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**Informality-oriented innovation network in Vietnam's
Agribusiness sector: An analysis from innovation system
perspective**

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Abstract

In developing countries, innovation networks are an increasingly important strategic means for small and medium enterprises (SMEs) to access and adopt information from different knowledge domains. Understanding the dynamics of innovation networks, both from the SME and innovation system level perspective, has become increasingly important. This paper aims to contribute to the understanding of such networks by analyzing innovation networks in the context of profound contextual changes and rapid development of input producing SMEs in the agribusiness sector in Vietnam. In the paper we characterize the innovation network in the Vietnam's agribusiness sector and discuss how to support the development of such networks.

Drawing on a case study approach we identify structural and functional dynamics inside the innovation networks and investigate how networks are providing resources to innovation process of SMEs. We find that input producing SMEs use strategizing innovation, mainly in the product, marketing and market areas, to cope with newly enforced policies and regulations that relates to Vietnam's entrance in WTO in November 2006 and subsequent increased competition in the sub-sector. In the present situation the formal actors fail to accomplish the envisioned role lead-organizations. In the lack of formal coordination innovation networks supporting SMEs' activities operates mainly at the intermediary level and the operational functions are mainly based on informal network mechanisms. At the net-level, the innovation network is structured with five groups of actors focusing on production, market and marketing, know-how, funding, and resource supply, respectively. The network is governed through 'selection and trust' principles and 'tacit mechanisms'. Building core network competences and enhancing net-level coordination and interactive learning are critical for the further development of the network.

Key words:

Strategizing behaviour, net-level, network governance, tacit mechanism, SMEs, Vietnam

1 Introduction

In a profound-changing context, the concept of innovation system (IS) has been seen as the key paradigm to foster innovation. The innovation system plays an important role for the diffusion of innovations in terms of managing and shaping the networking activities among involved actors (Pittaway *et al.*, 2004). With the global trend of 'open innovation', innovation networks become increasingly critical in the emerging innovation systems in developing countries. Inter-organizational and cross-sectoral networks have emerged as a key strategy for facilitating the flows of information, resources and trust necessary to secure and diffuse innovations (Dewick and Miozzo, 2004). Such networks promote innovation abilities of different actors, the development of innovations within and across firms and the diffusion of innovations across and within sectors (Pittaway *et al.*, 2004; Zeng *et al.*, 2010). They foster interactions between different actors, representing a complementary response to insecurity arising from development and use of innovations (Zeng *et al.*, 2010). In developing innovation networks attention needs to be paid to the building of core network competences through engaging effectively in collaborative innovation, preparing and managing collaborative work, and strengthening effective innovation clusters and public-private innovation initiatives (Rampersad *et al.*, 2010). Understanding the dynamics of networks' development is crucial for managing such networks and for establishing core network competences.

Literature on network in general and innovation network in particular, is by now rather extensive (Provan *et al.*, 2007). However, research on innovation networks has only limitedly addressed the issue of network performance (Van der Valk *et al.*, 2011). The majority of research highlights the role of individuals and, more specifically, the importance of interpersonal and informal networking for the diffusion of innovations (Pittaway *et al.*, 2004; Provan *et al.*, 2007). Few studies have addressed the innovation network for different types of innovations and the dynamics of the network development (Pittaway *et al.*, 2004). The studies on whole (or net-level) networks are scarce and mainly address conceptual issues based on anecdotal or single, descriptive cases (Provan *et al.*, 2007; Moller *et al.*, 2007; Van der Valk *et al.*, 2011). Moreover, there is little research on management processes in the context of emerging innovation networks (Moller and Svahn, 2009).

This study aims to respond to this gap in the literature by analyzing dynamic development and network governance of emerging innovation networks dealing with diverse types of innovations from the net-level perspective. It addresses two related questions. First, how profound contextual changes in an emerging innovation system influence the development of the innovation network? Here we use the case of input producing SMEs in the Vietnamese agribusiness sector as an example of the development of an innovation network at the micro level and discuss its structural and functional dynamics at the net-level. Second, we ask how the whole innovation network can be enhanced through sectoral IS support? We address this question by focusing on network governance and management as well as network functions and competences. Significant contextual changes in Vietnam's agribusiness innovation system (ABIS) and the strategizing reaction of input producing SMEs provide a valuable context for analyzing innovation network across the sector. The study contribute to the literature on management of innovation networks by providing a system level perspective on networks for diverse types of innovations as well as insights into the network governance and limitations under extreme institutional conditions.

In the next section, we will briefly summarize the literature on innovation networks in relation to innovation systems and analyze innovation networks from the net-level perspective. The third section describes methodological approach for collecting data and analyzing the innovation network in Vietnam's ABIS. The fourth section presents results analyzing the contextual changes, innovations and innovation network at the organizational level using the case input producing SMEs. Acknowledging the growing importance of the contextual changes, the fifth section discusses the roles of institutions in the network development at the net-level and the networking practices at the individual organizational level. The final section contains conclusion, together with limitations, implications for managers, and avenues for further research.

2 Conceptual and analytical framework

2.1 Innovation system and innovation network

The general concept of innovation systems has recently emerged as the key paradigm to foster innovation. The concept has been defined differently based on different perspectives (see Freeman, 1987; Carlsson and Stankiewicz, 1991; Lundvall, 1992; Nelson, 1993; Cooke *et al.*, 1997; Gall and Teubal, 1997; Malerba, 2002; Edquist, 2005).

However, the defining aspect of innovation system approach is its focus on relationships, such as networks, bridging, and brokerage, as crucial for enhancing enterprises' innovative capability. The innovation system concept considers relationships as crucial for increasing innovative capacity – relationships among enterprises as well as between enterprises and other domains. Hence, innovation networks play a major role in innovation systems. At the individual firm level, the principal benefits of networking are numerous, including risk sharing, access to new markets and technologies, accelerating product time to market, and pooling complementary skills (Pittaway *et al.*, 2004). In the case of Small and Medium Enterprises (SMEs), networks are indispensable for successful innovations as SMEs increasingly rely on external resources which are obtained only through networking (Zeng *et al.*, 2010). At the macro level, networks facilitate interactive learning and exchange of knowledge, information and other resources supporting innovation processes (Carlsson and Stankiewicz, 1991; Lundvall, 1992; Musiolik and Markard, 2011). They foster linkages between relevant actors such as scanning, scoping, filtering, and matchmaking of possible cooperation partners. They facilitate the trust building necessary to secure and diffuse innovations (Dewick and Miozzo, 2004). Network relationships with suppliers, customers and intermediaries are important factors affecting innovation performance and productivity (Pittaway *et al.*, 2004).

