THE EFFECT OF NETWORK RELATIONSHIPS ON INNOVATION IN KNOWLEDGE INTENSIVE BUSINESS SERVICES

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Abstract: Recent research has emphasized the importance of networking for innovativeness. One of the key drivers of innovation is network relationships with various stakeholders such as customers, suppliers, competitors, investors, universities and research institutions, and government and regulatory agencies. This study explores the effect of network relationships on innovation in knowledge intensive business services (KIBS). The knowledge provided through strong ties is important for development of many forms of innovation in knowledge intensive business services. The study looks into six distinct forms of innovation adapted from the service innovation model proposed by Hertog et al. (2010): New Service Concept (NSC), New Customer Interaction (NCI), Technological Process Innovation (TPI), Administrative Process Innovation (API), Strategic Partnering Innovation (SPI) and New Revenue Model (NRM). In in-depth interviews with senior executives of several KIBS firms, the study finds that particularly the networks with customers, suppliers, competitors and investors are important in fostering innovation in KIBS.

Keywords: service innovation; networks; knowledge intensive business services; knowledge sharing; creativity and business; technological innovation; process innovation; new service concept; new customer interaction; administrative innovation; strategic partnering; new revenue model.

Introduction

Companies increasingly realize the need for innovation for growth. One of the key drivers of innovation is network relationships with various stakeholders such as customers, suppliers, competitors, investors, universities and research institutions, and government and regulatory agencies. In an interview for Mckinsey Insights (2014), McKinsey director Travis Fagan describes how innovation in the services sector is gaining momentum with digitization as an important driving force. Doz and Wilson (2012) discuss that a firm may find critical skills, knowledge and capabilities needed for innovation in other firms. The ideas and knowledge for new products and services often result from a wide network of contributors. Successful firms collaborate on a number of innovation projects (Nidumolu et al., 2014). Ibarra and Hansen (2011) in their leading article in *Harvard Business Review* (July-August 2011), discuss the importance of collaboration and describe connectors as individuals who have multiple ties to different social worlds and who are able to connect people, ideas, and resources.

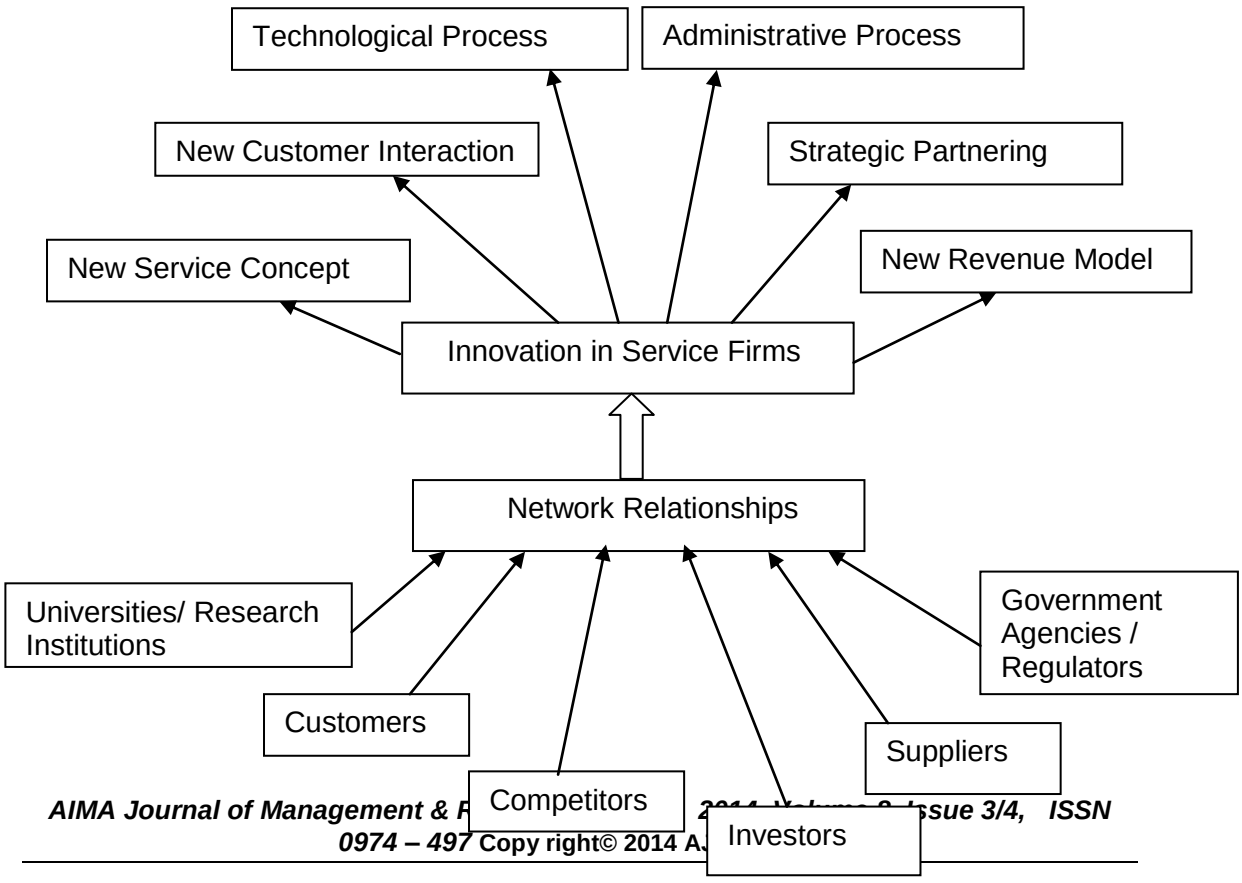
Business organizations have linkages with other organizations through networks. Arias (1995) defines a network as a set of nodes and relationships which connect them. Networks provide access to knowledge, resources, markets or technologies (Inkpen and Tsang, 2005). Innovation is a complex process and firms do not innovate in isolation but through a complex set of interactions with other actors (Huggins, 2010). The knowledge provided through strong ties is important for development of many forms of innovation in knowledge intensive business services (Amara et al.,

