

MAPPING PARTNERSHIPS AND INTERACTIVE CAPABILITIES IN SKILLS DEVELOPMENT SYSTEMS

A guide to data management and analysis

RESEARCH INSTRUMENT 7: *This document provides practical guidelines and a set of templates for managing and analysing data on the partnerships and capabilities of universities and TVET colleges to form effective partnerships and learn through interaction. It forms part of a set of related documents providing a conceptual framework, and practical guidelines and instruments for research in universities, TVET colleges, firms and intermediaries such as SETAs. The guide should thus be read in conjunction with the set of documents.*

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LMIP PROJECT: A STUDY OF LABOUR MARKET INTERACTIVE CAPABILITIES,
STRUCTURES AND MECHANISMS IN DIVERSE POST-SCHOOL EDUCATION AND
TRAINING INSTITUTIONAL SETTINGS

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ACRONYMS

AET	Adult Education and Training
DHET	Department of Higher Education and Training
HSRC	Human Sciences Research Council
LMIP	Labour Market Intelligence Partnership
PSET	Post-school Education and Training
SETA	Sector Education and Training Authority
SKA	Square Kilometre Array
SMME	Small, Medium and Micro Enterprise
SSI	Sectoral System of Innovation
TVET	Technical and Vocational Education and Training

Introduction

In 2012, the Department of Higher Education and Training (DHET) commissioned the Human Sciences Research Council (HSRC) to lead a national research consortium, *the Labour Market Intelligence Partnership (LMIP)*, to support it in creating a strategic labour market intelligence system.

This set of research guides is based on an LMIP project: *A study of labour market interactive capabilities, structures and mechanisms in diverse post-school education and training institutional settings*. The study investigated ways in which alignment between public and private education and training providers, and firms and labour markets, can be improved. The researchers designed a framework and a set of instruments for collecting and analysing data on organisational capabilities and interaction in skills development networks. It used these to analyse practices within three sectoral systems: sugarcane growing and milling in Kwa-Zulu Natal, automotive components manufacturing in the Eastern Cape, and astronomy, specifically the Square Kilometre Array big-science project.

In a changing policy landscape, universities and TVET colleges are challenged to improve their responsiveness to skills needs, and Sector Education and Training Authorities (SETAs) are expected to improve their performance as intermediaries (see DHET 2013). New regulatory instruments require that these post-school education and training organisations work more closely with key stakeholders in their local settings, such as firms and local government. To improve responsiveness, universities, TVET colleges and SETAs are required to improve their understanding of skills needs in their local settings, and gather information on their partnerships and linkages with other education and training organisations, employers, and so on.

The LMIP research team thus offer a set of research guides, as one set of tools skills and strategic planners and researchers in the DHET, universities, TVET colleges and SETAs can use to inform their skills planning processes. We offer a conceptual framework, practical guidelines and instruments for research on skills development partnerships and networks, and the capabilities of universities, TVET colleges and SETAs to form effective partnerships towards improving alignment between skills demand and supply.

Purpose of this research guide

This research guide (**Research Instrument 7**) provides practical guidelines and a set of templates for analysing information on the partnerships and capabilities of universities and TVET colleges to form effective partnerships and learn through interaction – i.e. their interactive capabilities. It is designed as a supporting document and should be read in conjunction with a set of related research guides, as listed in Table 1. **Research Instrument 1** describes the framework and methodology underpinning the research. **Research Instrument 2** provides a template for conducting a sectoral overview that can be used to inform the fieldwork. **Research Instruments 3 to 6** provide detailed practical guidelines and templates for gathering information on partnerships and interactive capabilities. Each focuses on a key type of organisation in skills development systems: universities, TVET colleges, firms, and intermediaries.

Table 1: Description of the research guides

Document number	Description of document
1	A framework and methodology to guide research
2	Guide and template for conducting a sectoral overview
3	Fieldwork guide and template for research in universities
4	Fieldwork guide and template for research in TVET colleges
5	Fieldwork guide and template for research in firms
6	Fieldwork guide and template for research in SETAs and other intermediaries
7	Data management and analysis strategy and instruments

Structure of the research guide: Data management and analysis strategy and instruments

Section 1: Towards a narrative report: outline of the case study design

Section 2: Managing and analysing data on firms

Section 3: Managing and analysing data on intermediaries

Section 4: Managing and analysing data on universities

Section 5: Managing and analysing data on TVET colleges

Key terms and concepts

Table 2 provides a summary of the key terms and concepts used in this document. It is a useful glossary that can be referred to repeatedly, in each section of the guide.

