

Strengthening the university third mission through building community capabilities alongside university capabilities

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Abstract

Growing concern about widening inequalities and a deepening sustainability crisis has prompted new directions and conceptions of the third mission of universities. This paper contributes by drawing attention to the capabilities required to enable mutually-beneficial engagement with community-based partners in resource-poor local settings to not only co-produce scholarly outputs but also co-produce development outcomes. Based on in-depth case study research of three resource-poor communities in South Africa, we identify a set of capabilities that communities need to possess to seek out and engage with suitable partners and to co-learn through their engagement activities. We propose a new framework, a community ‘dynamic interactive capabilities’ (von Tunzelmann and Wang, 2003) framework, extending the concept from firms and universities to local community settings. The framework prompts a fresh way of thinking about the third mission, whereby universities orient their engaged teaching and research activities in ways co-evolved with the capabilities of community partners.

Key words: third mission; university–community engagement; dynamic interactive capabilities; local development; South Africa.

1. Introduction

This paper contributes to efforts aimed at better understanding and strengthening the impact of university third mission activities in middle- and low-income countries. It aims to do so by drawing attention to the capabilities required to enable mutually-beneficial engagement with community-based partners in resource-poor local settings to not only co-produce scholarly outputs but also co-produce development outcomes. Universities need to build their capabilities to engage and learn through interaction with community-based partners in such a way that engagement and learning lead to the co-evolution of capabilities. We argue that this is one important way for universities to contribute to transformative change within resource-poor communities and strengthen their third mission activities. There have been many attempts to explore *university*¹ policy, structures, and mechanisms required to engage with societal actors, whether with firms, government, civil society, or local communities (Brown-Luthango 2013; Jones and Lee 2017; Kruss et al. 2015; Kruss and Gastrow 2017; Petersen et al. 2018; Thakrar 2018). A gap remains: What are the attributes of *communities* that enable them to seek out and learn through engagement with university partners to help them deal with prevalent societal challenges?

Although it is widely acknowledged that the third mission refers to universities’ contributions to economic and societal development of territories (Aranguren et al. 2016; Goranson et al. 2009; Saad and Zawdie 2011), it is fair to say that research has concentrated on the economic dimension

of universities’ potential impact, with an implicit assumption that innovation and economic growth will lead to societal development. Investigations of the dynamics of knowledge and interaction are still predominantly concerned with actors in firms, technology transfer, and regional growth (Carvalho de Mello et al. 2016; Loi and Di Gaurdia 2015; Perkmann et al. 2013, 2021; Salomaa and Charles 2021).

Growing concern about widening inequalities and a deepening sustainability crisis has prompted a range of new directions and conceptions of the third mission of universities. General support to explore the implications and impact of the UN Sustainable Development Goals has prompted renewed motivation to orient universities’ teaching, research, and engaged activities to promote inclusive and sustainable development. In high-income country contexts, this means a renewed focus on sustainability, smart specialisation, and responsible innovation (Salomaa and Charles 2021; Pinheiro et al. 2015). The imperatives differ in the context of universities in middle- and low-income countries in the global South, characterised by different levels of technological capabilities, higher levels of inequality, and significant resource constraints for large proportions of the citizenry, particularly those situated away from the major metropolitan centres. Here, the focus tends to fall more strongly on the dimension of inclusion, exploring how universities, through their community engagement activities, can contribute to efforts to shift the constraints of inequality and poverty (Akpan et al. 2012; Arocena et al. 2017;

In this way, universities can achieve sustainability and the social impact that is increasingly demanded.

2.1.1 Competences, strategies, and mechanisms to engage and learn through interaction

Key determinants of a group or organisation's interactive capabilities include their *competences*, such as human resources, and their *strategies and mechanisms for engagement*, such as co-operative linkages with external actors.

In the context of a firm, university, or other types of formal organisation, competences stem from the pre-set attributes that are typically produced by education and training organisations (Von Tunzelmann and Wang 2003). More specifically, competences refer to *knowledge*, held at the individual or organisational level, which facilitates the formation of effective partnerships and learning through interaction. Competences therefore include cognitive aspects such as beliefs and attitudes that influence learning. For instance, the recruitment of a suitably-skilled community engagement officer may be a necessary internal competence for a university wanting to drive and co-ordinate the engagement activities of its academics and students. However, merely employing a qualified person does not guarantee that co-ordination and the desired change will take place. These require agency and 'institutional work', the 'purposeful action' taken to actively maintain, disrupt, and change norms, values, and practices (Lawrence and Suddaby 2006: 215).

External interface structures refer to the mechanisms that organisations use to interact and partner with other organisations. Internal interface structures refer to the mechanisms that organisations use for learning and accumulating knowledge gained through their interactions. The effectiveness of an organisation's internal and external interface structures depends on the appropriateness and effectiveness of its competences, and vice versa.

Conceptualisation of competences, and internal and external interface mechanisms important for university dynamic interactive capabilities are illustrated in Fig. 1, informed by empirical research on university–industry interaction (Kruss et al. 2015) and university–community interaction in South Africa (Kruss and Gastrow 2017; Petersen et al. 2018; Petersen and Kruss 2021). The specific set of competences and mechanisms important for university–firm dynamic interactive capabilities is likely to differ considerably, and the instances of each dimension could take specific forms in different contexts. Research focusing on university–community engagement has highlighted the importance of engagement policy, dedicated co-ordinating units, strategic leadership, and engagement champions as key competences facilitating engagement with community partners (Brown-Luthango 2013; Kruss and Gastrow 2017; Mtawa et al. 2016; Petersen and Kruss 2021; Thakrar 2018). New mechanisms for engagement such as science shops and community-based hubs are growing in popularity (Petersen and Kruss 2021; Dorland et al. 2019) as external interface mechanisms. To bring about a change in academic identities and disrupt existing institutional cultures requires a degree of co-ordination and integration of new knowledge learned through engagement with community partners into existing teaching and research processes, and perhaps even reconfiguring institutional structures and routines.

2.1.2 Proactive responsiveness and dynamic capabilities

As Teece et al. (1997) indicate, organisational competences shape organisational processes or routines, and both competences and routines, as well as the strategic alternatives available, are path-dependent. Breaking path dependency depends on the capacity of an organisation to learn and adapt by sensing change, seizing opportunities, and reconfiguring competences and routines as necessary. These complementary processes of the dynamic capabilities framework (Teece et al. 1997) are illustrated in Fig. 2, based on Pavlou and Sawy's (2011) application of the framework.

Sensing refers to capabilities around intuiting change or disruption in the internal and external environment of an organisation, also known as its value network (Christensen 1997). Seizing refers to the capturing of opportunities identified in the value network. Reconfiguration refers to the process of embedding new knowledge gained into organisational structures and routines and reconfiguring activities and resources to capitalise on the opportunities seized (Helfat and Peteraf 2015).