2009). The collaboration extends in both directions: upstream with suppliers; and downstream with customers (Walters and Rainbird, 2007).

Service firms rarely have research and development departments and innovation in service firms is more of a search and learn process (Pires et al., 2008; Sundbo, 1997). Miles (2000) discusses that important lessons learnt from innovation in manufacturing may be applied to innovation in services. Instead of treating innovation in services completely similar or completely different from manufacturing, the synthesis approach considers innovation in services both similar to and different from manufacturing (Gallouj and Savona, 2009; Tether, 2005).

The study of innovation in the service industries is relatively recent and under-represented in the innovation literature (Pires et al., 2008). A serious challenge that remains is to unpack different types of services and to evaluate their different approaches to innovation (Tether, 2005). There is a need for more research in knowledge intensive services such as information technology (Jong and Vermeulen, 2003). This study looks at this effect in details and also looks at different forms of innovation, going beyond the conventional concept of technological innovation. The study looks into six distinct forms of innovation adapted from the service innovation model proposed by Hertog et al. (2010): New Service Concept (NSC), New Customer Interaction (NCI), Technological Process Innovation (TPI), Administrative Process Innovation (API), Strategic Partnering Innovation (SPI) and New Revenue Model (NRM). Also, in innovation research it is important to distinguish between professional (p-KIBS) and technology based KIBS (t-KIBS) (Rodriguez and Nieto, 2012). The following figure describes the effect of network relationships on innovation in KIBS:

Figure 1: The effect of Network Relationships on Innovation in KIBS



Adapted from Hertog et al. (2010)

Network Relationship

Network relationship can be described in terms of:

Relational Capital

Agrawal and Selen (2009) define relational capital as relationships and trust and the level of socialization between individuals in the partnership organizations. Strong ties imply that working relationship with a firm's important stakeholders is strong and is almost like working in the same workgroup or discussing and solving issues together with frequent exchange of information (Amara et al., 2009) and frequency of communications with network partners is high (Xu et al., 2008). Partners can rely on trust to safeguard and coordinate inter-firm collaboration (Ren et al., 2013).

Knowledge sharing

Knowledge sharing includes obtaining access to external knowledge or technology. Arias (1995) defines knowledge sharing as access to information systems, assignment of key employees to work on partner's organization and joint collaboration in key projects. It includes pooling complementary skills. Employee capital is defined as the knowledge among the employees of the organization about the products, services and technology of the organization as well as its partners (Agrawal and Selen, 2009).