A network is generally defined as a set of nodes referred to actors (individuals, work units, or organizations) and a set of ties representing relationships, or lack of relationships, between the nodes (Brass *et al.*, 2004). However, networks viewed from an innovation system perspective, is more specific. Rampersad *et al.* (2010, P.794) define innovation networks as '*a relatively loosely tied group of organizations that may comprise of members from government, university and industry continuously collaborating to achieve common innovation goals*'. Musiolik and Markard (2011) distinguish between formal and informal networks. Formal networks are strategically established among actors with clearly identifiable members and a common aim or strategy. For example, formal networks in the public administration are multi-actor arrangements explicitly constituted by public managers to produce and deliver public services (Isett *et al.*, 2011). Such networks encompass strategic alliances, working groups of associations, technical committees or project networks. Informal networks emerge in a less planned way through the interaction of actors and rely by actors' own resources for network management, a budget, or establishment of communication channels (Musiolik

and Markard, 2011). A key feature of informal networking is the transfer of tacit knowledge promoting learning (Pittaway *et al.*, 2004). Isett *et al.* (2011) argue that informal networks are important tools for information sharing, problem solving, capacity building, and service delivery. Informal networks seem to have a tendency to become formalized over time, however, the level of this tendency and how this transition occurs remain unknown (Isett *et al.*, 2011).

A body of literature has emphasized the analyses of innovation networks at the individual organizational level. More specifically, these analyses have focused on dyadic relationships and networking activities (Pittaway *et al.*, 2004; Provan *et al.*, 2007). Although it has been highlighted in the research agenda, there are a number of areas in need of further research. These areas include the relationship between networking and different forms of innovation (e.g. process and organizational innovation); 2) the network dynamics and network configurations; 3) mechanisms that facilitate diversity of partners and transfer of tacit knowledge promoting learning; and 4) the role of third parties and networking and their impact on innovation (Pittaway *et al.*, 2004).

Analyses of innovation networks from the net-level perspective, however, is mainly limited to an attempt to understand what networks are, how they are structured, how they operate, and how they develop (Provan *et al.*, 2007). There has been a lack of systematic work on networks as a net-level, hindering the ability to understand how networks evolve, how they are governed, and, ultimately, how collective outcomes might be generated. Isett *et al.* (2011) stresses that there is a need to understand what it is about networks that make dyads, for example, different when they are in networks and when they are not. Furthermore, there is a call for study on establishing the range of functions networks fulfill to serve as a basis of comparison for the evaluation of cooperative networks. Studying networks at the net-level has important implications for individual network members in many aspects. For instance, the stage of evolution of a network may have implications for how the network might best be structured to accomplish the goals of individual members (Provan *et al.*, 2007). Applying the net-level perspective, this study will analyze innovation networks supporting innovation practices of SMEs in emerging innovation systems in developing countries. In the next section we propose a conceptual framework for analyzing innovation networks from the net-level.

2.2 Analysing innovation networks from a net-level perspective

Theorizing about networks can generally be viewed from two different but complementary perspectives of the individual organization (actor level) and the net-level of analysis (Kilduff and Tsai, 2003; Brass *et al.*, 2004; Provan *et al.*, 2007; Rampersad *et al.*, 2010). The actor-level perspective on network refers to egocentric theory, focusing on an organization and its embeddedness in a network such as dyadic relationships between organisations as well as structural and position measures of a network. Provan *et al.* (2007, p. 482) emphasize that the net-level perspective address the whole network as '*a group of three or more organizations connected in ways that facilitate achievement of a common goal*' and that the perspective draws on ideas and research on behavior, process, and structure. The analyses focus on properties and characteristics of the network at the whole net-level (Møller *et al.*, 2007; Provan *et al.*, 2007).

Conceptual elements in analyzing the whole network consist of its properties such as *structure, function, governance and management, and development and evolution as well as its outcomes* (Provan *et al.*, 2007). *Network structure* is captured by cohesion (density of ties and connectivity), centralization of actors' position (centrality or balance of the network), fragmentation and structural holes, and the existence of sub-networks or cliques (Provan *et al.*, 2007; Van der Valk *et al.*, 2011). Cohesion is the overall level of connectedness among actors in the network. Centralization is the extent to which one or a few organizations in the network is considerably more centrally connected than others (Provan *et al.*, 2007). Centralization of a network entails the emergence of so-called 'hubs', facilitating interaction and coordination in the network (Provan *et al.*, 2007; Van der Valk *et al.*, 2011). Fragmentation and structural holes show unconnected or loosely connected level of an actor(s) in connecting to other clusters of connected organizations. A high level of differentiation on the network is an important indicator for identification of the fragmentation and structural holes or cliques (Owen-Smith and Powell, 2005; Provan *et al.*, 2007). *Network functions* refer to coordination, collaboration, and cooperation within and beyond the networks (Isett *et al.*, 2011). Different types of networks form different collective action functions which may be highly context dependent.

Network governance and management refer to mechanisms used to govern and/or manage the overall network (Pittaway *et al.*, 2004; Provan *et al.*, 2007). The mechanism can vary and ranged from shared-governance, to hub-firm or lead-organization governed, to a network administrative organization modes (Provan and Kenis, 2008). Shared

governance networks occur when actors in the network collectively decide on both strategic and operational decisions about how the network operates. Lead-organization governance occurs when more powerful actors has sufficient resources and legitimacy to play a leading role. In addition to the common role in the network, lead actors are responsible for maintenance of existing internal relationships and the development of external relationships (Dhanaraj and Parkhe, 2006; Provan *et al.*, 2007; Provan and Kenis, 2008). Network administrative organization governance is similar in nature to the lead organization model but specifically created to oversee the network and primarily support network leadership (Provan *et al.*, 2007). Processes of governance and management of the network aims to establish the ‘rules’ guiding the collaboration and build trusts among actors.

Network development and evolution refer to the process and outcome of using resources, and rules and norms as steering mechanisms to drive development of the network. Development of the network is dependent on the mechanisms and the meanings, goals, and values of all actors within the network (Provan *et al.*, 2007). It is accompanied with the network dynamics leading to changes in structure, governance and management mechanisms, and networking practices. Network outcome occur at the net-level where a new alignment among network interpretations, structures and practice occurs (Knight and Pye, 2005). The most important network outcome is its effectiveness which refers to the degree to which network collaborations are successful (Rampersad *et al.*, 2010).

