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Dynamics and diversity of innovation support services: especially networking service activities on selected agro- food innovation cases in Madagascar and Burkina Faso

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Abstract

In this contribution, we have analysed the “dynamics and diversity of innovation support services, especially networking, facilitation and brokerage service situations as key for influencing successful outcome of innovation processes”?. Results indicate that service activities linked with “enhancing access to resources” and “offering capacity building, stand out as dominant across all three phases of innovation processes for the four innovation cases studied. This implies, support actors and beneficiaries of services seem to attach more importance to technical service activities (e.g. training) and access to resources (e.g. technical, financial resources) as well as facilitating market access over soft skills related service activities such as networking facilitation and brokerage, institutional support for niche innovations, advisory and consultancy and demand articulation. Nevertheless, a cross-cutting view of especially networking service activity reveals its presence in varied dynamics, diversity and forms. We, therefore, recommend that to enhance the key role of networking in any attempt at accompanying and supporting innovation processes, this service function: 1) should be considered as cross-cutting, embedded in every service function and service situation and 2) its specific activities should be sub-categorised under intended networking service activities and side-effect networking service activities all driven by both service providers and beneficiaries of these services for a better maximization of their expected impact on the success of targeted innovations under promotion

Keywords: Innovation processes, Innovation support services, Networking service activities

1 Introduction

Recent studies have stated the necessity for re-conceptualising advisory services as a broad range of innovation support services (Kilelu et al., 2014) to adequately promote innovations within agro-food systems. These services are provided by pluralistic service providers organisations, with various methods, funding sources, governance mechanisms and varied visions of sustainability (Knierim et al., 2017). This institutional pluralism increases the challenge of how to optimally align the needs of innovators with appropriate innovation support services (Faure et al., 2019; Mathé et al., 2016).

In bridging this knowledge gap, some past studies have focused on the macro-structural level, characterising the types of service providers with their varied service functions (Birner et al., 2009; Klerkx and Leeuwis, 2008), while some (e.g. Birner et al. (2009) have concluded that a 'best-fit' between demand and supply should be sought for by choosing services from a 'menu of options' from the supply side. So far, there has been limited insights at the micro-scale level, with regards to how the interplay of matching service demand with supply (a "service situation") is realised, nor has there been an emphasis on characterising the dynamics, interactions and learning which accompany service provision process (Kilelu et al., 2014). Besides, recent findings in this regard are dominated by experiences drawn from case studies in the EU (Faure et al., 2019; Koutsouris and Zarokosta, 2020; Ndah et al., 2018; Wielinga et al., 2017), with only a few examples from the global South (Kilelu et al., 2014; Toillier et al., 2018). For advancement at the micro-level analysis of these interactions, conceptually, a relationship between innovation service situations and phases of innovation processes is assumed (Faure et al., 2019; Kilelu et al., 2014; Ndah et al., 2017). Besides, an in-depth analysis of this relationship could assist in better targeting and appropriation of innovation support services. More so, from an analysis of 43 innovation cases across Europe (Faure et al., 2019; Ndah et al., 2017), a significant role of the networking, facilitation and brokerage function was recognised and further remarked that different forms of networking among innovative stakeholders are required at different phases of the innovation processes to overcome specific problems.

Reporting as part of an EU-African partnership project: SERVInnov (*Strengthening innovation support SERVICES to enhance INNOVations for sustainable food production, ensuring the well-being of rural populations and reducing environmental degradation and resource depletion*) - this contribution operationalises the above insights by "*analysing the dynamics and diversity of innovation support services, especially networking, facilitation and brokerage service situations as key for influencing successful outcome of innovation processes*". Presented and discussed findings are based on selected agro-food innovation case studies drawn from Madagascar and Burkina Faso.