Characteristics of Innovation in Services

Innovation in services can be described in terms of:

New Service Concept

A firm may gain leadership position in the industry in terms of introduction of new services (Bell, 2005). A firm may introduce new or significantly improved services. This may include increasing service attributes of an existing service offering (Amara et al., 2009; Yen et al., 2012). A firm may use innovation to improve product characteristics (Chang et al., 2012). This may also include changes in service design (Trigo and Vence, 2012). This may include new products or services that have been launched that are new to the industry or new to the firm (Laforet, 2012; Yen et al., 2012). Many new service concepts are combinatory since they combine different individual services such as telecom providers bundling telephone, broadband access and television (Hertog et al., 2010).

New Customer Interaction

Hertog and Bilderbeek (1999) discuss about innovations in client interface such as: new patterns of client interaction, client involvement in research and development and design services and development of internet and e-commerce portals. It may also include new variations of 'Self Service' such as the concept of self service through automation (Hertog et al., 2010). It may include services with ease to use user interface (Hipp and Grupp, 2005).

Customer delivery innovation relates to how a firm changes the way it delivers goods or services to its customers (Amara et al., 2009) and includes implementation of new sales or delivery methods (Trigo and Vence, 2012). It may include development of service delivery channels and customer interfaces that are new to the market or new to the company (Yen et al., 2012).

Technological Process Innovations

A firm may introduce new elements in its service operations for providing its services (Damanpour et al., 2009). The drivers of these innovations include reduction in delivery time, increased productivity, better operational flexibility and lower costs (Chang, et al., 2012). Process innovation relates to new or improved production process (Amara et al., 2009). It may include implementation of new methods of production (Trigo and Vence, 2012) and flexible production process (Ko and Lu, 2010). A firm may adopt new information technology and new management information systems (Damanpour et al., 2009; Hertog et al., 2010; Laforet, 2012). It may extensively use e-commerce in its operational activities (Hertog et al., 2010).

Administrative Process Innovations

Administrative process innovations refer to changes in an organization's structure, administrative systems and knowledge management systems. It includes introduction of new administrative processes (Chang et al., 2012; Laforet, 2012) and new managerial working concepts and practices (Armbruster et al., 2008).

Changes in organization structure may be done in order to promote innovation (Chang et al., 2012; Hertog et al., 2010; Trigo & Vence, 2012). Such structural organizational innovations may include changes in responsibility, accountability, chain of command and divisional structure of functions (Armbruster et al., 2008) such as creation of cross functional teams, decentralization of planning, operating and controlling functions. A firm may nurture a service oriented culture (Hertog et al, 2010) and promote knowledge sharing among its employees (Amara et al., 2009), develop new knowledge management systems and encourage increased cross organizational collaboration such as increased interaction between marketing and R&D (Chang et al., 2012; Ko and Lu, 2010).

Strategic Partnering related innovation

Innovative organizations are strongly involved in strategic partnering (Arias, 1995). New business partners can be involved in providing service innovation. Combinations of service functions can be provided by collaboration among service providers (Hertog et al., 2010). A firm may collaborate with business partners and rapidly respond to changes (Yen et al., 2012). The combination of iPhone and iStore shows how new services can be provided by a community of services provider linked through a platform (Hertog et al., 2010).

New Revenue Model

Firms may innovate in terms of introducing new revenue models. A firm may shift from product based (such as software products) revenue model to a service based (such as software as a service) revenue model (Hertog et al., 2010). Solar energy firms in United States have innovated in terms of their revenue models by requiring users to pay monthly charges instead of paying upfront for setting up a solar energy system. Information Technology firms have also innovated in terms of new revenue models by shifting from time and material projects (based on billable hours) to turnkey projects.

Network Relationships and Innovation in Service Industries

Brettel and Cleven (2011) discuss that collaboration with external partners can result in new innovations. Network relations with stakeholders such as suppliers, customers

and investors are important for innovation (Varis and Littunen, 2010). Grant (1996) argues that primary role of the firm is to integrate the knowledge of specialists into goods and services. Frequent external contacts facilitate generation of new ideas and opportunity exploitation (Jong and Vermeulen, 2003). KIBS are at the centre of learning in terms of knowledge exchange with clients, suppliers, universities and research institutions (Landry et al., 2012) and are able to combine explicit codified knowledge with experience based tacit knowledge. Knowledge provided through strong ties is important for development of many forms of innovation in KIBS (Amara et al., 2009). Service firms are less likely to access knowledge and technology through hard sources such as research and development, and are more likely to access knowledge and technology through cooperation with suppliers, customers and trade associations (Tether, 2005). Pittaway et al. (2004) discuss that in small high technology firms, customers and suppliers are the most important partners in innovation.

