, evaluation) as a cost-effective mechanism for guiding product and process development could, in the long run, save money. Having effective feedback mechanisms indicating what worked and what did not is crucial for both continuing innovative development and transferring innovation across VET systems (or across firms). The role of systemic innovation in developing a long-term strategy for VET (or business, as the case may be) was argued to be an essential element in the crisis response and a necessary component in accompanying immediate, short-term cuts/stimulus packages. A long-term strategy would also be necessary for getting the system (or firm) back on track after the initial shock of the crisis has passed.

To set up the conditions for such a system, governments in particular, with the support of the remaining stakeholders in VET, may need to:

Develop a systemic approach to innovation in VET as a guiding principle for innovation-related policies

Such a systemic approach includes at least five basic elements:

- A clear policy intended to support VET research in the light of national priorities, both at policy and practitioners levels;
- An evolving framework for sustaining both top-down and bottom-up innovations in VET, including monitoring and evaluation mechanisms, which can contribute to the generation of new knowledge about VET policies and practices;

- A unified knowledge-base that includes both VET research evidence and the new knowledge emerging from the assessment of innovations, including links to international knowledge bases on these topics; and
- Regular efforts to synthesise and disseminate new knowledge on effective VET policies and practices to challenge the *status quo* of the system, set new horizons and contribute to incremental change.
- Capacity building (structural, personal) to enable all the elements above.

Promote a continuous and evidence-informed dialogue about innovation with the stakeholders in VET

Often, VET policy discussions are particularly prone to biased uses of the knowledge base, particularly in view of the absence of solid empirical evidence. However, engaging stakeholders in policy dialogue to reach consensus is a pre-requisite for successful policy interventions in VET. It is therefore of the highest importance to inform the policy debate with evidence, provided that all stakeholders share a minimal capacity level to benefit from it. This would include the creation or support of brokerage agencies designed to provide the required links between research and practice as well as build relevant capacity both in the system and among stakeholders.

This type of dialogue would serve to build trust and firm up networks among the various key stakeholders. It could also act as an important mechanism for encouraging local innovation and supporting bottom-up innovations to percolate up from the field. Transforming the relatively unconnected communities of VET practice, institutions of education and training, research, and local agents of innovation into a coherent and dynamic learning ecology would be an important step in the development of a truly systemic innovation system.

Build a well-organised, formalised, easy to access, and updated knowledge base about VET as a prerequisite for successfully internalising the benefits of innovation

In many countries, the usual mechanisms (such as dedicated journals, academic journals, conferences, national reference and research centres, etc.) that would contribute to the articulation of a knowledge base are not in place. Some countries may want to address this need by using existing facilities or mechanisms, while others may prefer to set up new measures as an indication of the increased priority allotted to innovation in VET, such as the creation of dedicated research centres, networks, or prioritised calls. Irrespective of

the situation, countries should certainly make an effort to generate a one-stop shop or window for accessing the existing knowledge base about VET.

The benefits of investments made in VET innovations will hardly be recognised and of any relevant use unless the appropriate tools for knowledge management are in place to gather knowledge that might be usually dispersed (for instance, in different stakeholders but also from diverse sources of innovation), cumulate it in a consistent and coherent way, articulate it to generate clear messages, and finally to disseminate results in decision-oriented terms both for practitioners and policy makers.

Supplement investments in VET innovations with the necessary efforts in monitoring and evaluation

It is in the best interest of public governance and accountability to generate the mechanisms and procedures required to approach critically both bottom-up and top-down innovations. An empirical assessment can contribute decisively to:

- Inform decisions about scaling up or diffusion of innovations.
- Instil in the main actors involved the culture of output-oriented innovation – innovations aimed at measurable improvements that can help to cope with innovation fatigue or resistance.
- Get value for money.
- Obtain feedback on the results of particular policy measures intended to foster innovation.

Support relevant research on VET according to national priorities and link these efforts to innovation

VET research needs an additional impulse. VET research is scarce in some countries. In others, there is much development work that is identified as research but has trouble accumulating relevant evidence in a meaningful way. Still in others, VET research is mostly a domain for economists and policy makers, and less for educationalists. But whatever the situation, there exists a need for both practitioners and policy makers to address common challenges regarding the relevance of (sometimes dubious) research, the dissemination of results to stakeholders, and the actual use of those results by them.