2 Conceptual basis

While many models have been used to illustrate the innovation process, in this contribution we make use of the **three phases aggregated model of innovation process** introduced in Ndah et al. (2020) after Wielinga et al. (2017) which limits the phases of an innovation process to initiation, implementation and dissemination phases. To capture the diverse support actors along the innovation process, we make use of the **generic typology of service providers** (Knierim et al., 2018), which differentiates between public, private, third-sector farmer-based, third sector non-governmental, and informal service providers. With regards to **innovation support services (ISS)**, we base our understanding on the discussion linked with the state of "service" partly in economics and recently in the agricultural extension literature (Faure et al., 2012; Labarthe et al., 2013) where, by its nature, an ISS is seen as "*intangible and involves one or more service providers and one or more beneficiaries in activities where they interact to address a more or less explicit request from a problematic situation, formulated by the beneficiaries and to co-produce services to solve this problem. Interactions aim to achieve the objectives of one or more beneficiaries according to the willingness to strengthen an innovation process*" (Mathé et al., 2016 pp.6). Base on this definition, and for differentiating the various ISS functions offered by actors in an innovation process, we make use of the following generic typology of service functions: "*Awareness and knowledge exchange; Advice, consultancy and technical support; Articulation of demand; Networking, facilitation and brokerage; Capacity Building; Enhancing/improving access to resources, institutional support for niche innovation*", initially derived from the literature (Mathé et al., 2016) and later refined through fieldwork in Europe (Faure et al., 2019; Ndah et al., 2018) and also in Africa (Toillier et al., 2018).

Lastly, for capturing the micro-level service interaction along the innovation process, we make use of the concept of "service situation" (Ndah et al., 2020), which builds on the reasoning behind the "triangle of service relationship", introduced in Labarthe et al. (2013) following Gadrey (1994) as well as the targeted differentiation of beneficiaries of advisory services following Hoffmann et al. (2009) after Albrecht et al. (1989). The concept of "service situation" captures the specific interaction between the service provider organisations and beneficiaries of services at a specific moment in time along the innovation process. This implies a service

situation can arise at any point within the course of an innovation process in response to an identified problem that triggers the intervention of an innovation service provider.

3 Methodology

3.1 innovation case studies

Targeted innovation cases were selected through a participatory interactive process characterised by a series of bilateral talks and discussions between the practitioners, research teams and case owners using a predefined selection grid as the basis for a decision. This grid, revealed the novelty (newness) of the innovation, the main issue driving the innovation process, the scale of the innovation, the phases of the innovation process, the main obstacles to the success of the innovation and the potential of the innovation to impact on sustainable agriculture and agri-food system. For this contribution, we limit to four cases across Madagascar and Burkina Faso (Table 1).

Table 1: Studied innovation case studies

Country	Title of Innovation	Main Problem/short description
Madagascar (MG)	Potatoes Post-harvest storage	<i>How to solve the problem of potatoes post-harvest losses and hunger gap periods</i>
	Chicken Vaccination	<i>How to address the problem of increased chicken mortality during the epidemic period (2015) in Madagascar</i>
Burkina Faso (BF)	Organic cotton farming	<i>How to guarantee the certification of economic, social and environmental standards in the production, exportation and distribution of textile products</i>
	System of rice-fish cultivation	<i>How to optimise water resources use and reduction of synthetic products</i>

3.2 Data collection and analysis

The empirical data for this contribution was collected through a mix-method approach grounded in participatory, multi-stakeholder, and systemic activities. Especially specific tools for data collection included group and individual interviews, as well as a literature review. These resulted in detailed innovation chronologies and learning histories for the four cases - all capturing the diversity of service situations and influencing environmental factors along with the different phases of the innovation processes.

Data analysis followed an ex-post process, starting with a selection and prioritisation of key-service situations by actors involved in the innovation process through participatory workshops or by the country research teams for each case (determine by how they judged the situation to have played a critical (key) role in the success of the innovation, next by a detail characterisation of the prioritised situations using the innovation support service situation matrix (Ndah et al., 2020). Apart from the actors and role played, activities and support service functions generated, and effects of the services on the phases of the innovation process, this matrix further reveal how the service need was expressed? how the service need was offered? and which policies and socio-economic norms enabled or restrained the process?

