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policy brief

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How can universities and colleges improve the alignment between education and work? A systemic, demand-led approach to skills planning and development

Introduction

In the context of rapidly changing technology and increasing globalisation, firms in South Africa are challenged to upgrade their technology and to innovate so that they can become more productive and competitive in a global and national economy. At the same time, they are challenged to create more jobs for sustainable and inclusive growth in the context of high unemployment and growing inequality. This means that the nature of the required education, training and skills is changing rapidly. Thus, policy-makers call for post-school education and training (PSET) organisations to become more flexible, adaptable and responsive to socioeconomic demands. The White Paper for Post-School Education and Training (DHET 2013) sets out a vision for a more integrated and responsive post-school system in order to contribute to improved alignment between dynamic skills demand and supply.

Universities, technical and vocational education and training (TVET) colleges, and other public and private providers need an enhanced understanding of how they can respond to the changing technological capabilities and skills needs of employers. This is so particularly in relation to their professional, occupational and skills-oriented programmes, and to their roles in producing the 'right' graduates for the workplace and the national economy. In turn, if they are to inform and influence

core education and training activities, firms and skills planners need to have an enhanced understanding of the will, competencies and capabilities of universities, TVET colleges and private providers to respond to skills demand. Interaction and partnership between the different stakeholders involved in skills development systems thus becomes critical.

This policy brief proposes a framework that can be used by PSET organisations and skills planners to analyse the current alignment – or misalignment – between labour market demand and skills supply within a system. This framework provides a basis for identifying appropriate change mechanisms and intervention strategies to promote better alignment.

The framework is based on the systems of innovation approach, and focuses on two key dimensions. First, it emphasises the need to analyse whether and how the capabilities and goals of the actors involved in skills development networks are aligned with one another. Second, it concentrates on the capability of universities, TVET colleges, government agencies and firms to form effective linkages and learn through interaction – that is, their 'interactive capabilities'.[1] For instance, a TVET college or university may have well-qualified engineering lecturers but no way to communicate with local firms, or no support to change the curriculum in response to changing technology in a specific sector. The change intervention required relates to finding dynamic internal and external interface mechanisms. However, at another college lecturers may lack the necessary competencies, which means different change interventions may be needed to improve their qualifications and expertise. We have used this framework to conduct case studies of three skills development networks: astronomy and the Square Kilometre Array (SKA) project, automotive component manufacturers in the Eastern Cape, and sugar-cane growers and millers in KwaZulu-Natal (see Kruss et al. 2014). Examples are drawn from the sugar-cane case study to illustrate the framework and its potential value.

The value of a systemic, demand-led approach

The innovation systems approach to skills planning and development draws attention to the importance of *learning* and *interaction* among a range of stakeholders involved in the innovation system, and their *capabilities* and *institutional contexts* (Lundvall 1992). It investigates systemic interaction between firms, government departments and agencies, PSET organisations, trade unions, research organisations, industry associations, non-profit organisations, and other actors. The approach is dynamic and evolutionary, emphasising change over time, but also drawing attention to how historical trajectories and institutions shape what is possible. We adopt this approach, but foreground an emphasis on *network alignment* and *interactive capabilities* (Von Tunzelmann 2010).[2]

The framework leads us to map the existing structure, agents, mechanisms/strategies and dynamics of skills development in specific systems of innovation.

Considering that sectors and regions differ significantly in terms of knowledge bases, skills needs and institutional conditions, it can be useful to focus analysis on the sectoral systems of innovation (SSI) that are relevant to the disciplinary areas of expertise of a university or college. Rather than simply emphasising a sector as an industrial concentration, we define a sector as 'a set of activities which are unified by some related product groups for a given or emerging demand and which share some basic knowledge' (Malerba 2005: 65). For example, the actors within the sub-sectors governed by the Manufacturing, Engineering and Related Services Sectoral Education and Training Authority (MerSETA) share a focus on metals and engineering-related product groups; they also share a knowledge base of engineering and other technological processes that all those who work in the sector will need to acquire.

We can equally consider the influence of stakeholders at the national and/or regional levels that are significant for the university or college, and focus on analysing networks and interactive capabilities in national and/or regional systems of innovation.