VET systems could greatly benefit from a national system of VET research that combines the following elements:

- Funding opportunities for researchers according to national priorities with international standards of quality;

- Capacity building with the co-operation of research centres and universities, if possible, in view of cooperation with international networks;
- Dissemination activities, particularly by means of tailored publications, intended to engage a large range of stakeholders, who in some cases may require some additional capacity building, in the discussion of the implications of research evidence;
- Mechanisms for the involvement of those institutions or programmes responsible for initial and continuous VET teacher training.

The way ahead: can all this be transferred to other education sectors?

There are no particular theoretical reasons that the systemic approach to innovation developed throughout this project and applied to the VET sector cannot be eventually explored and refined in the context of other education sectors. Different sectors have different structural characteristics that, in many respects, can be said to be systems on their own. Particularly when it comes to innovation, the principle that the schools sector, the higher education sector, and even the sector of distance education can be examined as systems in which innovation can be approached holistically, in a systemic way seems plausible.

Less clear is whether the main findings of this project can be transferred to other education sectors. There are at least three characteristics that make VET systems unique in relation to innovation: a) the comparatively high importance that three groups of stakeholders have in relation to other sectors: private companies, professional organisations, and social partners; b) the closest interaction and interdependence with the labour market (particularly, but not exclusively, with young people); and c) the nuances specific to apprenticeship models, where they exist, and the financial implications both for public and private providers. All these factors can make VET systems more conducive to certain innovations and to developing particular dynamics among stakeholders that can hardly occur in other education sectors.

When analysing processes of innovation in education, context matters. Therefore, the transfer of lessons learnt from one particular context to others may not be immediate or automatic. On the whole, however, and drawing on previous CERI work on innovation in education, it appears that many of the conclusions and their corresponding policy implications presented here may be of interest to other education sectors. One example is that the issue of the evaluation of innovations would have to be completely revisited both in the schools and in the higher education sectors. In the former, many OECD countries have developed well structured assessment systems, which would certainly need to be considered when setting up any mechanism or procedure to evaluate the effects of innovations. However, the meaning of innovation in higher

education is often completely different, as it includes the possible range of innovations (for instance, in teaching and learning) and the degree of institutional autonomy and competition among institutions, which in some countries would make it unrealistic to consider top-down, government-led innovations but would certainly welcome opportunities for discrete innovations.

Finally, it is worth saying that for those interested in innovation in education, whether from a practitioner, researcher, or policy maker perspective, the systemic approach to innovation offers a good starting point for examining how a particular educational sector, and also a given institution or organisation, approaches innovation.

Key messages

There are four major lessons learnt:

- Systemic innovation is a useful analytical framework for assessing innovation policies in VET;
- A coherent and targeted system should be in place to promote and support successful innovations in VET and to induce system-wide change. Such systems are still infrequent at country level;
- VET systems need a formalised, coherent, well-sustained and up-to-date knowledge base to increase their innovation capacity, to address knowledge gaps and to benefit fully from systemic innovations; and
- VET systems may be losing innovation opportunities due to a lack of evaluations and knowledge feedback into the system.

In times of economic crisis, a systemic approach to innovation in VET is even more urgent. To set up the conditions for such a system, governments in particular, with the support of the remaining stakeholders in VET, may need to:

- Develop a systemic approach to innovation in VET as a guiding principle for innovation-related policies.
- Promote a continuous and evidence-informed dialogue about innovation with the stakeholders in VET.
- Build a well-organised, formalised, easy to access and updated knowledge base about VET, as a prerequisite for successfully internalising the benefits of innovation.
- Supplement investments in VET innovations with the necessary efforts in monitoring and evaluation.
- Support relevant research on VET according to national priorities and link these efforts to innovation.

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Working Out Change

SYSTEMIC INNOVATION IN VOCATIONAL EDUCATION AND TRAINING

What can do education systems to become more innovative? This book analyses systemic innovation in education by looking at the ways in which educational systems encourage innovation, the knowledge base and processes used, and the procedures and criteria used to assess progress and evaluate outcomes. It draws on findings from 14 case studies in Vocational Education and Training in six OECD countries: Australia, Denmark, Germany, Hungary, Mexico and Switzerland. The resulting analysis helps us understand how we can support and sustain innovation in educational systems in the VET sector.

This book's main findings and policy recommendations will interest researchers, policy makers and practitioners in the fields of education, public sector innovation and vocational education and training.

Further reading

*Beyond T*extbooks: *Digital Learning Resources as Systemic Innovation in the Nordic Countries*

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