Table 2: A summary of key terms and concepts

Sectoral system of innovation	“(S)ets of actors organised around specific types of productive activities and technologies” (e.g. sugarcane milling), within distinct geographical (e.g. in KwaZulu-Natal) and institutional settings (e.g. policy)¹.
Competencies	The pre-set attributes of firms (and individuals), including expertise, human resources, organisational routines and structures, technologies, formal policies or other physical resources ² .
Interactive capabilities	The capacity to form effective linkages with other organisations and use existing competencies to learn through interaction ³ .
Dynamic interactive capabilities	The capacity to sense changes in the environment relevant to the organisation, and take an effective and timeous response through strategic management.
Institutions	Rules or guides for behaviour, distinguished between: formal (e.g. national policy) and informal (e.g. organisational culture), binding (specific regulations) and created by interaction (e.g. contracts), national (e.g. patent system) and sectoral (e.g. sectoral labour markets) institutions.
Social skill	The ability to form linkages, work in a team and “induce cooperation among actors in an organisation or any other field” ⁴ .
Post-school education and training (PSET) organisations	Diverse set of private and public education and training organisations – that is, universities, universities of technology, vocational education and training organisations (TVET), private colleges, private higher education institutions, and other training providers (e.g. AET public and private institutions, training centres operated by industry associations, etc.).
Sectoral intermediaries	Organisations in sectoral systems of innovation that facilitate interaction, and translate and facilitate information flows ⁵ as well as offer services (e.g. training) that are not easily available in the system but are essential.
Private intermediaries	Sectoral intermediaries that tend to focus more on industry or firm-specific issues.
Public intermediaries	Sectoral intermediaries that tend to focus on public good objectives, especially those related to policy.
Actors	Participants or stakeholders in skills development systems, which could include individuals, organisations or units within organisations.

¹ Malerba (2005)

² von Tunzelmann and Wang (2003)

³ von Tunzelmann and Wang (2003, 2007 in Iammarino, 2009)

⁴ Fligstein and McAdam (2012: 46)

⁵ van Lente et al (2003: 248)

Section 1. Towards a narrative report: outline of the case study design

To recap: we developed a case study design, with the empirical boundaries defined by a sectoral system of innovation (SSI), using a combination of:

- desktop and data-based research
- key informant interviews at different levels within the firm, intermediary and education and training organisation

A detailed description of the conceptual framework and research design is provided in **Research Instrument 1**. It is important that you are familiar with these concepts, which you will use to analyse the data.

For convenience, we provide a summary of the **research design in Table 3** below. The research templates for conducting each phase are set out in separate documents: **Research instrument 1 to 7, as listed in Table 1**. The table shows the different steps to be followed and the relevant research instruments used at each step, to gather data. Now, the task is to analyse and synthesise the data across the SSI.

In **Sections 2 to 5**, we provide separate sets of **analytical templates** for each type of actor – university, TVET College, firm and intermediary organisation – as resources to manage and analyse the data in line with the conceptual framework. **Sections 2 and 3** focus on firms and intermediaries, whereas **Sections 4 and 5** focus on universities and TVET colleges, respectively. As indicated in **Table 3**, the analytical templates inform the preparation of a narrative report on each set of actors, which then feeds into a synthesis report on partnerships, capabilities and skills development in the sectoral system of innovation.

Table 3: Outline of the case study research design: how do all the pieces fit together?

	STEP 1 - DESKTOP RESEARCH	STEP 2.1 - FIELDWORK INTERVIEWS	STEP 2.2 - ANALYTICAL TEMPLATES	STEP 3 - FIELDWORK REPORTS	STEP 4 - CASE STUDY REPORT
SECTOR LEVEL	Sector background paper (Research Instrument 2)			Report on partnerships and networks (Research Instrument 7)	Integrated case study report (Research Instrument 7)
FIRMS	Desktop research and secondary data	Interviews with firms (Research Instrument 5)	Internal and external interface mechanisms (Research Instrument 7 Section 2)	Narrative Report (Research Instrument 7 Template 2)	
INTERMEDIARIES	Desktop research and secondary data	Interviews with private intermediaries (Research Instrument 6)	Internal and external interface mechanisms (Research Instrument 7 Section 3)	Narrative report (Research Instrument 7 Template 2)	
		Interviews with public intermediaries (Research Instrument 6)	Internal and external interface mechanisms (Research Instrument 7 Section 3)		
UNIVERSITIES	Desktop research and secondary data	University interviews (relevant to SSI) (Research Instrument 3)	(Research Instrument 7 Section 4 Template 1 A, B, C)	Narrative report (Research Instrument 7 Template 2)	
		University interviews (not relevant to SSI) (Research Instrument 3)	(Research Instrument 7 Section 4 Template 1 A, C)		
TVET	Desktop research and secondary data	TVET interviews (relevant to SSI) (Research Instrument 4)	(Research Instrument 7 Section 5 Template 1 A, B, C)	Narrative report (Research Instrument 7 Template 2)	
		TVET interviews (not relevant to SSI) (Research Instrument 4)	(Research Instrument 7 Section 5 Template 1 A, C)		
		Interviews in other types of colleges (e.g. agricultural colleges) (Research Instrument 4)	(Research Instrument 7 Section 5 Template 1 A, B, C)	Narrative report (Research Instrument 7 Template 2)	

Section 2. Managing and analysing data on firms

The main aim of the research in firms is to understand the skills needs of firms and how they meet those needs in the context of rapid change in technology and consumer demand, and dynamic competition. Such an understanding would provide insight into the role that education and training organisations are playing in the sectoral system of innovation (SSI), and (mis)alignment between firms' skills demand and education and training organisations' current responses to demand.