Customers can participate in new service development as supplier of ideas and maker of demands, co-developer and tester and finally as purchaser and feedback provider (Dorner et al., 2011). There is a need for customers to participate in the entire cycle of the innovation process (Chesbrough, 2011). The cooperation extends in both directions – upstream with suppliers and downstream with customers (Walters and Rainbird, 2007).

Suppliers pay a key role in new product development. Technological innovations are supplier dominated (Hertog, 2000). Suppliers have specific knowledge and competencies and can be a source of innovative ideas. Collaborative activities with their suppliers enables firms to focus on their core competencies (Brettel and Cleven, 2011). Suppliers are an important source of innovation since they understand the business of a firm and mechanisms of knowledge transfer, between the supplier and a firm, are typically in place. The collaboration with suppliers is particularly productive when these relationships are long term and there is strong mutual trust supported by open and honest communication (Henke and Zhang, 2010).

Collaboration with competitors can consolidate supplementary knowledge and generate synergy for innovation. Competitors may choose to complement their strengths in order to jointly develop new products although some of the research in this area points that collaboration with competitors is rare and is not significant for new product development (Brettel and Cleven, 2011).

Vence and Trigo (2009) discuss that universities are an important source of innovation in business services. Brettel and Cleven (2011) discuss that new product development increasingly depends on basic university research although only a limited number of firms draw their knowledge for innovative activities directly from universities. Wright (2008) argues that relationships with academic institutions can play an important role in product development but only if one knows how to leverage those relationships and dialogue is at the heart of this process. At the same time, in a survey conducted by Cornell University, the main reason that most companies come to campuses is for recruitment and not to engage in research or technology transfer.

KIBS compare favorably to manufacturing firms in terms of technological innovations (Amara et al., 2009). In KIBS technological and non-technological forms

of innovation are complementary and strong ties with clients contribute towards product, delivery, strategic, managerial and marketing innovations.

The industry classification of KIBS is given in Table 1. This is based on Statistical Classification of Economic Activities in the European Community (NACE). This study adopts the classification of KIBS put forward by Corrocher et al. (2009) who have adapted the classification from Freel (2006) and Nahlinder (2002).

Table 1: Knowledge Intensive Business Services

NACE Classification	Description	Type
72	**Computer and Related Activities**	
721	Hardware Consultancy	t-KIBS
722	Software Consultancy	t-KIBS
723	Data Processing	t-KIBS
725	Maintenance and repair of office and computer machinery	t-KIBS
726	Other computer related activities	t-KIBS
73	**Research and Development**	
731	Research and experimental development in natural sciences and engineering	t-KIBS
732	Research and experimental development in social sciences and humanities	t-KIBS
74	**Other Business activities**	
741	Legal, accounting, bookkeeping, auditing activities and tax consultancy	p-KIBS
742	Architecture and engineering activities and other technical services	t-KIBS
743	Testing activities and technical analysis	t-KIBS
744	Advertising	p-KIBS
748	Other professional or business services such as Market Research, Business and Management Consultancy, Recruitment Services	p-KIBS

Classification adapted from Corrocher et al. (2009)

Note: p-KIBS refers to professional Knowledge Intensive Business Services; t-KIBS refers to technical Knowledge Intensive Business Services

Status of Research on Networks and Innovation

Service activities have not received much attention of innovation researchers and traditionally innovation research has focused on product and technological innovation by manufacturers. The study of innovation in the service sector is relatively recent and under-represented in the innovation literature (Pires et. al, 2008). Although innovation networks have been widely studied in developed economies, there have been few studies in the emerging economies (Ren et al., 2013). Product and service innovations in large organizations haven't been explored in the Indian context (Tripathi et al., 2013).

Although it is acknowledged that innovation in services is not limited to changes in service products, research in this area is still weak in capturing all the facets of innovation (Amara et al., 2009). There is a need for more research in knowledge intensive services such as information technology (Jong and Vermeulen, 2003). Also few of the service innovation frameworks have been empirically studied (Droege et al., 2009). The process of knowledge exchange between KIBS and its clients is complicated and how this knowledge is converted into innovation needs to be explored further (Landry et al., 2012). Huggins (2011) argues that besides technological innovation, there is a need to focus on non-technological innovation related to changes in organizational and management practices and processes. Also there is a general lack of measures for innovation in the service sector (Adams et al., 2006).