4 Results

4.1 Overview of support actors, duration of innovations and number of villages visited

An overview across the four case studies show that, while Farmer Based Organisations (FBOs) (e.g. FIFATA) were observed as main innovation support actors for MG, on the other hand, there is a mix in the number and type of support actors for BF with international organisations, alongside the public organisations and few Non-Governmental Organisations (NGOs) actively involved in accompanying and supporting innovations. However, with regards to support actors, acting within the frame of projects, this is strongly observed as playing major roles across the four case studies in the two countries (Table 2). These project interventions through which innovations are supported are either financed by international organisations or through national funding. With regards to the duration of innovations, while the two innovations for MG are observed as relatively young in the process, (e.g. started in 2013 and 2015 respectively), those for BF have a much longer history (e.g. started in 2003 and 2006 respectively).

Table 2: Comparative overview of support actors, duration of innovations and number of villages visited

Innovations	No. of villages visited	Duration of innovation	Phases of innovation	Actors
Potatoes post-	02 villages visited	Since 2013 -	Initiation	• FBO (CEFFEL)

harvest storage (MG)		present	Implementation	<ul style="list-style-type: none"> FBO (CEFFEL), FBO (FIFATA), FBO (FIKOTAMIFI - FIFATA)
			Dissemination	<ul style="list-style-type: none"> FBO (CEFFEL), FBO (FIKOMAFI - FIFATA)
Chicken Vaccination (MG)	02 villages visited	Since 2015 - present	Initiation	<ul style="list-style-type: none"> FBO (FIKOTAMIFI-FIFATA)
			Implementation	<ul style="list-style-type: none"> FBO (FIKOTAMIFI-FIFATA)
			Dissemination	<ul style="list-style-type: none"> FBO (FIKOTAMIFI-FIFATA)
Organic cotton farming (BF)	01 Village visited	Since 2003 to present	Initiation	<ul style="list-style-type: none"> NGO (Helvetas)
			Implementation	<ul style="list-style-type: none"> Projects e.g. WACP/C4CP, CRS's EECOLTE International Organisations e.g. INERA, Cotton House Africa, CIRAD, CEDRES
			Dissemination	<ul style="list-style-type: none"> Private Org. e.g. Bioprotect, Fertiplus
Rice-fish cultivation (BF)	01 village visited	Since 2006 to present	Initiation	<ul style="list-style-type: none"> International Org. e.g. FAO Fisheries department
			Implementation	<ul style="list-style-type: none"> Public Org. (e.g. agents from the ministry of agriculture.
			Dissemination	<ul style="list-style-type: none"> International org. (e.g. FAO, Projects e.g. TCP/BKF/3501 project

4.1 An exemplary overview of actors, activities and outcome for accompanying innovation process – case of chicken vaccination case, Madagascar.

“Service interactions between two main networks (i.e. the chicken farmers’ network on the one hand, and the FIFATA network on the other hand). The farmers’ network is made up of individual farmers, who have joined in a farmers group, and who operate and function as a farmers’ network. On the other hand, the FIFATA (FBO) network comprised of the administrative officials, project leaders, field technicians, and local advisers”.

The chicken vaccination innovation case in Madagascar, started with an impulse of change, triggered by the need to solve the problem of a sharp increase in chicken mortality during and after the epidemic period in 2015 (Fehler! Verweisquelle konnte nicht gefunden werden.). Especially in the Itasy region, farmers expressed their concern to FIFATA, (a farmer base organisation as the main support actor) as a way of seeking for a solution to their problem. As a response to farmers’ demand, FIFATA has provided a series of solutions in form of knowledge awareness and exchange; Capacity building related with training; advisory, consultancy and backstopping; networking facilitation and brokerage etc. all directly using field technicians and local advisers to address the chicken mortality problem. For effective coverage and delivery of these services to farmers, **advisers** and **technicians** have directly connected with farmers through **Lead farmers (Paysans leader)**, and **Link farmers (Paysans relais)** all trained by them. While the Lead farmers have been directly responsible for addressing social issues (e.g. caring about networking and farmers group cohesion), the link farmers have been directly responsible for technical issues (e.g. caring for all technical training, and diffusion of the innovation). Especially, the close support and accompanying of this innovation has mainly evolved around donor-funded projects in FIFATA. For instance, it is within the frame of the PROTANA and FEKAMA 1 projects that close support and accompanying of this innovation was realised, especially at the initiation phase of the innovation (2015 to 2017). For the implementation phase (2017 to 2019), the FEKAMA 2 project, played an instrumental role while the SAKAO Project and CAP Malagasy projects have been influential in the support and accompanying of the innovation at the dissemination phase of the innovation (2019 to present) (Figure 1).