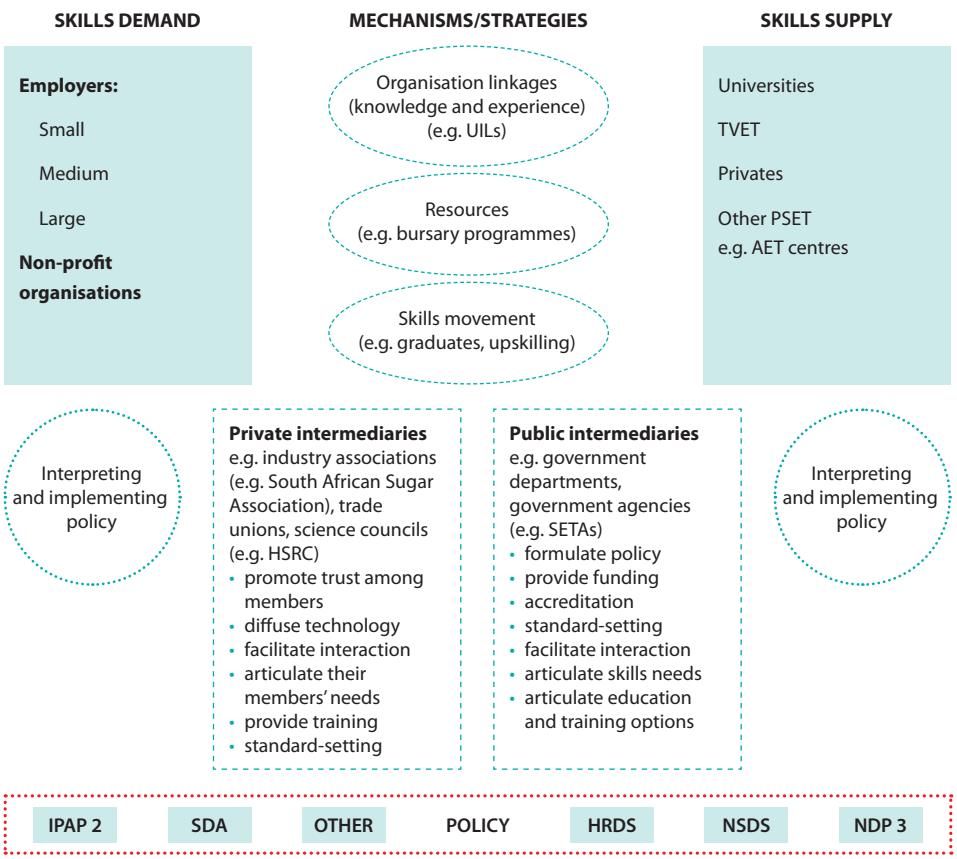
Figure 1 provides a generic representation of the actors, potential flows and interactive learning in a sectoral system of innovation in the South African context. It shows how the system could be outlined or mapped as a basis for studying skills development networks and the interactive capabilities of the main actors.

The left-hand side of Figure 1 describes the diverse groups of employers

1 'Interactive capabilities' are defined as 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 (Iammarino et al. 2009). Interactive capabilities are 'taken as outputs of adaptive learning processes that are sustained through a variety of external connections and sources for innovation' (Von Tunzelmann 2007 and Von Tunzelmann & Wang 2003; in Iammarino et al. 2009: 2).

2 In developing the framework, we integrated the work of Malerba (2005) and Von Tunzelmann (2010). For a detailed description of the framework and the case study research, see Kruss and Petersen (2014) and Kruss et al. (2014).

Figure 1: SSI framework for analysing skills development systems, foregrounding the role of intermediaries



KEY

IPAP 2	Industrial Policy Action Plan II 2014/15 – 2016/17
SDA	Skills Development Accord
HRDS	Human Resource Development Strategy
NSDS 3	National Skills Development Strategy III
NDP	National Development Plan
UIL	University–industry linkage

operating in a sector – whether formal or informal, large, medium or small firms, or non-profit organisations. It is critical to identify their distinctive goals in terms of skills needs. The framework highlights the need to investigate the strategies and mechanisms that firms use for meeting their routine and changing skills demands, which may provide pointers on how PSET organisations can and do play a role in addressing skills needs in specific sectoral systems.

The right-hand side of the figure analyses the different types of PSET organisations that could be addressing multiple skills demand in a sector – whether public TVET colleges, universities or universities of technology, private TVET colleges or higher education and training providers, or other types of providers such as adult education and training (AET) centres. Each of these has its own educational goals and may resist attempts to narrow the roles it might play in terms of its economic responsiveness. Each has different capabilities to interact with firms and other PSET actors or intermediaries.

The circles in the middle of the diagram represent examples of the typical mechanisms and strategies used to link actors on the skills demand and supply sides. For example, there may be flows of financial resources, whereby firms provide scholarships and bursary programmes to meet their future skills requirements. Varying degrees of direct involvement are possible, and could include knowledge flows as well. For instance, a firm may host artisans or college students for workplace training, or university or college lecturers may work in the firm to update their experience and qualifications. Hence, different types of partnerships, such as 'firm–university' partnerships for work-integrated learning and 'SETA–TVET college' partnerships, are identified as mechanisms for interaction in this framework.

Between the left- and the right-hand sides, we identify the intermediary organisations that may serve to connect employers and PSET organisations to align their goals. In the private sector, intermediary organisations include industry associations such as the South African Sugar Association, professional bodies like the Engineering Council of South Africa (ECSA), research institutes, and so on. In the public sector, intermediary organisations include government departments, agencies such as the South African Qualifications Authority (SAQA) and the Quality Council for Trades and Occupations (QCTO), and, critically, the facilitative and coordinating roles played by the SETAs.