This section should be read in conjunction with two other documents: Research Instrument 1, which provides a detailed description of the conceptual framework and research design; and **Research Instrument 5**, which provides detailed guidelines for conducting the research in firms. **Research Instrument 5** includes three structured schedules to guide the fieldwork:

1. A semi-structured **interview** schedule to explore the skills needs, strategies for meeting skills needs, and technological change in the sector (Schedule 2).
2. A Likert scale on technological change ('environmental turbulence') and dynamic interactive capabilities (Schedule 4).
3. A structured schedule eliciting information on the firms' interactions with others involved in skills development in the SSI, essentially who interacts with whom and how (Schedule 5).

In this section, we provide two analytical **templates**: **Template 1** requires that you list the mechanisms and strategies the firms use for meeting their skills needs, based on the interview data, and **Template 2** provides an outline that can be used to prepare a narrative report. The narrative report outline focuses on describing technological change in the sector and the related skills needs and strategies for meeting those needs, challenges/constraints/threats/facilitators to skills development that firms experience, and the dynamic interactive capabilities of the firms. The sources of data that should be used for the narrative report include the qualitative data gathered through the semi-structured interview schedule and the quantitative data gathered through the structured questionnaires on change in the sector or 'environmental turbulence' and dynamic interactive capabilities. In addition, **Research instrument 2**, the sectoral background paper, is an important source of contextual data.

TEMPLATE 1: Analytical template

Strategies and mechanisms for meeting skills needs

Use the information obtained via the questions on the strategies that firms use to meet their skills needs in order to complete this section. **Note that we have included indicative examples only, for you to add on to the template.**

1. What *internal interface mechanisms/strategies* does the firm use for building capacity?

Mechanism	Describe the nature and reach of the mechanism
Workplace learning	
Formal training	
Feedback	
R&D	
Mentoring	
Other – specify	

2. What *external interface mechanisms/strategies* does the firm use for building capacity?

Mechanism	Describe the nature and reach of the mechanism
Hiring graduates	
Formal training	
Knowledge transfer	
Financial investment (e.g. bursaries)	
Sectoral training centre	
Staff exchange	
Inform curricula in FET colleges	
Inform curricula in universities or universities of technology	
Guest lecturing in colleges or universities	
Other – specify	

TEMPLATE 2: Narrative Report Template: Firms

The report is loosely structured using the main concepts to guide the analysis. It will be analytically descriptive, to allow us to draw out trends and patterns within and between SSIs. It will require an understanding of the conceptual framework and draw on the analytical template for dimensions that may provide evidence for a concept. Below is a guide, but feel free to make changes as you proceed.

Throughout the report, you should consider whether there are distinct groupings of firms that differ in their capabilities and skills needs. Your analysis should use these groupings. We have been careful to select firms along the lines of the main distinction in the sector, highlighted by the sectoral background paper. For instance, in the sugar sector, we have small and large growers, and millers. In the automotive sector, we have MNCs and locally owned Tier 1 suppliers. Each is likely to have very different perspectives on the knowledge base and environmental turbulence, and hence, the skills needs and strategic mechanisms they use. So, for instance, multi-national firms may meet high level skills needs by importing staff from their subsidiaries in other countries, or small growers may rely on family members.

Section A. Characterising the knowledge challenges and environmental turbulence

Summarise the main knowledge and technology challenges in the sector, and how these are articulated by distinct types of firms in the SSI.

Describe and analyse your sense of the routine environment / and the degree of environmental turbulence for the distinct groupings of firms.

Discuss the kinds of skills that firms require, at the low, intermediate and high skills occupational levels, and the gaps or bottlenecks they identify in skills supply. In addition, identify the circumstances in the environment that may impact on skills development in future.

What we are aiming at is a dynamic sense of skills demands, rather than a static demand-supply matching exercise, and a nuanced distinction between sets of firms with similar capabilities.

Source: background paper, documentary analysis, environmental turbulence schedule, interviews with managers

Section B. Strategies for meeting changing skills needs

Building on the previous section, here we describe the strategies that distinct types of firm use to address their training and skills needs. Focus particularly on how firms respond to changes in skills needs occurring due to rapid changes in technology or consumer demand. In particular, we have data on firms' capability to sense, identify and adapt to change strategically that can be analysed systematically.

Source: dynamic interactive capabilities schedule, interviews with managers, analytical template

Section C. What are firms' proposals for change in the post-school sector?

Provide a detailed discussion of firms' successes and failures in working with education and training organisations directly or indirectly. Likewise, a detailed discussion of the changes managers propose to improve organisational responsiveness and the employability of graduates can add value. This section will provide important information on firms' perceptions of skills demand and the post-school sector for DHET, to inform possible interventions or existing gaps to be addressed.

Conclusion

In conclusion, you should sum up how distinct groups of firms display the capability to keep up with changes in their environment, and show whether and how these groups differ in the strategic mechanisms they use to address their skills needs, particularly mechanisms that involve interacting directly with education and training organisations.

Section 3. Managing and analysing data on intermediaries

The main aim of the research on intermediaries is to find out about the role that sectoral intermediaries play in relation to skills development. Specifically, we are interested in exploring the role that sectoral intermediaries play in initiating and supporting skills development networks, in assisting firms to recruit suitably skilled individuals, and to support education and training organisations in meeting firms' skills needs.

Sectoral intermediaries may also play a crucial role in co-ordinating skills development in the sector and in providing training in sector-specific skills in order to fill skills gaps. Intermediaries are suitably placed to provide insight into knowledge and technological change in the sector and related skills needs, as well as challenges/constraints/threats/facilitators to skills development and any bottlenecks, in order to provide recommendations for more targeted institutional mechanisms.