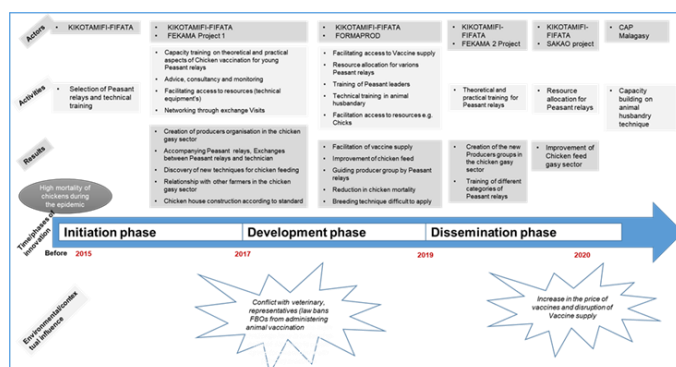


Figure 1: Innovation chronology for chicken vaccination case, Madagascar.

4.2 Observed service situations and phases of innovations – case of Madagascar.

Results have shown that both **facilitating access to resources** and **capacity building service function** emerged as dominant service functions across all three phases of innovations for the two cases in Madagascar (Figure 2). Specific activities related to access to resources included: support for market access, seed supply and distribution (especially for potatoes post-harvest case (MG)). For capacity building service functions, especially linked with technical training, specific activities included: training for seed production and potatoes storage (for potatoes post-harvest storage case), training for general animal husbandry, animal health, farm management, chicken feed fabrication and chicken vaccination process (for chicken Vaccination (Table 2).

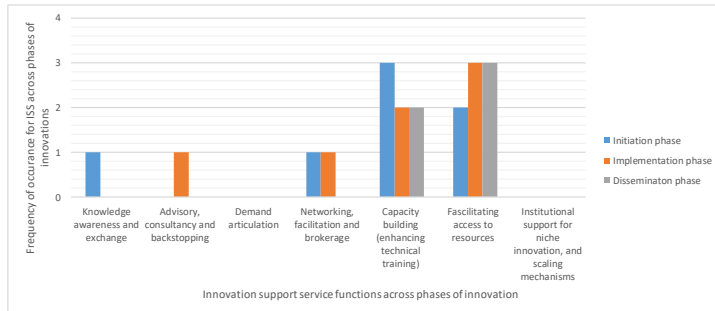


Figure 2: Support service functions across phases of innovations in Madagascar

With regards to **networking service functions**, this was observed to have occurred mainly at the first two phases of the innovations (i.e. initiation and implementation phases) with the later phase (i.e. dissemination) observed to be completely limited in networking activities. Specific networking activities included: the facilitation of farmers group formations (e.g. formation of a young farmers' group for chicken vaccination case; mobilising a network of Link farmers (Paysans relais) to closely support field technicians and extension workers; organising exchange visits to connect future farmers with other farmers of the region as well as discovering new feeding and breeding technics.

On the other hand, services linked with institutional support for niche innovation and Demand articulation were observed to be less visible in the case studies for Madagascar (Figure 2).