2.3 Analytical framework

Studies on innovation networks addressing the net-level have mainly focused on these five above-mentioned properties, but, surprisingly few studies address the contextual environment that influences these properties. In this study, we aim to address the contextual environment and its influence on the development of innovation networks. The net-level analysis of innovation networks is guided by the concept of institutional dynamics and its ability to influence network structure, function, governance and outcome as well as actors’ networking practices. This is based on the assumption that dynamic institutional changes increase uncertainties in the innovation network, fostering the formation of informal sub-networks and their transition to formal sub-network (Isett *et al.*, 2011). Network actors’ reaction to these uncertainties is mainly based on ‘strategizing behaviors’, reflecting that “strategies evolve over time, not from discrete decisions but from indeterminate managerial behaviours embedded in a complex social

setting” (Floyd and Wooldridge, 2000, p. 87). Their networking practices, hence, depend on tacit properties of the innovation networks such as trust, relationships, culture and norms.

Development of innovation networks in developing countries has happened in the context of rapidly and profound changes in the institutional framework which has significantly influenced to innovation practices and performance. In this study we apply the net-level perspective to analyse the dynamics of an emerging network under such contextual changes (Figure 1).

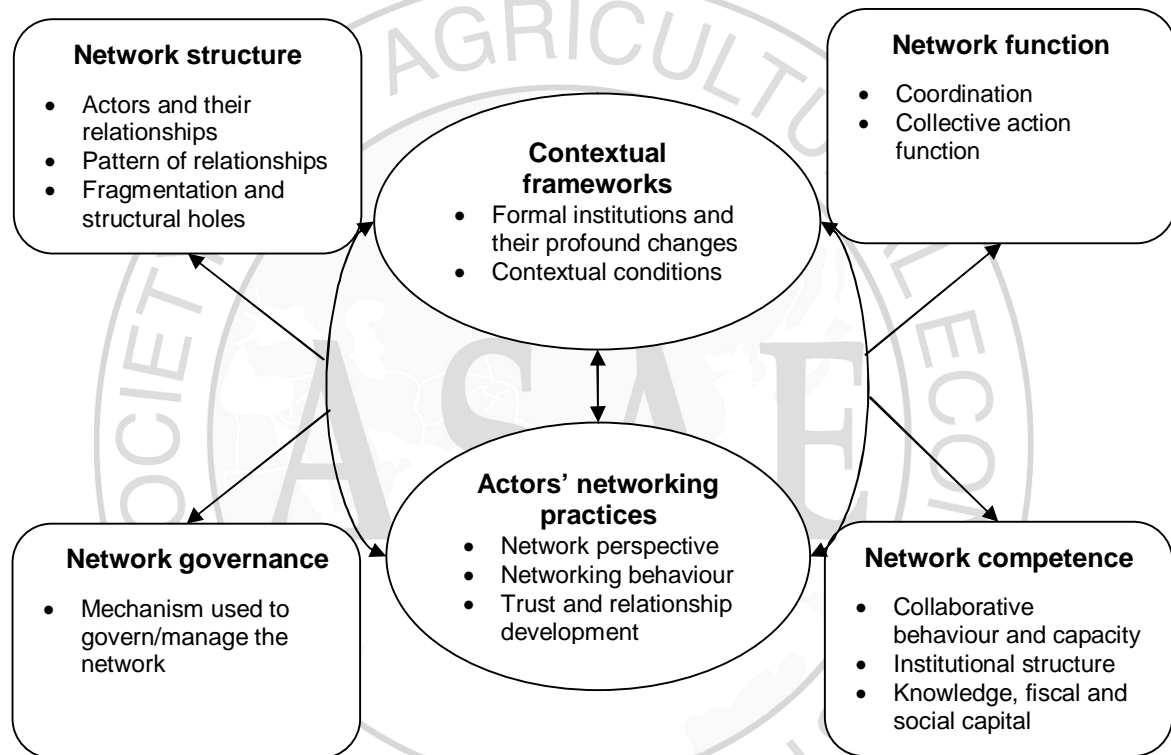


Figure 1. A framework for analysing network from a net-level perspective

Over the last decade, input producing SMEs in Vietnam’s agribusiness sector have been rapidly growing, playing a major role in the sector’s innovation processes as both innovation generators and adopters. Profound contextual changes, on one hand, facilitate their growth, but on the other hand, obstruct their capability to participate in innovation network and to be innovative. This phenomenon seems to be common in other sectors in Vietnam as well.

3 Methodology

In this study we aim to investigate the informality-oriented phenomenon in Vietnam's ABIS. In the first part of the study a review of the institutional framework was conducted based on existing agribusiness studies and on an analysis of the laws, decrees, statutory orders and regulations forming the legal framework in the agribusiness sectors. The second part of the study was based on an actor-oriented analysis (Jacobsson and Johnson, 2000; Geels, 2004; Kayal, 2008; Fløysand and Jakobsen, 2010). This approach applies the principle of 'network accumulation' where core actors, their roles and networks are initially identified. Subsequently, a snowballing sample technique is used to disclose further the structure of the network. For practical reasons, the analysis was at this stage focused on the North Vietnamese context. The pre-study was conducted to identify the actor groups considered to play a determining role in developing the innovation networks. Seven semi-structure interviews were carried out with representatives from public authorities, research institutes and universities identified through purposive sampling. The sampling was directed towards formal units with a mandate to support private and public enterprises in the agribusiness sector. In order to further refine the sketch of the ABIS network five semi-structured individual and group interviews were conducted with private employees and managers from feed producing enterprises. These interviews led to a more comprehensive mapping of the ABIS.

Based on the network sketch, we concentrate on the input producing SMEs because this group strongly influences the network's development and characteristics through their dynamic growth and behaviours. To obtain a sample of input producing SMEs the official list¹ of animal feed factories in Vietnam was obtained. The list includes 140 enterprises in Vietnam. At this phase the study was limited to the Red River Delta area where hereof approximately 40 enterprises are located. The enterprises on the list were contacted by telephone, but none of the enterprises were willing to participate in an interview. Subsequently, a more informal approach was applied. Through personal contacts in the feed producing sector one of the authors were personally introduced to factory managers in the Red River Basin area and in this way ten interviews were arranged. The enterprises were purposively selected in order to obtain geographical coverage of the entire Red River Basin, products types and size in terms of number of employees. Semi-structured interviews with managers of these factories were conducted each taking approximately

¹ This list is obtained from webpage: www.vncategory.com/

one hour on average. Furthermore, observations were conducted of SME production facilities. Every interview included questions about innovation and innovation process, innovative management skill and culture, networking practices, and network perspective in the company. Data analysis will use ‘grounded theory approach’ (Glaser and Strauss, 1967; Strauss and Corbin, 1997) to help identifying important categories in the material with the aim of generating ideas and theory ‘grounded’ in the data (Burck, 2005).