We distinguish between the roles of public and private sectoral intermediaries as they differ in terms of their main functions (see Interramakund et al 2012). Figure 1 illustrates the key dimensions we aim to investigate in relation to sectoral intermediaries, with possible features of each for illustrative purposes.

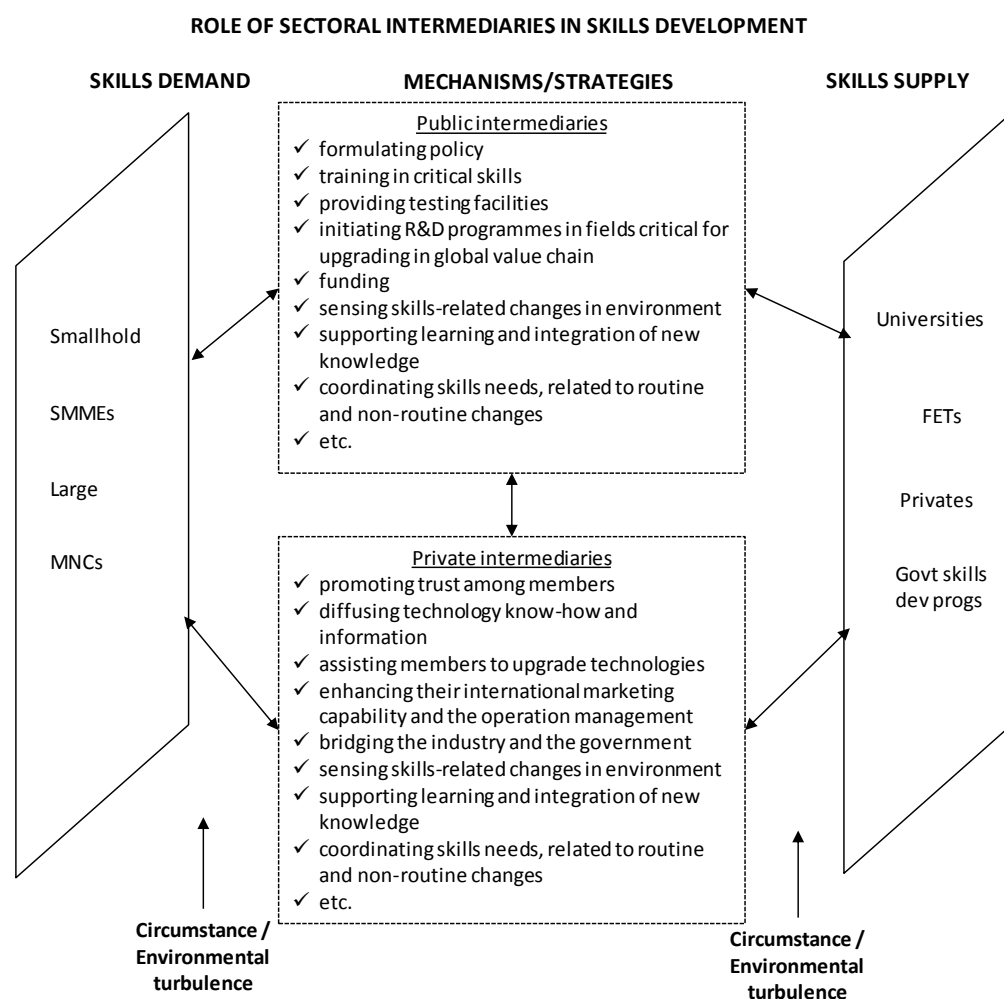


Figure 1: Role of sectoral intermediaries-a generic framework

This section should be used in conjunction with two other documents: Research Instrument 1, which provides a detailed description of the conceptual framework and research design; and **Research Instrument 6,** which provides detailed guidelines for conducting the research in intermediaries. **Research Instrument 6** includes three structured schedules to guide the fieldwork:

1. A semi-structured **interview** schedule to explore the skills needs in the sector, coordination of skills development overall, and the dynamic interactive capabilities and strategies of the intermediaries for meeting skills needs (Schedule 2)
2. Likert scales on dynamic interactive capabilities and technological change ('environmental turbulence') (Schedule 3), and a structured schedule eliciting information on who interacts with whom and how, for the network analysis (Schedule 4)
3. An analytical **template** to gather background information on the sectoral intermediary, and the internal and external interface mechanisms the organisation uses (Template 1)

In this section, we provide two analytical **templates**: **Template 1** requires that you list the mechanisms and strategies each of the (selected) intermediaries in the sectoral system of innovation (SSI), that reflects on the mechanisms and strategies they use in supporting skills development, based on the interview data, and **Template 2** provides an outline that can be used to prepare a narrative report. The narrative report outline focuses on describing technological change in the sector and the related skills needs and the role that the intermediaries play, providing a typology of intermediaries in relation to their main functions. The sources of data that should be used for the narrative report include the sectoral background paper and map of actors and networks in the SSI, the qualitative data gathered through the semi-structured interview schedule and the quantitative data gathered through the structured questionnaires on change in the sector or 'environmental turbulence' and dynamic interactive capabilities, and the desktop information obtained from websites, strategic plans, annual reports, GIS maps, secondary sources, on each intermediary.