Conditions of dynamic competition and rapid change in business, education, and policy environments are major challenges for firms, universities, and other types of formal organisations. Organisations require an additional set of capabilities to respond to such change effectively and efficiently (Von Tunzelmann 2010). Changes in an organisation's contextual circumstances often prompt changes in the organisation's capabilities. Therefore, a key indicator of an organisation's dynamic interactive capability is the degree of co-evolution with its partners, responding to change in a way that is aligned with the capabilities and goals of others in their networks.

Dynamic interactive capabilities are the result of adaptive learning processes that in their collective dimension can be highly localised, giving rise to system capabilities. This means that within a specific region or locale, a concentration of highly-qualified human resources is not a capability per se, but a resource that, through learning, may become technological capabilities for firms or academic capabilities for education and training organisations or innovation capabilities for the system as a whole.

In this paper, we experiment with extending the concept of dynamic interactive capabilities to understand how universities can contribute to building resilience and development in resource-poor communities. There is precedent in the community resilience and sustainable livelihoods literature, which emphasise resource-based understandings of capabilities (Scoones 1998; Steiner and Markantoni 2014). We contribute a fresh perspective from the strategic management and innovation systems literature (Teece et al. 1997; Von Tunzelmann and Wang 2003; Von Tunzelmann 2010) to explore how communities can learn and build capabilities to use university knowledge for their development needs. The result is a model that is grounded in the mutual value of engagement for university and community.

2.2 Extending the dynamic interactive capabilities framework to resource-poor community contexts

Resource-poor community settings are very different from the formal settings of universities, science institutes, and formal businesses. The unit of analysis is thus very different. For local communities, the collective is central, rather than an individual or organisation. Of course, as indicated above, the

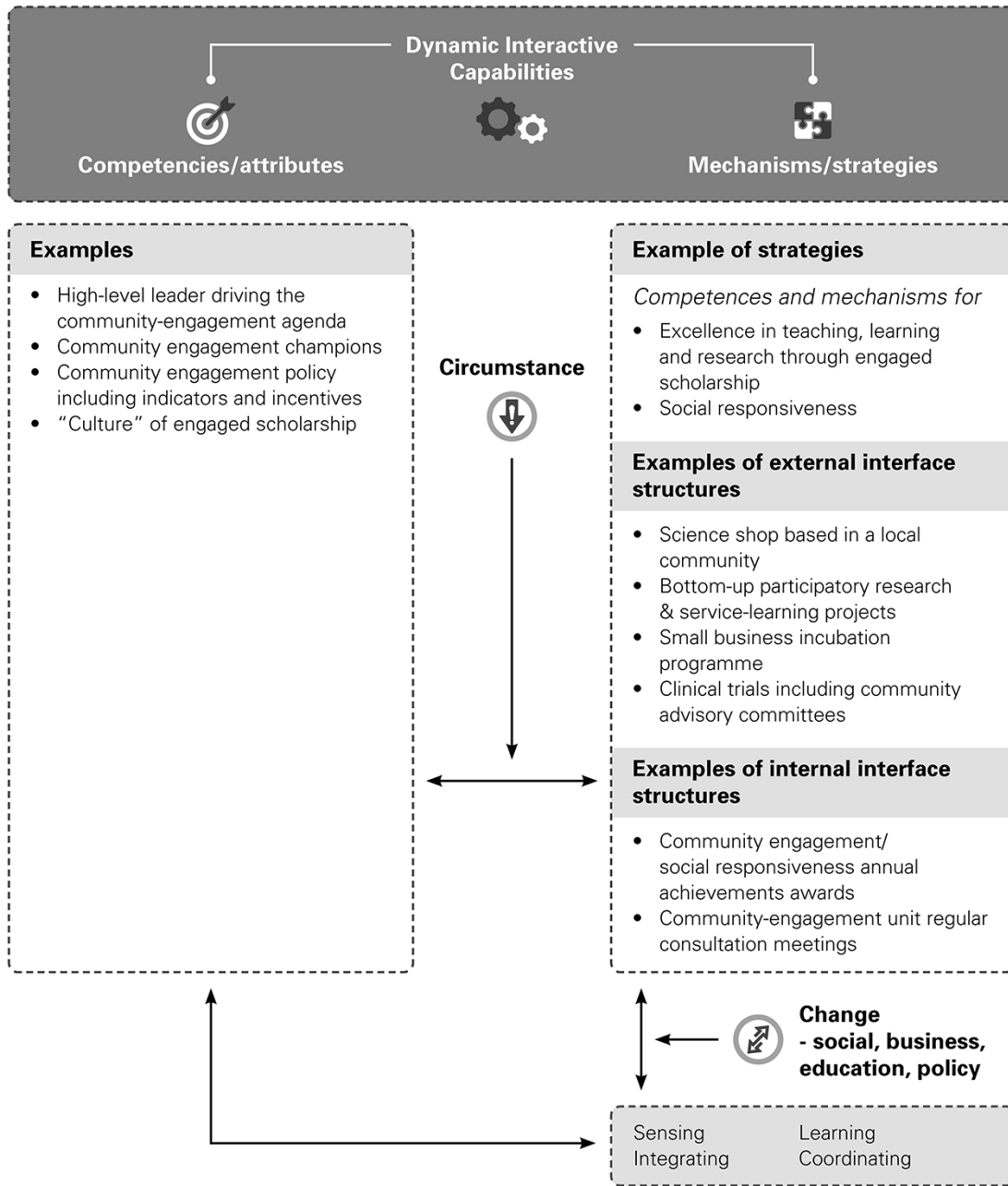


Figure 1. University dynamic interactive capabilities framework.
 Source: Authors (based on Petersen and Kruss 2021).

cumulative capabilities of organisations in the community, such as intermediary organisations and businesses, matter. The outputs and outcomes also differ, as both social and economic development are crucial for communities.

In addition, greater emphasis is placed on inclusion and participation. It is necessary to pay closer attention to who is included in the processes through which knowledge is generated and applied, how they are included and how knowledge is transformed into more easily acceptable forms and circulated within the local setting (see Benneworth and Olmos-Peñuela 2018: 4). Participatory knowledge generation, effective knowledge transformation, and wide-reaching knowledge circulation are more likely to lead to the development of locally-derived, socially-relevant solutions

to development concerns in the local context (Petersen and Kruss 2020; Preece 2016; Petersen et al. 2018). Such engagement is crucial for producing usable knowledge and building ‘reservoirs’ of useful knowledge that can be used in future (Benneworth and Olmos-Peñuela 2018; Sarewitz and Pielke 2007).