Fitment of Conceptual Framework

In order to explore the fitment of the conceptual framework, in-depth discussions were carried with executives of several KIBS firms. All respondents were at senior management positions. The respondents belonged to different KIBS sectors, as shown in Table 2.

Table2: Industry-Wise Details of Respondents

Firm	KIBS Classification	Firm Description	Designation of Respondent
Firm 1	Business and Management Consultancy	The firm provides effective solutions for managing the human capital needs of the energy industry. The firm had annual revenue of USD 2 million in 2012-13.	CEO
Firm 2	Business Services	The firm is a pioneer in providing loyalty and relationship marketing services. The firm had annual revenue of USD 3.4 million in 2012-13.	CEO
Firm 3	Recruitment Services	The firm is a recruitment and consulting firm and focuses on talent acquisition verticals. The firm had annual revenue of USD 1 million in 2012-13.	Director
Firm 4	Software Consultancy	The division is a global business solution vertical with focus on Indian operations of a large multi-national information technology company with worldwide revenues of 99.7 billion USD in 2012-13.	General Manager
Firm 5	Business and Management Consultancy	The firm is a global leader in high-value, custom research and analytics with annual revenue of USD 20 million in 2012-13.	CEO
Firm 6	Accounting and Auditing Services	The firm is an auditing and accounting services firm with annual revenue of USD 1.7 million in 2012-13.	Partner
Firm 7	Software Consultancy	The firm is a leading information technology company with USD 4.53 Billion in revenues in the financial year 2012-13.	Senior Corporate Vice President

Firm 8	Data Processing	The firm is India's leading recharge site that delivers instant online recharge solutions for payment for pre-paid phones with annual revenue of USD 67 million in 2012-13.	President & Co-founder

Note: Revenue in Indian Rupees has been converted to US dollars considering 1 USD is equal to 59 Rupees.

The first set of questions was based on exploring network relationships of KIBS with various partners: Customers, Suppliers, Competitors, Investors, Government Agencies and Regulators, and Universities and Research Institutions. The discussions are summarized in Table 3. The second set of questions was based on exploring the effect of network relationships on different innovation types. The discussions are summarized in Table 4.

The following table describes the network relationships with different network partners for each of the 8 firms:

Table 3: Network Relationships of KIBS with Partners

Network Partners	**Level of Relationship with each Firm**							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Customers	W M S	S	V	V	V	V	V	M
Suppliers	W	S	M	M S	S	N W	V	V
Competitors	N W M	W M	M	M V	N	M S	W M S	W
Investors	M S	S	N	W	V	N	M	V
Government and Regulatory Agencies	W	N	W	W	N	M	W M	W
Universities and Research Institutions	W	M	M	M	W M	N	W M	M

Note: The relationship ranges from None (N), Weak (W), Medium (M), Strong (S) to Very Strong (V).

The following table describes the effect of network relationships with different network partners on different innovation types for each of the 8 firms:

Table 4: The Effect of Network Relationships on Innovation

Network Partners	The effect on different aspects of innovation in each firm							
	1	2	3	4	5	6	7	8
Customers	NSC NCI SPI	NSC API	NSC TPI NRM	NSC NCI TPI API SPI NRM	NSC NCI TPI API	NSC TPI SPI	NSC NCI TPI SPI NRM	NSC TPI NRM
Suppliers	-	NSC TPI SPI NRM	-	NSC NCI SPI NRM	NSC TPI	-	NSC TPI NRM	NCI SPI NRM
Competitors	NCI TPI API	NSC NCI API	NSC TPI API	NSC NCI SPI NRM	-	NSC NCI SPI	NCI TPI	-
Investors	API	TPI API NRM	-	-	NSC TPI SPI NRM	-	-	TPI API
Government and Regulatory Agencies	-	TPI	API	API	-	NSC TPI API SPI	API NRM	TPI
Universities and Research Institutions	NSC	API	NSC	NSC SPI NRM	-	-	-	-

Note: Different aspects of innovation include: New Service Concept (NSC), New Customer Interaction (NCI), Technological Process Innovation (TPI), Administrative Process Innovation (API), Strategic Partnering Innovation (SPI), and New Revenue Model (NRM).