TEMPLATE 1. Analytical template

Strategies and mechanisms for meeting skills needs

Use the information obtained via the questions on the strategies that sectoral intermediaries use to meet skills needs in the sector in order to complete this section. **Note that we have included indicative examples only, for you to add on to the template.**

1. What *internal interface mechanisms/strategies* does the sectoral intermediary use for supporting skills development?

Mechanism	Describe the nature and reach of the mechanism
Training programmes / centres at the intermediary	
Offering short courses	
Developing sector-specific institutional mechanisms	
Developing/promoting institutional mechanisms relevant for the development of the sector	
Coordinating skills needs, related to routine and non-routine changes in environments	
Promoting trust among members	
Other – specify	

2. What *external interface mechanisms/strategies* does the intermediary organisation use for supporting skills development?

Mechanism	Describe the nature and reach of the mechanism
Scanning the environment for knowledge relevant to firms and education and training organisations and information processing	
Transferring specialised knowledge	
Diffusing information and best practice techniques	
Assisting members to upgrade technologies	
Enhancing members international marketing capability and the operation management	
Providing testing facilities	
Funding	
Facilitating development of associations and membership-based networks	
Helping education and training organisations market graduate programmes	
Helping firms articulate skills needs	
Supporting the setting up of co-operative training programmes	
Supporting the setting up of work placement programmes	
Helping combine the knowledge or experience of two or more partners	
Brokering	
Other – specify	

TEMPLATE 2: Narrative Report Template - Sectoral Intermediaries

The report is loosely structured using the main concepts and questions to guide the analysis. It will be analytically descriptive, to allow us to draw out trends and patterns that distinguish the diverse roles that public and private intermediaries play in promoting interaction between supply and demand in the SSI. It will require an understanding of the conceptual framework and draw on the analytical template for dimensions that may provide evidence for a concept. Below is a guide, but feel free to make changes.

Section A. Distinguishing types of intermediaries and environmental turbulence

In this section, you should describe and categorise the nature of the intermediaries, in relation to their main focus and organisation. You can distinguish between those that are public and private, as a first step, as in Figure 1, and then, consider if there are other dimensions that emerge from the empirical data. Throughout the report, you should consider whether there are distinct groupings of intermediaries that differ in their capabilities and roles. Your analysis should use these groupings. For instance, government intermediaries are likely to have very different perspectives on the knowledge base and environmental turbulence than private sector associations or professional bodies, and hence, the strategic mechanisms they use to promote skills development.

Describe and analyse your sense of how the sectoral intermediaries interpret and view the routine environment / environmental turbulence within the SSI. How much do they use such interpretations as the basis for or to inform their strategic roles and interventions in the sector?

Source: background information and documentary analysis, interviews with managers, Figure 1, environmental turbulence schedule

Section B. Strategies for meeting changing skills needs

Building on the previous section, here we describe the mechanisms and strategies that distinct types of intermediaries use to promote interaction between firms and education and training organisations in the sector – or not, as the case may be.

Focus particularly on how intermediaries respond to changes in skills needs occurring due to rapid changes in technology or consumer demand. In particular, we have data on intermediaries' capability to sense, identify and adapt to change strategically that can be analysed systematically. Describe the ways in which they support training to address critical skills or gaps.

For public sectoral intermediaries, it will be important to identify the policy framework and instruments developed to facilitate skills needs in general and in the specific sector.

Source: dynamic interactive capabilities schedule, interviews with managers, analytical template

Section C. What are intermediaries' proposals for change in the post-school sector?

Provide a detailed discussion of different types of intermediaries' successes and failures in working with education and training organisations directly or indirectly. Likewise, a detailed discussion of the changes proposed to improve organisational responsiveness and the employability of graduates can add value. This section will provide important information on intermediaries' perceptions of skills

demand and the post-school sector for DHET, to inform possible interventions or existing gaps to be addressed.

Conclusion. What are the main roles of sectoral intermediaries in the SSI?

In conclusion, you should sum up how distinct types of intermediaries display the capability to keep up with changes in their environment, and show whether and how these groups differ in the strategic mechanisms they use to ensure that education and training organisations respond to firms' needs.

We suggest a simple comparative matrix to identify and categorise the roles of the public and private intermediaries in an SSI, to engage critically and in an empirically informed manner with the indicative set of roles presented in Figure 1. Below is an indicative example, with a higher level of analysis discerning sets of roles in the left hand column, and space for listing specific roles in each of the other columns.

	Private intermediaries	Public intermediaries
<i>Sensing roles</i>		
<i>Coordinating roles</i>		
<i>Bridging roles</i>		
<i>Etc.</i>		

Section 4. Managing and analysing the data on universities

The main aim of the research in universities is to understand how the university is organised to facilitate interaction with firms to inform teaching activities, in terms of programmes, curricula and forms of work-based learning, as well as how universities are organised to facilitate graduates' transition to the workplace.