Inclusion and participation depend on the promotion of agency. We found that the use of formal knowledge by community partners depended on the promotion of proactive strategies, collective action, and collective learning. Proactive strategies refer to ‘the ability to reconfigure approaches and patterns of partnership to deal with changing circumstances’ (Hall 2005: 616). These strategies have been identified as crucial for innovation in informal

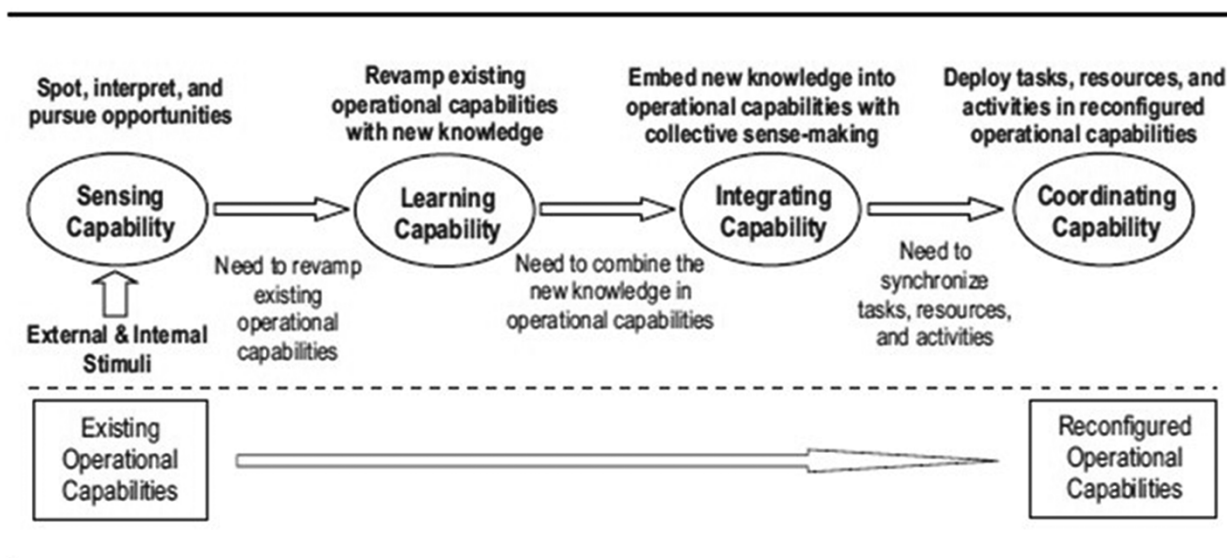


Figure 2. Process for learning through interaction based on the dynamic capabilities framework.

Source: Pavlou and Sawy (2011: 243).

settings (Arza and Van Zwanenberg 2014; Cozzens and Sutz 2014; Hall 2005; Kruss and Gastrow 2017; Petersen et al. 2018).

Using a neo-institutionalist understanding, we therefore refer to university and community partners as ‘actors’ or ‘knowledgeable agents with a capacity to reflect and act in ways other than those prescribed by taken-for-granted social rules and technological artefacts’ (Garud et al. 2007: 961). The way in which actors exercise their agency thus depends on their ability to reflect on and change their intentions and actions. And agency is distributed within and through social structures that actors themselves have created (Garud and Karnøe 2003 in Garud et al. 2007).

To build an empirically-grounded framework of community dynamic interactive capabilities, we analyse three cases, described in the next section.

3. Three case studies of community interaction with universities in South Africa²

The paper analyses how universities interact with communities in a manner that facilitates building capabilities for innovation, bi-lateral knowledge flows, and co-production of development outcomes. The empirical basis is three case studies of how universities can contribute to innovation in resource-poor contexts in South Africa. While the project aimed to identify successful case studies, we found that what universities achieved in practice was fairly limited, as the following section will show. We first describe our participatory research approach and then go on to describe the three cases.

3.1 Community-based participatory research techniques

A participatory approach was used to gain an in-depth understanding of engagement practice and the local contexts for

each case, as summarised in Table 1. Participatory visual methods, including digital storytelling and photovoice, were selected because they allow participants to convey their opinions and experiences in their own words, enabling co-learning and the co-production of research outputs (Pánek and Vlok 2013).

3.2 Small business development in a township on the fringe of a major city

A common approach to enact the third mission is to establish bridging mechanisms that offer training, incubation, and support programmes to external partners. Community-based hubs are emerging as useful interface mechanisms to bring the university closer to communities, physically and in orientation. A challenge is that conventional formal knowledge transfer models may not be suitable in resource-poor settings. They may exclude the majority of informal businesses, which tend to be survivalist enterprises run by owners with little formal education (Petersen and Kruss 2021).

We explore this challenge in the first case, of a well-established research university, with a strong academic reputation, which created its first community-based campus facility at a township innovation hub in 2016 (see Petersen and Kruss 2021). As one of the oldest townships in Cape Town, the local area was under-served, had high levels of unemployment and poverty, and high levels of violence that made everyday life insecure. Many families’ livelihoods and survival depended on informal micro-enterprises such as food stalls, and hair-dressing and tailoring services. The main aim of the township innovation hub was to nurture such micro-enterprises, support skills development, and promote job creation. How could actors in the hub support sustainable small enterprise development? The case provides an opportunity to interrogate how informal entrepreneurs in local communities built dynamic interactive capabilities to be able to access and benefit from the support offered in the hub.

Table 1. Case study participatory methods and samples.

Method	Purpose	Participants
Four initial stakeholder workshops	Stakeholder buy-in and consultation. Shape the research focus.	Each workshop included approximately forty representatives from a national university–community engagement co-ordinating organisation, universities, research institutions, NGOs and CBOs, students, and national and local government.
Five-day digital storytelling workshop	Understanding the nature of innovation and learning in informal enterprises. Shape the research focus (township case).	Township case: seven informal traders based in the township, in the vicinity of the innovation hub (including two NGO incubator programme participants).
Semi-structured interviews (ranged from 20 to 100 min)	Map networks. Understand learning strategies and the nature of engagement with universities and other formal knowledge producers.	Remote town case: three groups and twelve individual interviews with B&B owners and representatives from local NGOs and CBOs, universities, the big science project, and government. Rural town case: forty-one interviews with local business owners, traditional leadership, and representatives from local NGOs, universities, a science council, and government. Township case: eighteen interviews with informal traders and representatives from local NGOs, universities, and government.
Three to five-day photovoice workshops	In-depth insight into the role and nature of engagement.	For each case, participants who regularly engaged with local universities were included, particularly community-based actors: students, informal traders, small business owners, community members, and NGOs.
Participant observation	Insight into the roles of universities and into the complex socio-economic environment, which is critical for interpreting the data collected by the other research modalities.	Multiple follow-up visits and informal conversations with participants in the local areas. The township case also included workshops and consultative events at the innovation hub.
Three consultative closing workshops	Present findings and obtain feedback for finalising the research outputs.	Each workshop included approximately thirty representatives from a national university–community engagement co-ordinating organisation, universities, research institutions, NGOs and CBOs, students, national and local government, informal traders, and formal business.

3.3 A big science project in a small remote town

The second case study focussed on engagement between a big science project and a small remote town in the Karoo, a vast farming region in the Northern Cape that experiences severe drought. As agricultural and service sector economic opportunities have declined, social and educational problems such as unemployment, alcoholism, and foetal alcohol syndrome that affect learning in schools have increased.