4.4 Service functions and phases of innovations – the case of Burkina Faso (BF)

For BF cases, **networking facilitation and brokerage** featured as the most dominant service function in terms of occurrence, though mostly at the development phase of the innovation process (Figure 3). Observed activities linked with this function included: organisation of cooperation and collaboration between the water and forest agents with technicians from the agriculture ministry and formation of Farmers groups (e.g. Niassan-Kroi Rice producers group) for the case of integrated rice-fish farming (BF). Again, for organic cotton production (BF), linking producers and supplies with international standards was observed as a specific networking activity (Table 3).

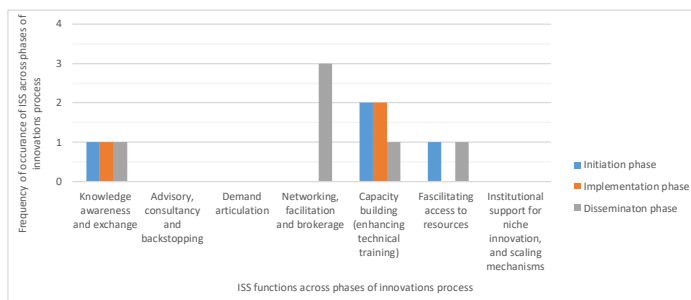


Figure 3: Support service functions across phases of selected innovations in Burkina Faso

With regards to service coverage across phases of innovations, **capacity building service function**, specifically linked with technical training is observed as the most offered service for the two innovation cases in BF. Specific capacity building activities include amongst others: “technical training with farmers” for the case of integrated rice-fish cultivation, and “training on digitalisation of data collection” as well as “labelling of organic producers” for the case of organic cotton production (Figure 3). Besides **capacity building**, knowledge awareness and exchange service function was observed as instrumental for the studied innovation cases across the three phases with specific activities such as “organising knowledge-sharing workshops” for the rice-fish farming case (BF); developing and introducing manuals on good practice for the organic cotton production case (Figure 3).

Table 3: Overview of services functions and corresponding activities across four innovation cases in MG and BF.

Phases of innovation	Observed innovation support service functions	Examples of observed service activities
Initiation phases	Capacity building (enhancing technical training)	<ul style="list-style-type: none"> • Training on seed production and potatoes storage (PPS, MG) • Training for farmers on general animal husbandry, animal health, farm management, chicken feed cultivation, and vaccination procedure (VC, MG) • Training for farmers on rice-fish cultivation (RFC, BF) • Training on digitalisation of data collection and labelling of organic producers (OCF, BF)
	Awareness raising and knowledge exchange	<ul style="list-style-type: none"> • Dissemination of knowledge by farmer multipliers (VC, BF) • Assessment and knowledge exchange workshops on Rice-fish cultivation (RFC, BF)
	Facilitating access to resources	<ul style="list-style-type: none"> • Facilitating the purchase of technical inputs and subsidisation of fish-feed for farmers (RFC, BF)
	Networking, facilitation and brokerage	<ul style="list-style-type: none"> • training farmers on creating a young farmers group, mobilising Link farmers network (VC, MG) • organising cooperation/ collaboration between the water and forest agents, with technicians from the agriculture ministry (RFC, BF)
	Facilitating access to resources	<ul style="list-style-type: none"> • Seed supply and distribution (PPS, Madagascar)
Implementation phase	Capacity building (enhancing technical training)	<ul style="list-style-type: none"> • Training on seed production, storage, and (PPS, MG) • Provision of technical assistance in form of training by agents from the agriculture ministry (RFC, BF) • Training support on organic cotton production and facilitating the adoption of new certification procedures (OCF, BF)
	Facilitating access to resources	<ul style="list-style-type: none"> • Marketing support and market access (PPS, MG) • Material allocations i.e. Facilitate access to vaccine supplies (VC, MG)
	Advice, consultancy and support	<ul style="list-style-type: none"> • Field visit of technician to FEKAMA young farmers group, ==> facilitate training and advice, monitoring and proximity (VC, MG)
	Networking, facilitation and brokerage	<ul style="list-style-type: none"> • organising exchange visits to connect future farmers with other farmers of the region as well as discovering new feeding and breeding technics (VC, MG)
	Awareness raising and knowledge exchange	<ul style="list-style-type: none"> • Development and introduction of manual on good practice in organic cotton production (OCF, BF)
Dissemination phase	Facilitating access to resources	<ul style="list-style-type: none"> • Seed supply and distribution through Link farmers and extension, facilitating the joint purchase of phytosanitary treatment equipment's (PPS, MG) • Facilitating the acquisition of technical equipment via the project and an installation of a fish feed production unit (RFC, BF)
	Knowledge awareness exchange	<ul style="list-style-type: none"> • Experience sharing workshops between the Sourou, Bagre and Bama villages, and between supervisors, provincial directors' and environmental agent (RFC, BF)
	Capacity building (enhancing technical training)	<ul style="list-style-type: none"> • Expanding training on digital data collection and labelling of organic cotton producers to a large scale (organic cotton cultivation, BF) • Leadership training on management and coordination of producers group for (VC, MG)
	Networking, facilitation and brokerage	<ul style="list-style-type: none"> • Connecting producers and supplies with international standards and a wider network of organic cocoa production (OCF, BF) • Designing and implementation of a farmer Field-School approach (RFC, BF)