This section should be read in conjunction with **two other documents: Research Instrument 1**, which provides a detailed description of the conceptual framework and research design; and **Research Instrument 3**, which provides detailed guidelines for conducting research in universities. **Research Instrument 3** includes three structured instruments to guide the fieldwork:

1. A semi-structured **interview** schedule to explore interactive capabilities and dynamic interactive capabilities (Schedules 2 and 3)
2. A **network** analysis structured schedule to record who interacts with whom and how (Schedule 4)
3. An analytical **template** to gather basic information pertaining to the university's competences in general, and in relation to the relevant fields; and on its interactive capabilities and dynamic interactive capabilities (Template 1)

In this section, we provide two analytical templates: **analytical Template 1** should be completed on each university in the sectoral system of innovation (SSI), to reflect on its competences, interactive capabilities and dynamic interactive capabilities in a systematic manner. **Template 2** provides an outline that can be used to prepare a narrative report. The narrative report will focus on the interactive capabilities of the university actors to address the routine and changing skills needs of firms in the SSI. The sources of data that should be used for the narrative report include the sectoral background paper and map of actors and networks in the SSI, on each university, qualitative data gathered through the semi-structured interview schedule and the quantitative data gathered through the structured questionnaires on change in the sector or 'environmental turbulence' and dynamic interactive capabilities and the desktop information obtained from websites, strategic plans, annual reports, HETMIS and CHET data sets, GIS maps, and secondary sources .

TEMPLATE 1: Analytical template

_____ UNIVERSITY (add name)

Section A: Assessment of tacit competencies of the university

A 1. Please provide total enrolments per *faculty* for the most recent year available, distinguishing between under-graduate and post-graduate students.

ENROLMENT		
Faculty name	Under-graduate	Post-graduate
Total		

A 2. Please provide the total number of *academic staff per faculty*.

ACADEMIC STAFF	
Faculty name	Total
Total	

A 3. How does the institution expect staff to distribute their working time among the following academic functions? **This data should be collected by the researcher during the interview with the Head of Institutional Planning.**

	% time
Teaching	
Research	
Private activities for individual gain	
Community engagement	
Administration	

Section B: Assessment of codified competencies and interactive capabilities of the university

Use the information obtained via the interviews and from analysis of university documents gathered, to complete this section. **Note that we have included indicative examples only, for you to add on to the template.**

B1. How do *formal organisational policies and structures* foreground the university's role in producing skilled graduates to meet firms' needs, in general and/or in relation to the sectoral system of innovation (SSI)? **We are interested in what mechanisms the university has in place, and how they use it.**

	Nature and reach, and key thrust in terms of responding to firms' skills needs	Comment on the extent to which these interface structures inform teaching (i.e. the degree of functional integration or fragmentation and operation in silos)
Organisational policy:		
Strategic institutional policy		
Teaching and learning policy		
Work-integrated learning policy (includes cooperative learning)		
Community engagement policy		
Service learning policy		
Organisational structures:		
Graduate attributes framework		
Technology transfer office		
Community engagement office		

Science park		
Small business incubator		
Experimental farm or agricultural centre		
Specialised outreach campus or delivery site based in communities		
Technology station		
Academic Development/Teaching and Learning Department		
Curriculum Development Centre		
Institutional Planning Department/Unit		
Short Course/Professional Development Centre		
Careers Advisory office		
Service Learning centre or unit		
Cooperative Learning centre or unit		
Alumni office and programme		
Financial Aid and Scholarships office		
Other – specify		

B2. Does the university have *internal interface mechanisms* that promote interaction with firms to inform graduate skills or transition to labour market?

Mechanism	Describe the nature and reach of the mechanism	Comment on the extent to which these interface structures inform teaching (i.e. the degree of functional integration or fragmentation and operation in silos)
Performance management system rewarding teaching and learning		
Awards for distinguished teaching		
Promotion criteria that rewards interaction or engagement with firms		
Specialised funds for promoting interaction with firms		
Graduate tracer surveys or exit polls		
Research on experiential / workplace learning		
Senate Teaching and Learning Committee		
Quality Assurance Committee		
Programme Accreditation and Approval Committee		
Other strategies for using competencies identified above for improving teaching		
Other strategies for using competencies identified above for improving graduates' transition to the work place		
Other –specify		

B3. Does the university have *external interface strategies and mechanisms* dedicated to producing skilled graduates, in relation to the relevant departments?

External interface structure	Describe the nature and reach of the interface	Comment on the extent to which these interface structures inform teaching (i.e. the degree of functional integration or fragmentation and operation in silos)
Industry input into Programme Qualification Mix		
Industry Advisory Body		
Strategy to engage with professional associations (e.g. Engineering Council of SA)		
Strategy to engage with higher education stakeholders (SATN, HESA, etc.)		
Strategy to engage with national qualifications structures (e.g. HEQC, QCTO)		
Strategy to engage with national disciplinary networks in a specific field of study (e.g. Deans Forum)		
Strategy to engage with SETAs or FET colleges in a specific field of study (e.g. SATN and SACPO)		
Strategy to engage with DHET with regard to teaching activities		
Training courses for firms		
Open days for firms		
Career exhibitions		

Firm bursary or scholarship programmes with a work requirement		
Internship programmes based in firms		
Other – specify		

Section C: Assessing competencies and interactive capabilities in the relevant departments

C 1. Please provide the total number for each of the competencies listed in the table, *per department/unit/centre relevant* to the sectoral system of innovation (SSI).