The town is located close to the infrastructure site of a big-budget, global science astronomy project that presents significant challenges as well as opportunities for local development. Over the years, there has been an increase in visitors to the town—mainly people who work for the big science project, such as technicians, engineers, civil servants, and scientists. To take up new opportunities, local residents opened, expanded, or upgraded restaurants and bed and breakfast (B&B) establishments. This hospitality industry faced many challenges, including limited access to capital, limited knowledge and capabilities, constrained access to networks, and racial imbalances in ownership and employment (Gastrow and Oppelt 2020).

The contrast between actors in a resource-constrained, isolated town and at the astronomy infrastructure site presents an interesting nexus for studying dynamic interactive capabilities. What role would the actors in the big science project play in addressing some of the prominent socio-economic challenges in the community to ensure that their engagement in the town would bring benefit? Attempts were made to draw in universities, both local and in other

provinces, science institutes, and technical colleges to support efforts on the ground. However, deep-rooted social challenges hindered such attempts to grow local expertise. Despite a stated commitment to local development, the big science project did not have an effective structured engagement programme to facilitate an understanding of local strengths and needs, manage community expectations, and build trust, as a foundation towards building local capabilities to engage.

3.4 Promoting information and communication technologies for development in an isolated rural area

The third case study explored the interaction between a set of information and communication technology (ICT) for development (ICT4D) initiatives and community members in a rural town in the Eastern Cape, one of the poorest remote regions of South Africa, with few economic opportunities and low levels of well-being.

Cell phones, tablets, the Internet, wireless networks, and other ICTs were identified as critical technologies that universities, science councils, community-based organisations (CBOs), non-governmental organisations (NGOs), and the public sector generally can support to promote inclusive development in such rural areas. In an attempt to drive transformative change, government encouraged the *crowding in* of multi-faceted interventions by a range of knowledge actors into the local area. Schools were a particular focus to provide

young people with the digital tools required in the economy and skills to access the labour market.

A challenge is that few of the ICT initiatives that aimed to address local development needs contributed to build local enterprises. As a result, people in the local communities, even those who were beneficiaries of ICT4D initiatives, had few options to turn to when digital devices broke down, for support with regular maintenance, or for skills training to support future planning and as the need arises. With the leaders of these ICT4D interventions based in universities many hundreds or even thousands of kilometres distant, these initiatives tended to have limited impact in the long term and were not sustainable.

The case therefore provides an opportunity to interrogate where and how local communities' capabilities are built to facilitate the initial uptake and diffusion of ICT4D solutions and for the continued maintenance and use of the technologies in a way that creates local livelihood opportunities and is sustainable (Fongwa et al. 2020).

Each of the three case studies highlights opportunities that could be exploited through a third mission approach that emphasises the building of local capabilities. The following section analyses the three case studies comparatively to inform our attempt to build a *community dynamic interactive capabilities* framework, akin to the *university dynamic interactive capabilities* framework set out in Fig. 1.

4. Community dynamic interactive capabilities to enable learning and resilience

Community resilience depends on historical trajectory and access to important resources such as potable water and basic services or 'freedoms' (Sen 1999), making up the wider circumstances enabling or constraining the ability of community-based actors to take up opportunities available to them. Such disadvantages can be overcome by social capital, and proximity to and inter-connectivity with relatively well-resourced towns, cities, and regions (Scoones 1998; Steiner and Markantoni 2014).

Resource-poor communities in townships located on the periphery of cities and towns in remote and rural settings tend to be disadvantaged by their location. Linkages with universities and other formal knowledge producers through well-resourced science, technology, and innovation interventions provide a way to access knowledge and other resources that could benefit development and capability-building in these resource-poor communities. However, too often, the benefit to the community tends to be limited.

Across the three cases, a general trend was that community partners did not identify universities as important knowledge partners for solving problems in their businesses and communities. When asked about the role that universities could play, community partners often identified the role of funder rather than knowledge producer. In the few instances universities were approached, it was through intermediary actors such as NGOs and schools. This finding points to the importance of understanding the types of knowledge and engagement mechanisms valued, the value placed on formal knowledge, the norms of working with universities, and cognitive frames regarding the potential roles of universities in local development.

Figure 3 presents an empirically-grounded framework that is the outcome of the comparative analysis in this section, of the competences, strategies, and interface mechanisms important for community actors to seek out suitable interaction with university and science institute partners and use university knowledge to address their development needs. While the structure of the dynamic interactive capabilities remains the same as for universities, the nature of the competences, mechanisms, and strategies differs markedly (see Figs 1 and 3).

Next, we discuss specific community-based competences and mechanisms for engagement and learning. Figure 3 should be used as a key reference point summarising and informing the discussion in this section.

4.1 Competences

To identify key competences within a community context, we analysed the case study data to determine: What *knowledge* is held at the individual, organisational, and community level to facilitate the formation of effective partnerships and learning through interaction with universities?

4.1.1 Types of knowledge

Von Tunzelmann's dynamic interactive capabilities framework does not offer a useful description of the types of knowledge that are important in a resource-poor community context. To explore knowledge resources, needs, and gaps, we turned to the innovation systems literature and found Lundvall's classification of knowledge types useful (Lundvall 2016: 112), specifically the distinction between (1) 'know-how' and (2) 'know-who (when and where)', and (3) scientific knowledge about facts ('know-what') and specialised scientific knowledge ('know-why'). Academics, researchers, and students wanting to engage community partners may find value in identifying specific types of knowledge held at the community level that may complement or provide a foundation for the use of more scientific forms of knowledge.

For example, in the township case, the university initially struggled to get the community to engage in the programmes they offered. Here, small business development in the informal local economy was important. Informal traders who grew up in the township developed a deep understanding of the local consumer market, including needs and preferences, buying trends, and pedestrian movement patterns. They thus possessed the kind of 'know-who' and 'know-what' that is essential in the demand-driven local economy. 'Know-who' relates to the ability to form relations with others who are in possession of relevant knowledge, capabilities, and physical and financial resources (Lundvall 2016: 112). 'Know-who' relates to social capital and the 'social ability to co-operate and communicate with different kinds of people and experts', which is important for building relationships (Lundvall 2016: 137). We found that this kind of local knowledge was key for identifying and capturing opportunities and linking into knowledge networks, but only if it was complemented by other forms of knowledge. The informal traders were only able to use this knowledge to take up opportunities for growth when they also had the necessary 'know-how' developed through previous retail experience or training. Similar to 'know-who', 'know-how' is mainly a tacit form of knowledge and is not easily accessible, except through interaction (Lundvall 2016). 'Know-how' was valued by informal traders, and they sought to develop this type of knowledge on-the-job