Each of the actors is embedded in wider institutional environments, which shape and are shaped by their activities. Hence, at the very bottom of the diagram, we include examples of the main global, national or regional policy instruments that could be shaping demand in a sector or influencing education and training supply. Firms, PSET organisations and intermediary organisations interpret policy and, depending on their interactive capabilities and strategic goals, respond to varying degrees and in different ways.

Understanding the existing interaction within such a sectoral system provides a basis for identifying challenges and bottlenecks. In turn, this can inform targeted policy interventions to address the specific gaps and bottlenecks, and enhance alignment. For example, in the sugar case study, network analysis revealed that there is a core network of actors centred on the firms, industry associations and private providers that includes agricultural colleges and universities to a limited extent, but largely ignores TVET colleges. One option for intervention is to fund the private providers to expand their expertise to function more effectively as the preferred providers of sugar-specific education and training. Given the policy commitment in the National Skills Development Strategy III (DHET 2011) and the White Paper for Post-School Education and Training (DHET 2013) to strengthen the role of public PSET organisations in skills development, another option might be to build cooperative partnerships between public agricultural and TVET colleges on the one hand and, on the other, private providers that have been functioning successfully.

Policy implications

The ability of a firm or PSET organisation to respond effectively to shifting demands in the sectoral and policy environments depends on the identification of changes that present opportunities, threats or constraints, and on the organisation's internal capabilities to respond. An appropriate response often involves the acquisition of new knowledge and capabilities, which transform and are transformed by the PSET organisations through learning.

Therefore, using this framework, universities, colleges, firms and skills planners can identify a number of potential spaces for intervention to promote such learning, each of which will require specific mechanisms and strategies. Strategies may include the identification of appropriate actors with which to collaborate in order to best address changes and improve alignment. Here, we provide three generic examples of intervention by way of illustration:

1. *Interventions to enhance employers' interactive capabilities*: This typically would take the form of industry audits of scarce and critical needs. Of greater value could be interventions to promote productivity and technological upgrading across a sector. Sectoral bodies could coordinate needs across employers, and play a bridging role to communicate demand to PSET organisations.
2. *Interventions to enhance interactive capabilities of PSET providers*: PSET organisations play multiple roles alongside producing graduates for the labour market, and any interventions need to start off by recognising that skills development is but one role. Mechanisms are required to strengthen institutional structures and organisational integration. For example, universities of technology have the mechanism of industry advisory boards. The challenge is how to introduce similar mechanisms in universities and TVET colleges, and, equally, to ensure that these mechanisms are incorporated into the core educational business of the university or college.
3. *The role of intermediary organisations*: Intermediaries such as SETAs, industry associations or government actors can play a key role in unblocking bottlenecks, addressing gaps and facilitating interaction. For instance, an industry association may organise private training based in firms given the low quality of education and training programmes offered in the public sector, or a SETA may recruit firms to offer workplace training opportunities for a TVET college. The bridging and networking role of public intermediaries provides multiple opportunities to promote better alignment and linkages.

By highlighting the dynamic nature of skills demand and supply, the framework thus leads universities, colleges and skills planners to focus on fostering alignment in capabilities and goals between networks of actors operating in a skills development system.

References

DHET (Department of Higher Education and Training) (2011) *National skills development strategy III*. Pretoria: DHET

DHET (2013) White Paper on post-school education and training. Pretoria: DHET

Iammarino S, Piva M, Vivarelli M & Von Tunzelmann N (2009) *Technological capabilities and patterns of cooperation of UK firms: A regional investigation*. IZA Discussion Paper No. 4129, Institute for the Study of Labour (IZA), Bonn

Kruss G & Petersen I (2014) Understanding interactive capabilities for skills development in sectoral systems of innovation: A tentative framework. LMIP Working Paper 2, Labour Market Intelligence Partnership

Kruss G, Petersen I, McGrath S & Gastrow M (2014) Responding to shifting demand for skills: How do we get firms and post-school education and training organisations to work together? LMIP Report 4, Labour Market Intelligence Partnership

Lundvall B-Å (Ed.) (1992) *National innovation systems: Towards a theory of innovation and interactive learning*. London: Pinter Publishers

Malerba F (2005) Sectoral systems of innovation: A framework for linking innovation to the knowledge base, structure and dynamics of sectors. *Economics of Innovation and New Technology* 14(1–2): 63–82

Von Tunzelmann N (2007) Capabilities and production theory. *Structural Change and Economic Dynamics* 18: 192–211

Von Tunzelmann N (2010) Alignment, misalignment and dynamic network-based capabilities. In DA Dyker (Ed.) *Network dynamics in emerging regions of Europe*. London: Imperial College Press

Von Tunzelmann N & Wang Q (2003) An evolutionary view of dynamic capabilities. *Economie Appliquée* 6: 33–64

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