TACIT COMPETENCIES IN THE RELEVANT DEPARTMENTS		
Department	Tacit Competence	Number
Department 1	Academics with PhDs	
	Academics with NRF rating	
	Average number of publications	
	Total academics	
	Postgraduate students	
	Number of grants awarded	
	Average total undergraduates produced	
Department 2	Academics with PhDs	
	Academics with NRF rating	
	Average number of publications	
	Total academics	
	Postgraduate students	
	Number of grants awarded	
	Average total undergraduates produced	

TACIT COMPETENCIES IN THE RELEVANT DEPARTMENTS		
Department	Tacit Competence	Number
Department 3	Academics with PhDs	
	Academics with NRF rating	
	Average number of publications	
	Total academics	
	Postgraduate students	
	Number of grants awarded	
	Average total undergraduates produced	

TEMPLATE 2: Narrative report template - Universities

The report is loosely structured using the main concepts to guide the analysis. It will be analytically descriptive, to allow us to draw out trends and patterns within and between SSIs. It will require an understanding of the conceptual framework and draw on the analytical template for dimensions that may provide evidence for a concept. Below is a guide, but feel free to make changes as you proceed.

Section A. Environmental turbulence

Describe and analyse your sense of the routine environment / environmental turbulence relative to firms in the SSI, the higher education sector and in each university (for example, are they still dealing with the impact of mergers, or weak administration necessitating external intervention).

What are the circumstances in the environment that may facilitate or constrain the development of interactive capabilities in a specific university?

Source: documentary analysis, interviews with managers

Section B. Competences

Analyse the tacit competencies of all the universities in the sector, in general and in relation to the SSI specifically.

What are their codified competences – the organisational structures and formal institutional policies – to respond to firm demand in general, and in relation to the SSI – in terms of their programmes, workplace learning and placement on completion?

Source: background data, interviews, documentary analysis

Section C. How are competencies transformed into interactive capabilities with firms and other intermediary actors in the SSI?

Analyse the internal and external interface mechanisms and strategies utilised in the departments, to consider how they enhance or constrain the ability to interact with firms in the SSI.

The capacity for learning and accumulation of new knowledge on the part of the organisation, and the integration of behavioural, social and economic factors into a specific set of outcomes (von Tunzelmann and Wang, 2003, 2007 in Lammarino, 2009). It refers to the capacity to form effective linkages with other organisations (e.g. firms, intermediaries). It involves the learning and exploitation of an organisation's competences, and the development of organisational routines for producing desired outcomes.

Analyse the dynamic interactive capabilities, assessing the capacity to sense, identify and adapt to change strategically:

The capacity to sense changes in the business and education environment relevant to the organisation, and take an effective and timeous response through strategic management. This requires familiarity with the organisation's competencies and interactive capabilities for appropriately adapting, co-ordinating, integrating and reconfiguring the organisation's

competencies and interactive capabilities to match requirements of the changing environment. Here, leadership skills for strategic management are crucial

Source: interviews with managers and heads, dynamic capabilities schedule, analytical template

Conclusion: What are the main forms of competences, interactive capabilities and dynamic interactive capabilities in the universities in the SSI?

We suggest a simple comparative matrix along the dimensions of the main concepts underpinning dynamic interactive capabilities, to allow for comparison between the universities in an SSI. We have listed the broad competence and capability categories, but from your analysis, you may be able to add specific significant dimensions within each.

	University 1	University 2	University 3	University 4
Competencies: tacit				
Competencies: codified				
Interactive capabilities				
Dynamic Interactive Capabilities				

Section 5. Managing and analysing data on TVET colleges

The main aim of the research on TVET colleges is to understand how the college is organised to facilitate interaction with firms to inform teaching activities, in terms of work-based learning, as well as how colleges are organised to facilitate students' transition to the workplace

This section should be read in conjunction with two other documents: Research Instrument 1, which provides a detailed description of the conceptual framework and research design; and **Research Instrument 4**, which provides detailed guidelines for conducting the research in TVET colleges. **Research Instrument 4** includes three structured instruments to guide the fieldwork:

1. A semi-structured **interview** schedule to explore interactive capabilities and dynamic interactive capabilities (Schedules 2 and 3)
2. A **network** analysis structured schedule to record who interacts with whom and how (Schedule 4)
3. An analytical **template** to gather basic information pertaining to the college's competences in general, and in relation to the relevant fields; and on its interactive capabilities and dynamic interactive capabilities (Template 1)

In this section, we provide two analytical **templates**: Completion of analytical **Template 1** is required on each college in the sectoral system of innovation (SSI), to reflect on their competences, interactive capabilities and dynamic interactive capabilities in a systematic manner. **Template 2** provides an outline that can be used to prepare a narrative report. The narrative report focusses on the interactive capabilities of the college actors to address the routine and changing skills needs of firms in the SSI. The sources of data that should be used for the narrative report include the sectoral background paper and map of actors and networks in the SSI, Interviews with key policy actors, Interviews with key organisational managers about the college in general, and with managers of relevant units/centres/programmes and desktop information obtained from websites, strategic plans, annual reports, FETMIS and CHET data sets, GIS maps, secondary sources

TEMPLATE 1: Analytical template

_____ TVET college (add name)

Please indicate the year for which you have supplied data

Year	
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Section A: Assessment of tacit competencies of the college

A 1. Please provide *total enrolments per college*, for the most recent year available, distinguishing between the different types of programme. Please indicate the year for data supplied.