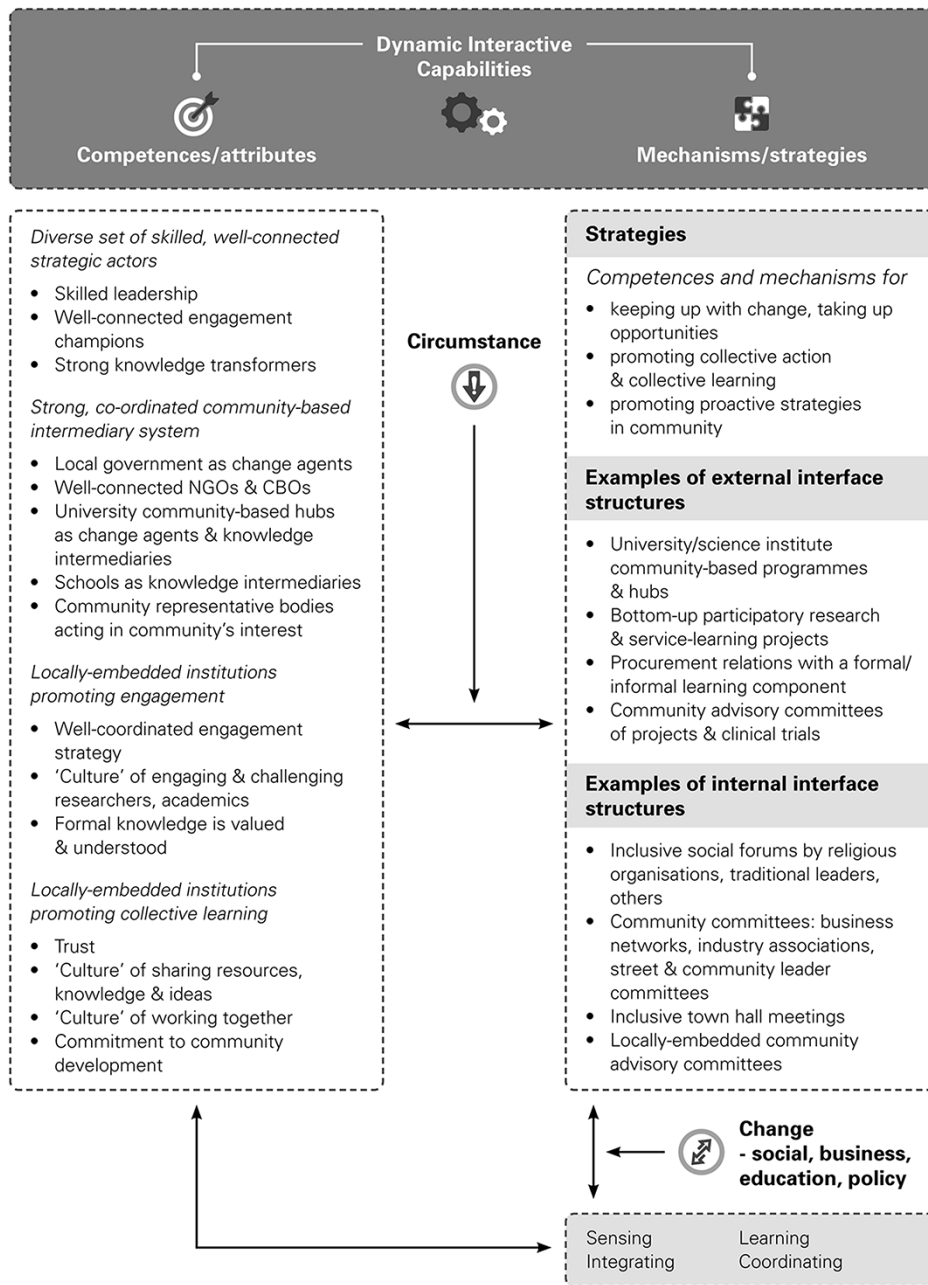


Figure 3. Community dynamic interactive capabilities framework.

Source: Authors.

as well as through small business development courses and incubation programmes.

In contrast, universities traditionally identify with providing specialised scientific knowledge ('know-why') and facts ('know-what'). The university at the township hub thus initially struggled to engage the community. They later focussed their engagement strategy on identifying and working with community partners possessing strong know-who and know-what and adapted their offerings to share know-how more complementary to what was already held and scientific knowledge that addressed gaps. This was done through incubation programmes involving mentorship and coaching, learning lunches, and other similar activities. What was more

difficult to overcome was asymmetries related to institutions (rules or guides for behaviour) underpinning local practices, university programmes, and engagement activities (see [Petersen and Kruss 2021](#)).

We therefore distinguish between competences based on (1) knowledge embedded in people (human capital) and (2) knowledge embedded in institutions, elaborated in the next two sub-sections. Interestingly, the context of community engagement shows a different set of categories to our previous research on the dynamic interactive capabilities of universities ([Kruss et al. 2015](#)) and of Technical and Vocational Education and Training (TVET) colleges ([Kruss et al. 2017](#)), where we distinguished between competences based on tacit knowledge,

such as an organisational culture of interaction, and codified knowledge, such as a formal policy on university–industry interaction. This distinction is not helpful for informal settings, although [Johnson et al. \(2002\)](#) argued that the distinction is not helpful even for formal settings.

4.1.2 Knowledge embedded in people

Based on the case study analysis, we identified four key types of actors, ‘skilled strategic actors’ ([Fligstein and McAdam 2012: 47](#)), that possess the social skill and symbolic power necessary for encouraging collective action, collective learning, and proactive strategies: skilled leaders, engagement champions, knowledge transformers, and intermediaries. Social skill, which is also important for managing conflict and stabilising communities, is defined as ‘the ability to induce co-operation by appealing to and helping to create shared meanings and collective identities’ ([Fligstein and McAdam 2012: 46](#)).

4.1.3 Skilled leaders and engagement champions

For universities to facilitate social change through their third mission activities, they need to engage community leaders who can facilitate co-operation and collective action ([Fligstein and McAdam 2012](#)) to secure support for and acceptance of institutional change ([Garud et al. 2007](#)). Skilled community leaders are able to motivate and persuade others to co-operate through empathy and presenting framings and narratives that resonate. They possess strong ‘know-who’ knowledge and are well connected, locally and with actors external to the community. Through their interactions with diverse networks, they can identify opportunities and mobilise collective action to take up these opportunities. In this way, skilled leaders drive proactive strategies. One example from the rural town case involved a traditional leader who led a process to support knowledge circulation and address problems highlighted through a research study. While universities typically engage community leaders as gatekeepers, this example points to ways in which they could strengthen their impact if they are engaged as partners. The example also highlights how skilled community leaders contribute to their community’s dynamic interactive capabilities.

Proactive strategies are also driven by community-based engagement champions. The role of university-based engagement champions is well recognised in the literature ([Weerts and Sandmann 2010](#); [Kruss and Gastrow 2017](#); [Petersen et al. 2018](#)). We found that NGO workers, informal business owners, and local leaders such as street committee leaders emerged as engagement champions, taking up opportunities, seeking partnerships with universities to address development concerns, and encouraging others to participate to ensure that the engagement benefits the community. One example relates to an NGO in the township that initiated partnerships with academics and researchers to inform development plans such as an informal trading strategy co-created with local informal traders. We also found that students from the community may champion engagement, particularly if they are actively involved in community development.

4.1.4 Effective knowledge transformers and well-co-ordinated intermediaries

One key competence supporting engagement and interactive learning relates to the capabilities of community-based actors

to de-codify and transform scientific knowledge for practical use, which [Benneworth and Olmos-Peñuela \(2018: 4\)](#) refer to as ‘knowledge transformation’.