4 Results

4.1 Contextual changes to innovations in ABIS in Vietnam

Contextual changes in Vietnam’s ABIS include two different aspects: first, changes in the hard (or formal) institutions such as law, policies, and legislation under which the ABIS and its actors operate, and, secondly, changes in the ‘business environment’ at the local, national and global levels.

During the last two decades, Vietnam’s Government has adopted a wide range of measures across all policy areas to implement the modernization and commercialization of agriculture and the promotion of the agribusiness sector. These measures operate through multiple channels of infrastructure, technology, land use, sectoral price regulations, credit, and taxes. Since the second half of the 2000s, there have been major reforms in the legal framework to improve the macroeconomic and business environment for the agribusiness sector (Mai, 2006; Ffprde, 2009; Hansen *et al.*, 2009; Tran *et al.*, 2009). Of which, most prominent are policies on integration into regional and global economies, the 10-years Socio-Economic Development Strategy (SEDS) 2011-2020, and the Enterprise Law No. 60/2005/QH11 and its corresponding statutory orders.

Policies on integration and accession to the World Trade Organization (WTO) in November 2006 have engaged Vietnam more deeply into the regional and global economy. Like other economies, Vietnam has been affected heavily by global price shocks and the financial crisis intensified since September 2008. Responding to these circumstances, national policies have shifted from stabilization/anti-inflation to stimulation of economic activities (Ffprde, 2009; Thanh and Duong, 2009). Stimulus packages for supporting infrastructure development, exports, SMEs, and low income groups as well as interest subsidies to short-term loans to all business sectors have been implemented (Ffprde, 2009; Thanh and Duong, 2009). The government seek to encourage Vietnam’s firms is to enhance their position in the value chain by diversifying

products and strengthening non-price competitiveness, attracting efficient FDI/strategic partners, and improving labour and management skills (Thanh and Duong, 2009).

SEDS 2011-2020 has highlighted a number of important goals in relation to agriculture and agribusiness development: (1) to develop a commodity agriculture using high technology in order to increase value added per land unit; (2) to closely combine scientific-technological application with production, processing, and distribution within the value chain, ensuring harmony of interests among links in the value chain; and (3) to increase total export value from the agribusiness sector from the current US\$3.2 billion to US\$10 billion by 2020. SEDS 2011-2020 emphasizes the role of knowledge in the development of market-oriented agriculture and the agribusiness sector.

Enterprise Law No. 60/2005/QH11 launched on 29 November 2005 presents the Government's efforts to eliminate the discrimination between different economic sectors and develop a better 'general business environment' for the enterprise's development. Under the legal framework of this law, Decree No. 56/2009/NĐ-CP on 'Support for development of small and medium sized enterprises' was launched on 30 June 2009. Contrary to its predecessor, Decree No. 90/2001/NĐ-CP² (GSRV, 2001), Decree No. 56/2009/NĐ-CP lays a clearer foundation for policy-making and appropriate support programs for SME development. First, Decree No. 56/2009/NĐ-CP categorizes SMEs as super-small, small, and medium reflecting the real scale of enterprises (see details in GSRV, 2009). Second, the function of state authorities in SME development promotion is better defined in many aspects. They include, for example, a clearer defining of the responsibilities of ministries and branches in specific support policies; an enhanced structure and assignment of functions to state agencies concerned with SME development support; and the appointment of the Department of Planning and Investment (DPI) at the People's Committees as a focal point for a support network of state agencies at the provincial level. Third, support measures of the Government are regulated clearer with a set of legal documents and guidelines to specific ministries, branches, localities and business associations regarding responsibilities for SME support activities. Fourth, policies on financial support have become more specific in terms of mechanisms to

² Decree No. 90/2001/NĐ-CP, 23 November 2001, on 'Support for development of small and medium sized enterprises' provides an overview in which guidelines promulgated from the early 1990s are joined. They include, for example, Resolution No. 16/NQTW on 'Small scale and private sector activities', 15 July 1988; Decree 66 from 1992 on 'Incentives and promotion of enterprise development'; Decree 120 from 1993 on 'Small credit for employment generation' and the 'Strategy for socio-economic stabilization and development up to the year 2000'.

allocation of government funds and state banks are supported in adjusting credit structures targeting SMEs. Moreover, the state encourages public and private financial and credit institutions to improve services related to business development support. Fifth, policies for improving technological capacity are more specific in assisting SMEs in the access to information about new technology and equipments, in prioritisation of technology investments for improved product quality, and in supporting the cooperation between governmental implementing agencies and SMEs. Despite of these favourable changes, SMEs are still facing difficulties in the access to credits and technologies due to the lack of effective policy tools for implementation.

In addition to these institutional changes, a number of contextual changes have also influenced the Vietnamese SMEs' business environment. Most important are the global financial crisis in 2008/2009, an increasing inflation rate, and the consequences of the financial policies addressing the balance of payments deficit (Ffprde, 2009; Thanh and Duong, 2009). These are the main reason leading to the '*capital crisis*' in SMEs. Currently, input producing SMEs are experiencing a situation of capital shortages, leading to a 'bumpy development' (*phat trien len thac xuong nghenh*) as mentioned by one respondent. SMEs are facing difficulties in accessing formal credit and they have to rely heavily on informal credit channels (Nguyen *et al.*, 2008). Moreover, a rapid growth in the number of input producing SMEs in the recent years (Hansen *et al.*, 2009) has increased the competition on quality and marketing of products and on the labour force. Increasing of prices on raw materials in the global and domestic markets leads SMEs into a 'pricing race' with their products. The next section describes the current innovation wave and networking practices in input producing SMEs, especially animal feed and medicine plants, in coping with these institutional and contextual changes.