Countries: MG – Madagascar, BF - Burkina Faso; **Cases:** VC - Vaccination case, RFC – Rice-Fish cultivation case, OCF- Organic cotton farming case, PPS – Potatoes Post storage case

Facilitating access to resource function was equally observed as influential for the success of the studied innovations in BF, however, this specific influence is exerted mostly at the early and later stages of the innovations (Figure 3).

On the other hand, service functions such as demand articulation, Advisory consultancy and backstopping as well as institutional support for niche innovations were observed to be completely missing across innovation processes for the two BF cases (Figure 3).

5 Discussion

In this subsection, we systematically discuss and reflect on the above findings under service functions and phases of innovations in general, before reflecting specifically on networking service activities. We do this while acknowledging a possible methodological limitation of the study which might have influenced the outcome such as 1) small sample size, crosscutting observations under different contexts with diverse cultures and agro-ecological systems, 2) findings partly relying on a recall process where farmers might have found it difficult to identify or recall experiences linked especially soft service-related activities, but highlighting with ease, those activities which rely on physical tools, physical meeting, sometimes easy to recall.

5.1 Service functions and phases of innovations – the missing links

The above results have revealed that for the four innovations cases across Madagascar and Burkina Faso, enhancing access to resources, and capacity building linked with technical training services appear dominant across the three phases of innovation processes. These results generally confirm the much importance attached by both support actors, and beneficiaries of services to technical services (i.e. through training), and enhancing access to both technical and financial resources in the course of accompanying and supporting innovations in the case study countries. This is closely followed by knowledge awareness and exchange service function (e.g. organisation of experienced/knowledge sharing/exchange workshops), though its activities are more prominent in the case studies for Burkina Faso than those for Madagascar. This is compared with other soft skills related services, either observed as minimal (e.g. networking services) or less visible (e.g. institutional support for niche innovations, advisory and consultancy, and demand articulation) in the portfolio of services offered by support actors in the examined cases.

Nevertheless, the influence of especially institutional support is not strongly visible in the studied cases despite the eminent need express by support actors and beneficiaries of these innovations. For instance, the case of chicken vaccination (Madagascar), where a government ban on FBOs from directly delivering veterinarian-related activities (e.g. animal vaccination) resulted in a conflicting situation between local advisers and technicians of FIFATA with local veterinary personnel. This situation could be resolved by strengthening service functions linked with institutional support for niche innovation in which lobbying activities and dialogue with the authorities could be directly initiated. Nevertheless, though FIFATA as an FBO is much involved in political lobbying, the process still needs time to yield results, and the main problem is more about power asymmetry between veterinaries and FBOs. The main question related to networking activities with no immediate answer is, *“how to strengthen FBOs political representation and lobbying in order, to weigh much more into the animal health actor-network in Madagascar?”*

5.2 Zooming into networking service activities and phases of innovations – the important lesson

The above results have shown that for the studied innovation cases, the networking service function appears to be visible at the initiation and implemented phases for cases in Madagascar (Figure 2), and mostly at the dissemination phase for cases in Burkina Faso (Figure 3).