We found that well-established NGOs and CBOs played a key role in linking community-based actors to researchers, academics, and students, and their intermediary function strengthened their roles as knowledge transformers and knowledge circulators. Since NGOs operate in the formal sector as well, they tend to have formal systems of reporting and accounting, which makes collaboration with universities easier. NGOs were thus best placed to assist with de-coding and translating knowledge into a form that was easily understood by community-based actors. For example, an NGO in the township case led a process to work with a local research university to assist with solutions to challenges faced by micro-farmers, such as designing a cost-effective prototype to display and sell their produce. In the remote town case, the town was created in the 19th century as a mission station, so religion remained central in politics and culture ([Gastrow and Oppelt 2020](#)). Church leaders had strong relationships within the town and were key in getting to know needs and dominant opinions, acting as important channels for knowledge circulation. The services of intermediaries may be directed at specific community-based actors but often benefit the whole community ([Kraemer-Mbula and Wamae 2010](#)).

NGOs and CBOs tend to possess cognate knowledge, built up over time through several years of experience of working in the same community, of how things are commonly done and what is valued. They also possess the necessary ‘know-who’ to be able to facilitate knowledge circulation and ‘know-what’ such as the number of businesses in the local area and their knowledge needs. Using their linkages to external formal actors such as universities and government, they may provide a *voice*, articulating the needs and challenges of community-based actors.

A concern raised in the township and remote town cases is that the presence of well-established NGOs and CBOs was not sufficient to support the transformation, use, and circulation of formal knowledge. Intermediaries may also serve to protect their own interests rather than promote inclusion ([Arza and Van Zwanenberg 2014](#)). Politically-driven intermediaries such as local government actors and street committees were important for negotiating access to basic services, for example, but, at times, hindered relationship-building processes. In the remote town case, we found that religious organisations had politically-driven agendas that caused division, especially along racial lines, in the town. We identified a general lack of trust in local government as a constraint. Participants—including representatives from government, local universities, and NGOs—reported that complicated political dynamics at the local level often hindered engagement. Similarly, street committees, informal trader associations, and other community committees were found to be important channels for knowledge circulation and knowledge transformation, but in-fighting, abuse of power and poor financial accountability indicate that they did not always act in the interest of their members ([Charman et al. 2019](#)).

In the rural town, where the entrepreneurial system was not well developed, schools emerged as knowledge intermediaries for ICT4D projects, playing a role in knowledge transformation and circulating knowledge gained through the ICT4D projects to the surrounding communities. Universities, science councils, and government-led ICT4D interventions typically

included schools as partners, in the absence of other knowledge actors. In the remote town, the absence of a strong intermediary resulted in tensions between the big science project and community members that lasted for years, even after the project actors implemented an engagement strategy. An intermediary was required to articulate community needs and to manage community expectations. Although NGOs and CBOs were active in the town, co-ordination of engagement strategies and mechanisms among NGOs and CBOs was essential.

The advantage of a 'systemic intermediary' (Van Lente et al. 2003: 256), co-ordinating services by NGOs and other actors, was highlighted in the township case where the innovation hub began to play that role. The community-based university hub also linked community-based actors to important knowledge resources, such as training and incubation programmes, and to regional and international networks of universities and businesses. University–community-based hubs and schools may thus act as knowledge intermediaries and change agents (Petersen and Kruss 2021).

This section highlighted four types of actors that are necessary for mutually-beneficial engagement and co-creation towards transformative change. The roles may be performed by different individuals and types of organisations, with some taking on more than one role. From a neo-institutionalist perspective, we understand that what these actors are able to achieve is both constrained and enabled by their personal characteristics and social position, as well as the institutional environment (Cajaiba-Santana 2014; Lok and Willmott 2019).

4.1.5 Knowledge embedded in institutions

This section focuses on knowledge embedded in institutions, that is, norms, values, and practices. Since institutions contribute to path dependencies that may serve to constrain or enable agency, understanding the local institutional context is crucial for academics, researchers, and students wanting to effect social change. Also, the presence of specific types of norms, values, and practices in a local community may contribute to proactive strategies to use the knowledge gained through interaction with universities to effect change.

Based on the neo-institutionalist literature, we define institutions as 'multifaceted systems incorporating symbolic systems – cognitive constructions and normative rules – and regulative processes carried out through and shaping social relations' (Scott 1995: 33). Institutions provide cognitive frames that direct sense-making processes, which depend on individual action and a degree of co-ordination and acting with others (Fligstein and McAdam 2012; Garud et al. 2007). Individual actors and organisations are expected to conform to these rules or guides for behaviour if they are to receive support and legitimacy (Scott 1995: 132 in Garud et al. 2007). New social practices are only imitated and institutionalised if they are seen as legitimate by most in the social system (Cajaiba-Santana 2014).

Our case studies showed that collective action is a key feature of how community-based actors solve problems. The analysis of local norms, values, and practices showed the importance of operating as a collective, which includes pooling resources and helping others through procurement. We found that although collective action was valued, operating as a collective did not always result in collective learning, which

involves the sharing of knowledge and ideas. In the township case, a lack of trust hindered knowledge-sharing and learning, even in business clusters and training programmes, pointing to an area to improve in university programmes.

In general, locally-embedded institutions that value formal knowledge exchange, co-learning and co-production with universities were lacking. Analysis across our cases highlighted the need for a more co-ordinated approach to engaging and managing engagements with universities. As is the case with universities, community-based actors could benefit from the implementation of an engagement strategy that sets out the value and purpose of engagement, as well as rules for engagement. This could then be a basis for identifying engagement champions and for improving co-ordination of research activities, knowledge needs, and opportunities. A key question that arises is, who should be the driver or co-ordinator of such a strategy? A public intermediary, such as a local government implementing agency, that acts as a systemic intermediary bridging across public and private interests may be most suitable (see Petersen et al. 2016).

4.2 Mechanisms for engagement and learning

To allow for learning and the accumulation of knowledge at the community level, suitable internal and external interface structures are required that facilitate the sensing of change and opportunities; taking strategic decisions to adapt or change routines, drawing on existing competences, or developing new competences; and integrating and co-ordinating the new knowledge gained through interaction across relevant actors in the community (see Fig. 3). When necessary, skilled strategic actors stimulate and drive the reconfiguration of physical and social systems, thereby improving community resilience. Table 2 provides a summary analysis of internal and external interface structures, including examples from the cases, and identifies benefits, facilitators, and constraints for the community; challenges to implementation; and implications for universities. It provides vital empirical insights about different kinds of spaces for university–community engagement.

4.2.1 Internal interface structures

Internal interface mechanisms should enable community actors to draw on existing or new competences to adapt or change routines and integrate new-found knowledge throughout the community. We found that knowledge-sharing and circulation took place in social forums led by community leaders. Social forums and town hall meetings were key for facilitating collective sense-making processes about the potential value of engagement. These forums may be important vehicles for driving proactive strategies, co-ordinating activities, and circulating scientific and other knowledge gained through university engagement (cf. Petersen et al. 2018).