4.2 Strategizing innovations and networking practices in input producing SMEs

To animal feed and medicine producing SMEs in the agribusiness sectors in Vietnam, the terms 'innovation' is often understood as 'high-tech' solutions (*cong nghe*) that has been imported from abroad. 'Innovation' defined as anything new successfully introduced into an economic or social process (Davis *et al.*, 2008: 37) is, therefore, not a common interpretation of 'innovation' among Vietnamese SME managers. SMEs considered their innovations as 'improved things' (*nhung cai tien*) that need to be implemented in order to immediately cope with the above institutional and contextual changes. These 'improved things' are found mainly in four categories:

Product development: Two common ‘improved techniques’ in this category are adjustments of chemical formulas used for producing animal feeds and medicines and to improve quality of selected products in the ‘livestock product chain’ with the explicit purpose of establishing customer loyalty. In the adjustment of chemical formulas, specific ratio of important ingredients such as protein, starch and vitamin are adjusted within the range that allows the maintenance of the products’ price while minimizing changes in the products’ quality. These adjustments are a response to the increase in input prices and shortage of raw materials. With the product improvement strategy the SMEs expand their product range into a series of products corresponding to the different development stages of animals. One example is ‘seven B for one pig’. One fattening pig needs seven bags (B) of bran in total for three periods of growth. If the customer likes the first bag, it is highly likely that the company will also be supplying the following six bags. Compared at the economical optimisation through adjustments of chemical formulas, which may not lead to improved products, the ‘livestock product chain’ innovations are more strategically aiming at building customer satisfaction and increasing market shares.

Process development: Upgrading production lines from labour intensive manual work to a more automated processes, is common found in this category. SMEs consider this change in the production line as an innovation (*doi moi cong nghe*) to ensure the quality of the products, to increase the productivity, to cut down the production cost in a long-run, and to reduce the dependency on the labour forces.

Organizational system development: ‘Self-container production mode’ (*chuoì san xuat khep kin*) is a new idea mentioned by respondents from two animal feed producing SMEs. This strategy aims for vertical integration in the agribusiness value chain. Production of animal feed is the first activity that provides input for subsequent downstream activities. The production is integrated with livestock raising farms that use the feed producing SMEs products. A third component is then concerned with the processing and marketing of final products based on farm output.

Market organisation, sales and distribution development: mixed cash sale, market-keeping sale, product brand-name sale, agent cooperatives, and faithful agents are changes found in this category. The *mixed cash sale* strategy combines two ways of marketing products: direct to farmers and through an agent system. This strategy is imposed to avoid debt receivables from selling on credit to end customers. To gain

market shares customers are offered price-subsidy, cash-discount or quantity-discount programs from SMEs. In the *market-keeping sale* strategy, SMEs seek to maintain their market shares by selling with no or negative profit. For example, commercial brand for egg-laying poultry is non-profitable but SMEs still produce and sell it in order to maintain a market share for meat producing poultry as poultry feeding farmers often buy both types of products from the same supplier. The *product brand-name sale* has led to a change in the distribution system. Feed producers distribute their products through a network of locally based company employed marketing staff responsible for the resale to independent local agents selling to individual farmers. Often marketing staff might try to optimize their revenue by selling products from different producers at the same time or moving to competing producers bringing the customers along. In order to avoid this practice, SMEs have introduced exclusive agreements where the marketing staff can only sell a specific brand and, furthermore, is obliged to provide the SME with a list of local agents selling the brand. Moreover, more brand-oriented incentive schemes have been introduced to motivate marketing staff. The establishment of *agent cooperatives* reflects that small agents (or secondary agents) join together to buy large enough quantities of products enabling them to be treated as the larger agents (or the first agents³). Agent cooperatives are intervened by marketing staff in order to increase sales. The establishment of *faithful agents* aim to assist selected first agents in developing and implementing their business plans creating mutual benefits for both SMEs and agents. This faithful agent partnership concept is created to ensure the commitment of the agents based on long-term business cooperation with SMEs.

Similar to the term ‘innovation’, the term ‘innovation network’ seems unclear to the managers in the animal feed and medicine producing SMEs in our study. The interviews show that SME managers generally understand ‘innovation network’ as ‘*different relationships and connections spontaneously established during the doing businesses with their partners*’. Since they are spontaneously established, innovation networks are obviously governed based on the ‘*selection and trust*’ principles. Interviewees argue that they carefully select their partners after they, over a period of time, have had a chance to have personal interaction and developed trustful relations. SMEs carefully select partners for long-term business interaction and build trust with them through ongoing cooperation.

³ The first agent is an agent that directly contacts to SMEs and can sell up to certain amount of one product in a certain time. This standard is varied depending on each SMEs. One example is minimum 30 tons of one product per month.

These practices forms '*friendship sub-networks*' of informal actors⁴ including SMEs, material providing companies, individual consultants and consultancy companies, informal credit providers and customers (agents and farmers) as illustrated in the core layer in Figure 2. Intensive exchange of resources such as information, capital and equipments used for their innovation activities occurs mainly within this '*friendship sub-network*', establishing strong connections among these actors. For instance, material providing companies, and individual consultants and consultancy companies, provide concrete information on how to implement innovations. Informal credit providers invest capital for implementing innovations, especially for process innovations.

The innovation network in SMEs is expanded with the '*business sub-network*' as illustrated in the middle layer and the '*formal sub-network*' illustrated in the outer layer in Figure 2. The '*business sub-network*' consists of different types of firms and institutions that have either cooperative or competitive relationships with the SMEs. These members are also informal actors, including large-firms, foreign and joint-venture companies, other SMEs, firms in abroad, private banks and mass organisations. This '*business sub-network*' is where SMEs can find information for the scanning for innovations and implementation of innovation.

⁴ Informal actors are individuals and organizations in the non-public sector.