Nevertheless, a cross-cutting view (Table 3), have revealed that specific networking features are visible across the entire innovation process phases in varied dynamics, diversity and forms. Sometimes, in combination or conjunction with other services offered. For instance, in the cases of Madagascar, specific dedicated service activities related to networking like organizing fairs, a workshop for sharing experiences and knowledge, and other services which include some part of networking activities as **second-level services** (e.g. linkages through input provision, technical training gathering actors from several networks, etc...) have all been distinguished. Again, in Table 3, for example, networking service elements have been observed in situations where **i)** farmers where get connected and collaborate in farmers groups on specific and general aspects linked with enhancing their innovative activities, **ii)** farmers and input supply dealers get connected for input supplies as well as with middlemen and market linkages for the supply of outputs, **iii)** farmers get familiar, learn and exchange with each other. More so, in the course of exchange visits to different case study regions and sites, networking processes between farmers with different levels of exposure to the innovations are further realised. Besides, activities within and around development projects through which support organisations use to accompany and support innovation processes (see for instance the innovation chronology for the vaccination case (Figure 1) all further enhance farmers and support actors' networking activities. These results signalled to the fact that different forms of networking must be defined for each phase of the innovation in combination with the

targeted services and intended purpose to be achieved, a confirmation to findings of Faure et al. (2019) and Ndah et al. (2017) who stated that different forms of networking among innovative stakeholders are required at different phases of the innovation processes to overcome specific problems. Moreso, findings tally with emphasis made by Pittaway et al. (2004) on “the need for better-understanding network dynamics and network configurations, as well as the role of third parties (e.g professional and trade associations) in innovation processes.

Summarily, from the above findings, it is safe to say that networking service functions play an influential role in the successful outcome of innovations in a flexible manner. In this regard, we, therefore recommend the following in any attempt at accompanying and supporting innovation processes: 1) networking service function should be **considered as cross-cutting**, embedded in every service function and service situation and 2) its specific activities should be sub-categorised under **intended networking service activities** (i.e. managed and or formal activities) and **side-effect networking service activities** (not managed, and or informal activities) all driven by both service providers and beneficiaries of the services.

6 Conclusion

This contribution has analysed the “dynamics and diversity of innovation support services, especially networking, facilitation and brokerage service situations as key for influencing successful outcome of innovation processes”?. Results have shown that **enhancing access to resources** and **capacity building service functions** stand out as dominant service functions across all three phases of innovation processes for the four studied cases. Again, support actors and beneficiaries of services are observed to attached more importance to these two functions (e.g to technical service activities (training) and facilitating access to technical, financial resources and market access) over soft skills service functions and activities (e.g. networking services, institutional support for niche innovations, advisory and consultancy, demand articulation services). Especially, the latter is either minimal or as less visible in the portfolio of services offered by most support actors in the studied innovation cases and countries of the global south in general.

Based on these findings, we recommend a close consideration of other service functions beyond the observed technical training, and enhancing access to inputs services that presently dominate the portfolio of services offered by support actors in the course of accompanying and support innovations in the global south. Especially, there is a need for a rethink on how to integrate networking services, institutional support for niche innovations services, as well as advisory, consultancy and backstopping service functions which appear to be completely neglected despite their potential positive influence for the success of innovations.

Nevertheless, from the findings, it is safe to conclude that networking service functions play an influential role in the successful outcome of innovation processes in a flexible manner. Especially, a combined view has revealed specific networking features across the entire innovation processes and phases in varied dynamics, diversity and forms hence. We, therefore, recommend that in any attempt at accompanying and supporting innovation processes: 1) networking service function should be **considered as cross-cutting**, embedded in every service situation function and service situation and 2) its specific activities should be sub-categorised under **intended networking service activities** and **side-effect networking service activities** all driven by both service providers and beneficiaries of these services.

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