Year	
------	--

Number of students per programme					
NC(V)	Report191	Occupational Qualifications	Report 550/NSC	Other	Total
Number of students per programme % national					
NC(V)	Report191	Occupational Qualifications	Report 550/NSC	Other	Total
Number of full-time equivalent (FTE) enrolments					
NC(V) L2 – L4	Report 191 N1 – N3 Engineering Studies	Report 191 N4 – N6 Engineering Studies	Report 191 N4 – N6 Business Studies	-	-

A 2. Please provide the total number of teaching and lecturing staff in the college per field.

Category	Number of staff
Management Staff	
Lecturing Staff	
Support Staff	
Total	

A 3. How does the college expect lecturers to distribute their working time per week among the following functions? **This data should be collected by the researcher during the interview with the Head of Academic Services.**

Activity	Hours per week
Teaching contact time	
Student consultation time	
Outreach (e.g. linkages with small businesses)	
Administration	
Other – specify	

Section B: Assessment of codified competencies and interactive capabilities of the college

Use the information obtained via the interviews and from analysis of college documents gathered, to complete this section. **Note that we have included indicative examples only, for you to add on to the template.**

B 1. Does the college have its own *formal policies* and how do they foreground the colleges' role in producing skilled graduates to meet firms' needs, in general and/or in relation to the SSI? **We are interested in what mechanisms the college has in place, and how they use it.**

	Nature and reach, and key thrust in terms of responding to firms' skills needs	Comment on the extent to which these interface structures inform teaching (i.e. the degree of functional integration or fragmentation and operation in silos)
Organisational policy:		
Strategic institutional policy		
Teaching and learning policy		
Work-integrated learning policy (includes cooperative learning and practical training)		
Community outreach policy		
Student support policy		
MoUs with SETAs		
MoUs with firms		
MoUs with provincial government		
Organisational structures:		
Student support services unit		

Teaching and learning unit		
Placement unit		
Trade test centres		
Institutional Planning unit		
Careers Advisory office		
Cooperative Learning centre or unit		
Skills centre		
Linkages unit		
Marketing unit		
Small business incubator		
Experimental farm or agricultural centre		
Specialised outreach campus or delivery site based in communities		
Alumni office and programme		
Support for bursaries/Financial aid from NSFAS and firm donations		
Other – specify		

B2. Does the college have *internal interface mechanisms* that promote interaction with firms to inform graduates' skills or transition to labour market?

Mechanism	Describe the nature and reach of the mechanism	Comment on the extent to which these interface structures inform teaching (i.e. the degree of functional integration or fragmentation and operation in silos)
Performance management system that rewards teaching and learning		
Awards for distinguished teaching		
Promotion criteria that rewards interaction or engagement with firms		
Specialised funds for promoting interaction with firms		
Graduate tracer surveys or exit polls		
Quality assurance committee		
Staff employed from industry to update teaching		
Staff training to keep up with new technology		
Other – specify		

B 2. Does the college have *external interface mechanisms and strategies* dedicated to producing skilled graduates, in relation to the relevant fields?

Mechanism	Describe the nature and reach of the mechanism	Comment on the extent to which these interface structures inform teaching
Local firms serving on college Council		
Industry liaison events		
Involvement in SACPO committees		
Industry members active role on council		
Internship programme		
Learnership programmes		
Apprenticeship programme		
Open days for firms		
Career exhibitions		
Firm bursary or scholarship programmes		
Internship programmes based in firms		
Student CV database for employers		
Industry Advisory Committee		
Student placement activities (e.g. employment agency)		
Other – specify		

Section C: Assessing competencies and interactive capabilities in the relevant field (agriculture / engineering)

C 1. Lecturers' competencies, *per field relevant* to the sectoral system of innovation (SSI).

	Certificate or short diploma	3-year diploma in the field being taught	First degree in the field being taught	Formal teaching qualification	Experience in industry (number of years)
Number of lecturers in Agriculture					
Number of lecturers in Engineering (total)					
Number of lecturers in Mechanical Engineering					
Number of lecturers in Electrical Engineering					
Number of lecturers in Chemical Engineering					
Total					

C 2. Student achievement in the relevant fields for the latest year

Competence measure	Qualification	Number of students
Field 1: Agriculture		
Enrolment in the relevant field	N 1 – 3	
	N 4 – 6	
	NCV	
	Learnership	
	National Introductory Courses	
	Other – specify	
Average number of students who achieved the qualification in the most recent year available	N 1 – 3	
	N 4 – 6	
	NCV	
	Learnership	
	National Introductory Courses	
	Other – specify	
Field 2: Engineering		
Enrolment in the relevant field	N 1 – 3	

	N 4 – 6	
	NCV	
	Learnership	
	National Introductory Courses	
	Other – specify	
Average number of students who achieved the qualification in most recent year available	N 1 – 3	
	N 4 – 6	
	NCV	
	Learnership	
	National Introductory Courses	
	Other – specify	

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Competencies: codified				
Interactive capabilities				
Dynamic Interactive Capabilities				