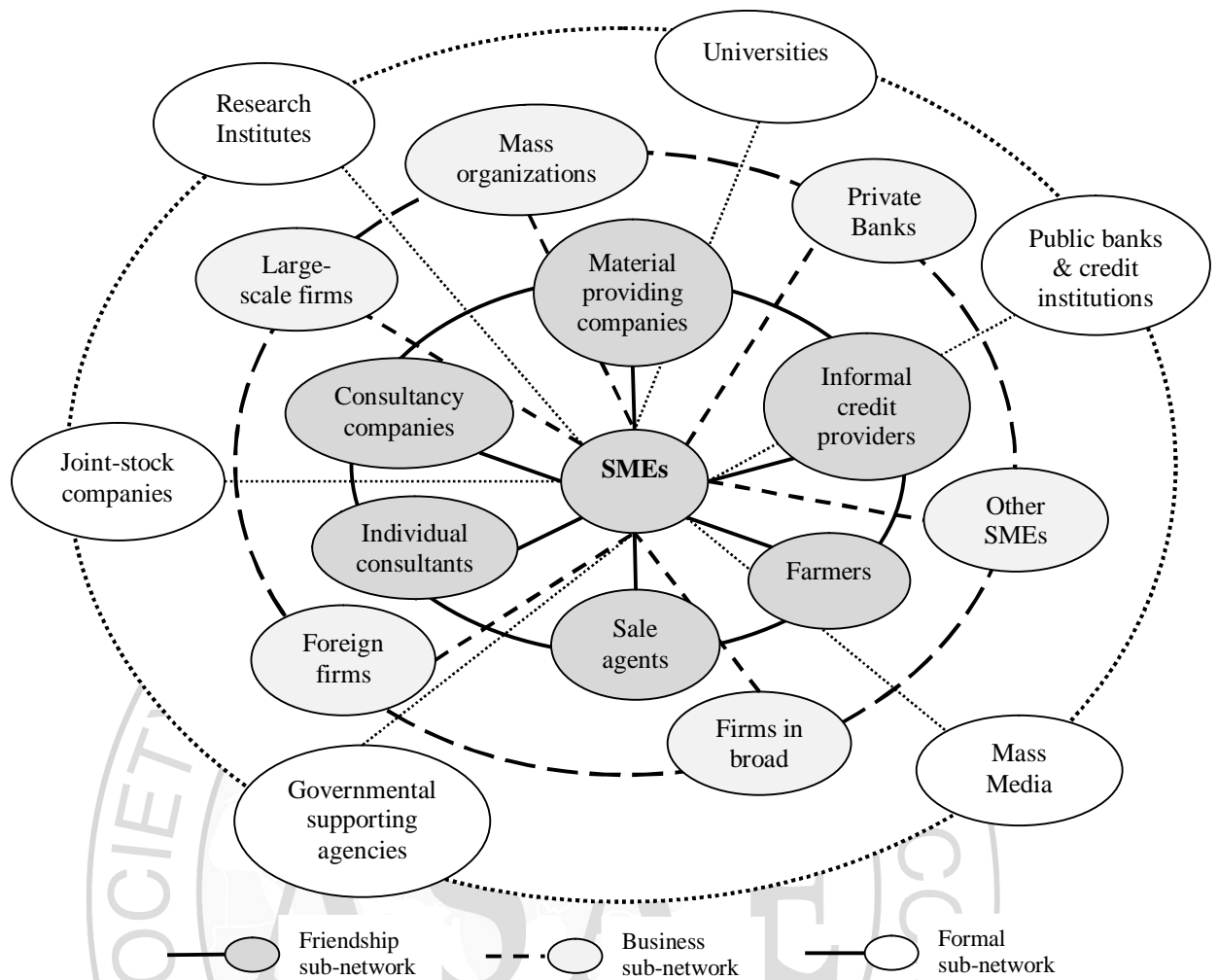


Figure 2: Innovation network for input producing SMEs

The ‘*formal sub-network*’ consists of formal actors⁵ such as universities and research institutes, public banks and credit institutions, and government supporting agencies illustrated in the outer layer in Figure 2. This ‘*formal sub-network*’ has official responsibility to provide technical, administrative and financial supports to SMEs. However, this sub-network limits itself only to indirect relationships, communicating with SMEs through intermediation of informal actors. Linkages between SMEs and the ‘*formal sub-network*’ are weak. Technical support institutions are not capable in providing information and equipments that SMEs need or as one respondent expresses in: ‘*Knowledge from research institutes and universities is bookish/dogmatic (sach vo) and can hardly be applied in our practical business*’. Administrative support agencies by no means provide the SMEs with efficient assistances. A respondent expresses it this way:

⁵ Formal actors are different organizations and institutions in the public sector.

‘Administrative supporting agencies are harassing (nhung nhieu) us with uncountable and changeable regulations, guidelines and requirements’. Financial support institutions discriminate against SMEs by, for example, applying strict conditions and procedures and providing unprepossessing credit products with short-terms loan, high interest rates and unreasonable mortgages (Nguyen and Neelakantan, 2006, Nguyen *et al.*, 2008). Therefore, there are still strong institutional obstacles limiting SMEs’ access to resources in the *‘formal sub-network’*. The innovation networks of SMEs currently operate mainly at intermediary (brokerage) level in the two sub-networks involving mainly informal actors. The networks are governed through ‘network mechanisms’ (Minh *et al.*, 2011) that depends on SMEs’ self-motivation to develop and adopt innovations to serve particular needs or to solve certain problems at an organisational level.

4.3 Emergent structure and properties of ABIS’s innovation network

At the net-level, ABIS innovation networks have five organizational components involving both formal actors (illustrated in white background rectangles in Figure 3) and informal actors (illustrated in dark background rectangles in Figure 3). These components and their actors connect with each other through five direct relationships⁶ (illustrated in solid double arrows in Figure 3) and three indirect relationships⁷ (illustrated in dash single/double arrows in Figure 3).

The first component is *‘innovation’*, located at the centre of the network. Innovation happens as different actors, such as SMEs, large firms and farmers built direct relationships of information searching for developing innovations through business cooperation and formal and informal meetings. The second component is *‘market and marketing’*, acting as a major driving force for the actors in the *‘innovation’* component. Within this component, different actors like sale agents, traders and customers have developed an indirect relationship of information exchange, creating demand for innovations. This component links with the *‘innovation’* component through a direct relationship of information searching. The third component is *‘know-how’*, including providers of knowledge for the actors in the *‘innovation’* component. Within this component, different actors are linked by indirect relationships such as government agencies influencing research institutes and universities through funding schemes and

⁶ Direct relationship is interaction and cooperation among involved actors in the innovation process of searching and scanning information needed to developing innovation as well as implementing developed innovations

⁷ Indirect relationship is interaction and cooperation among involved actors beside the innovation process.

priority setting; and providing human resources from research institutes and universities to government agencies, consultancy companies and individual consultants. This component connects with the '*innovation*' component through direct relationships of supplying knowledge and information for implementing innovations and improving innovation capacity and capability. The fourth component is '*funding provision*', linking with the '*innovation*' component through a direct relationship financial support for implementing innovation. The fifth component is '*resource supply*' connecting to the '*innovation*' component through direct relationships of information searching, and technological and input supply for implementing innovations. Beside direct relationships with the '*innovation*' component, the remained four components also connect with each other through indirect relationships. These relationships include, for instance, information exchange between informal actors in '*know-how*' and '*resource supply*' components, and between '*market and marketing*' and '*resource supply*' components; guidance for technical and financial support between formal actors in '*know-how*' and '*funding provision*' components; and financial support from '*funding provision*' to '*market and marketing*' component, primarily in terms of credits. What can be seen from this structure is an emerging innovation network with a dynamic involvement of the informal actors and a lack of network institutions developed through interaction among all relevant stakeholders.