Although knowledge transformation and circulation took place through social forums and town hall meetings, examples of these were limited. We found more examples of external interface structures.

4.2.2 External interface structures

In this section, we briefly discuss how mechanisms universities typically use to interact and partner, such as service-learning projects (see also Petersen et al. 2018), may promote learning and capabilities (refer to Fig. 3 and Table 2 for detail).

Table 2. Summary of mechanisms for engagement and learning.

Mechanism	Interface structure	Examples from the cases	Facilitators/constraints for community	Benefits for community	Challenges to implement	Implication for university
Internal interface structures	Social forums	Across the cases: regular gatherings by local church leadership; councils co-ordinated by traditional leaders; meetings and interactions in local business networks; and street committees.	Complex social dynamics was a constraint: e.g. unequal race relations in the remote town restricted knowledge circulation and learning across racial divides in forums such as industry networks; lack of social cohesion in the township, where informal settlements were established by migrants, which presented a challenge to collective learning. Forums led by intermediaries with strong social capital ('know-who') and led by skilled leaders can facilitate participation and learning. Same as for social forums. A lack of trust in local government may hinder participation by community members.	Vehicles for proactive strategies, better co-ordination, and knowledge circulation.	Overcoming social dynamics that hinder engagement, knowledge-sharing, and learning.	University leaders and engagement champions could facilitate partnerships with community leaders to engage in social forums as spaces to get buy-in and to share knowledge and co-create locally-derived solutions.
External interface structures	Town hall meetings University-community-based mechanisms	Township case: a research NGO in collaboration with a community-based NGO, successfully hosted town hall meetings in 'neutral' and accessible spaces (e.g. local sports stadium), which facilitated participation and engagement. Science shops and community-based hubs and centres.	Weak alignment between university and locally-embedded institutions is likely to hinder engagement and uptake.	Engage academics and students to influence agendas, and better direct activities and outcomes of projects to benefit the community. Facilitate local capability-building and knowledge circulation. Co-create locally-derived solutions. Promote knowledge circulation and use of formal knowledge to address local challenges.	Aligning university and locally-embedded institutions is a challenge.	Reconsider engagement models and offerings based on traditional knowledge transfer to better align with knowledge needed and valued, and locally-embedded norms, values, and practices.

(continued)

University–community-based programmes and hubs, bottom-up participatory research projects, and service-learning facilitate repeated interaction between students, academics, researchers, and community-based actors, which contributes to the development of ‘shared knowledge resources’ (Benneworth and Olmos-Peñuela 2018: 4) and ‘cognitive frames’ (Garud et al. 2007: 959). These shared knowledge resources contribute to building cognate knowledge, which facilitates knowledge transformation and the use of scientific knowledge, ‘know-what’ and ‘know-why’. The advantage of university–community-based programmes and hubs is the close proximity—physically, and in orientation and institutional context—to the community, as management may try to align their offerings with locally-embedded institutions. Our analysis shows how weak alignment is likely to lead to low uptake of knowledge resources ‘transferred’ by universities, but these mechanisms can contribute to knowledge circulation if more community actors are brought into the network. Engagement through research and service-learning projects, positioning the university as knowledge partner, benefitted the communities in two ways: as channels to access specialised knowledge and as channels to access other useful resources that are not easily accessible, such as financial resources and policy networks. Social capital plays a key role in linking actors to important resources (Lin 1999). Participatory engagement and research processes also contributed to building local networks and know-who, know-how, and know-what (cf. Petersen et al. 2018; Petersen and Kruss 2021; Trencher et al. 2014).

A less conventional interface mechanism, procurement relationships, facilitated knowledge transformation and the sharing of know-how and knowledge related to standards for ‘acceptable’ quality goods and services. Similarly, community advisory committees set up for clinical trials, and health research, facilitate knowledge transformation. These committees, which typically bring together NGOs, CBOs, and other community actors, emerged as useful for collective learning and knowledge circulation. Community advisory committees act as both external and internal interface structures and can be a useful model for other types of research.

5. Towards a capabilities approach to university–community engagement

For middle- and low-income countries in the global South, deepening inequalities and a growing sustainability crisis have prompted new expectations and roles for universities in society that require careful consideration of the value created through teaching, research, and engagement. What types of value are important for tackling key societal challenges? How should value be created and with whom? The importance of closer engagement at the local level, with community-based partners, and the co-creation of value are highlighted in the literature, policy, and practice. The impetus is to move beyond goals of economic growth and of prioritising the advancement of scientific knowledge; beyond engagement with firms and other formal actors only; and beyond conventional knowledge transfer mechanisms. To meet such expectations requires suitable capabilities to engage and learn through interaction, the importance of which has been largely overlooked in the third mission literature.

Universities may introduce policies and rules guiding engagement practice, and adapt and change their structures, programmes, and policies to better meet knowledge needs in their local contexts. If community-based partners do not have the capacity to use and benefit from the new offerings and knowledge, it is unlikely to have the intended impact, likewise if universities do not appreciate the different types of knowledge embedded in community-based actors and institutions. The extent and nature of uptake and benefit depend on both the university and their community-based partners’ capability to engage and learn, that is, their dynamic interactive capabilities. The ability of a university to not only engage the community-based partners in its local context but also co-evolve with these strategic partners in response to change is the mark of a high degree of dynamic interactive capability and may be a game-changer for the university third mission.

This paper proposes a new framework, a *community dynamic interactive capabilities framework*, for analysing and building local community capabilities alongside university capabilities. Specifically, we extend and adapt the concept of ‘dynamic interactive capabilities’ (Von Tunzelmann 2010) from firms and universities, based on an analysis at the micro-level, of the interplay and tensions between university and community level institutions, needs, and capabilities. By analysing *what is* in a set of three cases, we attempted to inform what the third mission *could be*.

Dynamic interactive capabilities are about sensing change and building the capability to learn through engagement into a community’s social structure and development planning initiatives. In this way, development opportunities can be identified and taken up. Dynamic interactive capabilities are particularly critical for overcoming power dynamics by promoting the agency of community partners to actively participate in networks with academics, researchers, students, community engagement champions, and other formal knowledge producers. To exploit knowledge and resources gained through engagement with universities and other formal knowledge producers effectively, community partners need to develop proactive strategies and be able to strengthen or even reconfigure the social structure and change established norms and practices, when necessary. In this way, it may be possible to break path dependency related to historical development trajectories. Capabilities are built over time, through the development and strengthening of competences, mechanisms, and strategies for learning with others as well as co-ordination and integration of the learning within. The effect is cumulative. As more community-based actors in a local setting build their capabilities to learn through interaction with universities and others, the stronger the dynamic interactive capabilities held at the community level, contributing to improving community resilience and local development.

The *community dynamic interactive capabilities framework* proposed in this paper makes a start in guiding efforts to better work with community-based partners, in a way that is more likely to lead to the identification of locally-derived solutions, bi-directional knowledge flows, and the co-creation of development outcomes. The framework identifies distinctive competences, mechanisms, and strategies within local community settings that facilitate the design of locally-derived solutions, co-ordination of engagement activity, and the co-production, transformation, and circulation of knowledge. For each type of internal and external interface

structure, we identify the benefits to the community, facilitators and constraints to engagement, challenges to implementation, and potential implications for the university (refer to Table 2).