Currently, there is a disconnection between formal and informal actors in the innovation network, negatively influencing the function of the whole net-level. Strong direct relationships have been developed among informal actors, while direct relationships between formal and informal actors are weak in the innovation network. One reason led to this disconnection is the institutional barriers mentioned in Section 4.2. Others are the lack of capacities and lack interests in participating actively in the network. Formal actors are expected to act as supporters to the '*innovation*' component and as coordinators of the net-level network. Inefficient performance of the formal actors, therefore, blocks the coordination in the whole innovation network. Coordination is an important net-level function. Due to the absence of coordination interactive learning, an important collective function of the innovation network, is also hindered. Existing innovation networks are mainly governed based on informal norms, by which informal actors individually, or to a limited extent jointly, work to develop the operational principles of '*selection and trust*' for operating the network. These operational principles are informal mechanisms that

often determined individual actors' and group of actors' strategizing behavior. Coordination and cooperative mechanisms have not been developed as the net-level functions are absented. Development of core network competences, including actors' collaborative behavior and capacity, institutional structure, and knowledge, fiscal and social capital is spontaneously initiated among informal actors but without coordination from the innovation system level.

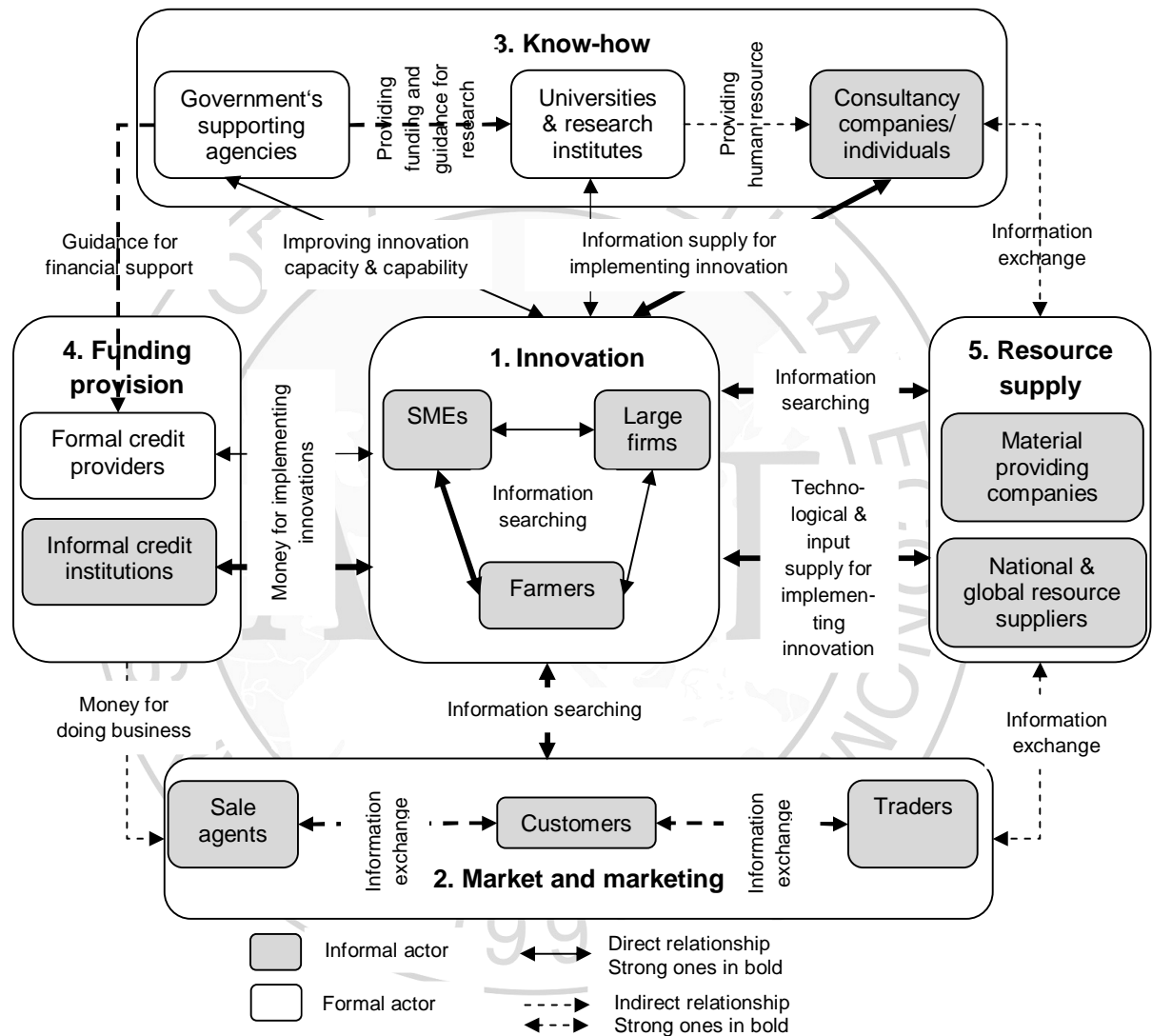


Figure 3: Net-level structure of an innovation network in the ABIS context

5 Discussion

5.1 Effects of contextual changes on Vietnam's ABIS innovation network

As our result has shown, the context of Vietnam's ABIS has experienced many profound changes, including: (1) the legal framework has been reformed aiming for creating a better business environment for the agribusiness sector; (2) the global financial crisis and

Vietnam's policies on balance of payments deficit have caused the '*capital crisis*' in the private sector; and (3) increasing competition in the agribusiness sector, both at the national and global level. These profound changes have significantly influenced the development of innovation networks at the organizational level and at the net-level. At the organizational level, individual informal actors have spontaneously responded to the contextual changes by introducing new approaches or by improving the existing processes and procedures. Often this has happened without developing or shaping innovation strategies with other stakeholders in the (potential) networks. Resources and supports, that informal actors cannot access from the public sector, have been temporarily substituted from the network relationship '*friendship and business sub-networks*'. Informal relationships such as actual networking behavior and organizational attitudes towards networking are important factors in obtaining resources for innovation processes (Nguyen, and Neelakantan, 2006; Nguyen *et al.*, 2008). These strategizing behaviors of informal actors have developed the informality-oriented innovation networks presented in Figure 2. The trust and relationship basis, short-sighted innovation practices, and inconsistent and frequently changing legal institutions have not only shaped this informality-oriented configuration but also increased uncertainty in the innovation networks. Increasing uncertainty leads to the development of weak ties relationships in the network and inhibits innovation by encouraging competitive behavior (Pittaway *et al.*, 2004).