The framework can inform practice and policy in other contexts, particularly in the global South, where communities and universities face similar development challenges to South Africa. More work is needed to explore the usefulness of the framework in other contexts and build on the components of dynamic interactive capabilities proposed here. Specifically, more empirical research is needed to understand the mechanisms and strategies resource-poor communities may use to better co-ordinate, circulate, and integrate, within, knowledge and learning gained through interaction with universities and others. Another gap is an understanding of the distinct knowledge needs of community-based actors, and the potential mechanisms universities may create and use to better meet these needs. The framework and empirical findings presented in this paper point to some examples of the forms of knowledge needed, and the mechanisms that may be useful to add value to communities and their sustainable development goals. It lays a foundation towards an empirically-grounded capabilities approach to strengthening the third mission.

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Conflict of interest statement. None declared.

Notes

1. *Italics* are used to note that we recognise that ‘universities’ and ‘communities’ are diverse in nature. We refer to ‘the university’ and ‘the community’ for the sake of simplicity.
2. This section draws on the case study reports prepared by Michael Gastrow and Thelma Oppelt for the remote town case study; Sam Fongwa, Mogege Mosimege, Ndiyakholwa Nqulu, and Xolisa Magawana for the rural area case; and Il-haam Petersen and Xolisa Magawana for the township case.

References

- Akpan, W., Minkley, G., and Thakrar, J. (2012) ‘In Search of a Developmental University: Community Engagement in Theory and Practice’, *South African Review of Sociology*, 43: 1–4.
- Aranguren, M. J., Guibert, J. M., Valdaliso, J. M., et al. (2016) ‘Academic Institutions as Change Agents for Territorial Development’, *Industry and Higher Education*, 30: 27–40.
- Arocena, R., Göransson, B., and Sutz, J. eds (2017) *Developmental Universities in Inclusive Innovation Systems: Alternatives for Knowledge Democratization in the Global South*. Switzerland: Palgrave MacMillan.
- Arza, V. and Van Zwanenberg, P. (2014) ‘The Politics of Technological Upgrading: International Transfer to and Adaptation of GM Cotton in Argentina’, *World Development*, 59: 521–34.
- Benneworth, P., Pinheiro, R., and Sanchez-Barrioluengo, M. (2016) ‘One Size Does Not Fit All! New Perspectives on the University in the Social Knowledge Economy’, *Science & Public Policy*, 43: 731–5.
- Benneworth, P. and Olmos-Peñuela, J. (2018) ‘Reflecting on the Tensions of Research Utilization: Understanding the Coupling of Academic and User Knowledge’, *Science & Public Policy*, 45: 764–74.
- Bhagwan, R. (2017) ‘Towards a Conceptual Understanding of Community Engagement in Higher Education in South Africa’, *Perspectives in Education*, 35: 171–85.
- Bozeman, B., Fay, D., and Slade, C. P. (2013) ‘Research Collaboration in Universities and Academic Entrepreneurship: The-State-of-the-Art’, *The Journal of Technology Transfer*, 38: 1–67.
- Brown-Luthango, M. (2013) ‘Community-University Engagement: The Philippi CityLab in Cape Town and the Challenge of Collaboration across Boundaries’, *Higher Education*, 65: 309–24.
- Brundenius, C., Göransson, B., and Carvalho de Mello, J. M. eds (2017) *Universities, Inclusive Development and Social Innovation: An International Perspective*. Switzerland: Springer International Publishing.
- Cajaiba-Santana, G. (2014) ‘Social Innovation: Moving the Field Forward: A Conceptual Framework’, *Technological Forecasting and Social Change*, 82: 42–51.
- Carvalho de Mello, J., De Fuentes, C., and Iacobucci, D. (2016) ‘Introduction to the Special Issue: Universities as Interactive Partners’, *Science & Public Policy*, 43: 581–4.
- Charman, A., Bacq, S., and Brown, K. (2019) ‘Spatial Determinants of Formal Retailers’ Impact on Informal Microenterprises in the Township Context: A Case Study of Philippi East, Cape Town’. Food Security SA Research Report Series. Research Report 002. DST-NRF Centre of Excellence in Food Security, Cape Town.
- Christensen, C. (1997) *The Innovator’s Dilemma: When New Technologies Cause Great Firms to Fail*. Boston: Harvard Business School Press.
- Cozzens, S. and Sutz, J. (2014) ‘Innovation in Informal Settings: Reflections and Proposals for a Research Agenda’, *Innovation and Development*, 4: 5–31.
- Dorland, J., Clausen, C., and Jorgensen, M. (2019) ‘Space Configurations for Empowering University-Community Interactions’, *Science & Public Policy*, 46: 689–701.
- Fligstein, N. and McAdam, D. (2012) *A Theory of Fields*. New York: Oxford University Press.
- Fongwa, S., Mosimege, M., Nqulu, N., et al. (2019) *The Role of Universities and Science Councils in Building a Local System around ICTs for Rural Development (ICT4D) in Cofimvaba*. Case Study Report. <<http://www.hsrc.ac.za/en/departments/cestii>> accessed 28 Feb 2020.
- Garud, R., Hardy, C., and Maguire, S. (2007) ‘Institutional Entrepreneurship as Embedded Agency: An Introduction to the Special Issue’, *Organization Studies*, 28: 957–69.
- Garud, R. and Karnøe, P. (2003) ‘Bricolage vs. Breakthrough: Distributed and Embedded Agency in Technology Entrepreneurship’, *Research Policy*, 32: 277–300.
- Göransson, B., Maharajh, R., and Schmoch, U. (2009) ‘Introduction: New Challenges for Universities Beyond Education and Research’, *Science & Public Policy*, 36: 83–4.
- Gastrow, M. and Oppelt, T. (2019), *The Square Kilometre Array and the Hospitality Industry in Carnarvon*, Case Study Report. <<http://www.hsrc.ac.za/en/departments/cestii>> accessed 28 Feb 2020.
- Hall, A. (2005) ‘Capacity Development for Agricultural Biotechnology in Developing Countries: An Innovation Systems View of What It Is and How to Develop It’, *Journal of International Development*, 17: 611–30.
- Helfat, C. E. and Peteraf, M. A. (2015) ‘Managerial Cognitive Capabilities and the Microfoundations of Dynamic Capabilities’, *Strategic Management Journal*, 36: 831–50.
- Jones, D. O. and Lee, J. (2017) ‘A Decade of Community Engagement Literature: Exploring Past Trends and Future Implications’, *Journal of Higher Education Outreach and Engagement*, 21: 165–80.
- Johnson, B., Lorenz, E., and Lundvall, B.-Å. (2002) ‘Why All This Fuss about Codified and Tacit Knowledge?’, *Industrial and Corporate Change*, 11: 245–62.