At the net-level, the profound contextual changes have not been accompanied by a increase in capabilities and competences of the actors, especially formal actors, enabling adjustments to the new context (see more details in Nguyen, 2008; Hansen *et al.*, 2009, Thanh, V.T and Duong, N.A. 2009). Inefficient performance of the formal actors in relation to the requirements outlined in the institutional reforms, as well as the growing importance of informal processes has had significant consequences for the development of the innovation sub-networks. First, it weakens the cohesion in the overall network and creates disconnection between formal and informal actors and cliques within sub-networks. Owen-Smith and Powell (2005) argued that the existence of cliques occurs when there is a geographical convenience or bias in service provision. In this study, we contend that the cliques develop when formal actors perform inefficiently their roles in networking activities. Second, it obstructs functions at the net-level, i.e. coordination, cooperation, collaboration, and interactive learning within the innovation network. Isett *et*

al. (2011) commended that networks do not necessarily have to perform these net-level functions. In the case of emerging innovation network in Vietnam's ABIS, the absence of these net-level functions has increased the uncertainty related to innovation process as well as decreased formation of the network institutions that might in turn facilitate the networking effectiveness. Third, it has strongly encouraged the informal mechanisms of '*selection and trust*', while weakening the coordinative or cooperative governance mechanisms in the overall network. Although networks are not simply coordinative or cooperative mechanisms (Isett *et al.*, 2011), the absence of these mechanisms, however, could create favorable conditions for a domination of the informal mechanisms such as norms of reciprocity and trust imposed and maintained by individual actors (Provan *et al.*, 2007). This way of governing the network is, to a certain level, similar to the shared governance mechanism presented by Provan *et al.* (2007). However, due to its informality and individualized character, we would rather name this type of network governance as '*tacit mechanism*'.

Additionally, the strategizing innovation and networking practices of informal actors tend to prevent transition from informal to formal innovation networks in the ABIS. The transition from informal to formal network requires a shift from an emergent structure of interactions to multi-actor arrangements coordinating by public actors (Isett *et al.*, 2011). Currently, this shift in Vietnam's ABIS innovation network is obstructed due to the unfavorable contextual conditions, the inefficient performance of the formal actors and the strategizing behavior of different actors. More specifically, strategizing behavior forms short-term relationships and temporary-trust among different actors, impeding the actors' commitment to network goals and their incentives to participate. Different actors prefer to informalize the network for their individual purposes rather than shaping a structured network for an achievement of the common goal of the innovation network.

5.2 Strategy for enhancing innovation networks

A strategy for fostering the development of innovation network should address both organizational and institutional aspects from the innovation system perspective in order to managing the transition from informal to formal network. From the organizational perspective, each organization or actor should be seen as a factor capable of forming and adjusting institutions. From the institutional perspective, institutions should be seen as guiding the structure of organizations and actors in performing their roles (Edquist, 2005). This intertwine-function of organizations and institutions affirm the important role

of organizations and actors in the process of network transition. Strategizing behaviour is associated with the sub-optimisation at the enterprise level and hence necessary for short-term survival of individual actors. On the other hand, at the net-level informal strategizing behaviour creates uncertainty and fails to foster the benefits obtainable from formal coordinated action involving the entire network. Thereby, a strategy should seek to achieve transition from informal to formal informal network in the emerging ABIS in Vietnam through an incremental approach based on changes in the everyday practices of organizations. The development of the innovation network must depart in the existing perceptions of the actors and is unlikely to be successful if imposed in a top-down manner. We argue that emphasis should be placed on aligning individual actors strategizing innovation and networking practices with a more strategic innovation practice in order to increase certainty in and non-cost competitiveness of the innovation network at the organizational level. This can only be achieved if goal congruency between individual actors and the objectives of the innovation networks.

This leaves the question of how to benefit from informal actors strategizing behavior to facilitate changes in the practices of formal actors making them more efficient network participants. It seems important to gradually establish the connection between formal and informal actors in the innovation network. The current situation with a mismatch between changes in legal framework and implementation capacity of the government's agencies creates an impasse. One way to overcome this might be to assign a formal actor functioning as a network coordinator in order to promote the net-level functions. Such a lead organization should apply a adaptive strategy drawing on existing practices thereby ensuring the recognition of informal actors' knowledge and experiences and effectuate a gradual change enabling the network to develop core network competences over time.

Analyzing network at the net-level is an important way of better understanding how whole networks operate, how they might best be structured and managed, and what outcomes might result. Network outcomes in general and effectiveness in particular are critical issues when studying networks (Isett *et al.*, 2011). In this study, we have not addressed the analysis of network outcome. In addition, intensive qualitative data was collected from SMEs as key innovative actors and other informal actors in the network, while indebt analysis of how formal actors perform their roles has not yet covered. Hence, further study on innovation network at the net-level in Vietnam's ABIS should address these two issues for better understanding the perspectives of all stakeholders and

identify how the whole innovation network can facilitate changes based on the participation of all actors.

6 Conclusion

Studies on innovation networks at the net-level and from the IS perspective offer insight into how networks develop, how they are governed, in which context they function, and how different actors practice their networking activities. The development of innovation networks in Vietnam's ABIS is characterized by the informality-oriented structure with the domination of informal networks. Informal actors have adopted a strategizing behavior to maximize their resources for developing and using their innovation networks. In the context of a reformed legal framework, a national and global financial crisis, and an increasing competition in the private sector, informal actors have relied on '*tacit mechanism*' of '*selection and trust*' to govern the innovation networks. A transition from informal to more formalized collaboration in the whole network is prevented. Formal actors are only passively involved in the network, resulting in lack of connections between formal and informal actors, and in the absence of coordination and interactive learning processes.

We conclude that limited institutional capacity to deliver high quality services at the macro level and limited innovation capability to strategically manage innovation process at the SME level are a crucial hindrance to innovation networking. Moving beyond operating at the informal network level and strengthening whole network functions require more pro-active network governance and management and the establishment of core network competences. Strategies for formalizing Vietnam's ABIS innovation networks need to emphasize the strategic adoption of strategizing behavior in order to build the connection between formal and informal actors and to foster the transition from informal to formal network. Formalization is desirable as it increases the overall capacity and accountability of the network and moves it beyond personal relationships (Isett *et al.*, 2011). A long-term strategy for fostering the formalization is to understand better how the transition from informal to formal network takes place and what mechanisms determine this transition process.

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