Discussion

The study, as discussed earlier, emphasizes the important role played by customers in innovation in KIBS. In the study, in Table 3, the network relationships vary from *Strong* to *Very Strong* for key customers. In Firm 1, the relationship may vary from *Weak* to *Medium* with some customers but is *Very Strong* with key customers. Similarly, in Firms 2, 3, 4, 5, 6 and 7 the relationship is *Very Strong* with key customers. In Firm 5 there is a need to work with customers even before engaging them in order to show to the clients what can be done for them and what kind of solutions can be provided. In Firm 6, which provides accounting and auditing services, there is a need to deeply engage with customers. In Firm 8, the relationship with customers is at the *Medium* level since its customers are mainly online retail customers although it finds customer feedback, given by customers through its website, very useful.

As described in Table 4, the study finds that network relationships with customers are effecting all aspects of innovation: *NSC, NCI, TPI, API, SPI, NRM*. In Firm 2, relationship with customers has helped develop new revenue models and improved learning and training methods. In Firm 4, relationship with customers effects administrative process innovations, since sometimes teams need to be redefined, in order to meet customer service requirements. In Firm 5, customers request for online and web based services, thus effecting technological innovations. Customers also suggest new ideas resulting in development of new service concepts. Customers also provide insights into best practices that can be implemented within the firm, thus effecting administrative process innovations. In Firm 6, customer requirements may lead to strategic partnering related innovation, since there is a need to collaborate with business partners in order to be present at multiple locations and customize solutions as per the requirement of customers. In Firm 7 there is a customer advisory council which provides advice and insights into all aspects of innovation. In Firm 8, which provides online services, even customer complaints may lead to technological process innovations.

Suppliers play an important role in innovation in KIBS. In the study, in Table 3, the network relationships with suppliers vary from *Weak* to *Very Strong*. It is *Weak* to *Medium* for tactical suppliers while *Strong* to *Very Strong* for strategic suppliers. While Firms 1, 3 and 6 have no major suppliers of significance, Firm 2 has strong relationships with information technology suppliers particularly where bespoke solutions need to be provided to customers. Firms 4 and 7, which are leading information technology services firms, collaborate with their suppliers particularly for providing turnkey solutions to clients. This may include hardware equipment suppliers, cloud based suppliers and software suppliers. Similarly, Firm 5 has a strong relationship with its suppliers particularly for access to research databases. It has a collaborative approach in its relationship with suppliers. Firm 8 maintains very strong relationships and one to one interface with its suppliers.

In the study, in Table 4, firms which have *Strong* to *Very Strong* relationships with their suppliers, the network relationships with suppliers are effecting innovation in *NSC, NCI, TPI, SPI* and *NRM*. In Firm 2, with respect to new revenue model, the suppliers are willing to improve their delivery or terms of service. In Firm 5, since key suppliers are database vendors, they collaborate with the firm in developing new services and improving efficiency and productivity through technological process innovation. In Firm 7, suppliers collaborate for value added reselling and thus effect

strategic partnering and new revenue model related innovations. In Firm 8, suppliers, such as payment gateways, facilitate development of new customer interfaces.

In the study, in Table 3, the network relationships with competitors vary from *None* to *Very Strong*. The relationships are *Strong* to *Very Strong* when there is a need to collaborate for a specific project or client requirements. Firms 1 and 5 have very little interaction with competitors. Firms 2 and 3 have *Weak* to *Medium* relationships with competitors. In Firms 4, 6 and 7, depending on the opportunity, there may be a need to collaborate with competitors for project requirements, resulting in *Strong* to *Very Strong* relationships. Sometimes these firms need to work as a part of a global alliance. In some cases, large customers require their vendors to comply with common processes and specifications thus making it necessary for them to collaborate.

In the study, in Table 4, the network relationships with competitors are effecting innovation in *NSC, NCI, TPI, API, SPI and NRM*. In Firm 2, relationships with competitors help in developing new forms of customer interaction. For example, the firm can deliver online for overseas clients. In Firms 5 and 8, competitors are having no effect on any innovation types. In Firm 7, relationship with competitors effects *NCI* in order to meet common process requirements by certain customers and *TPI* in order to meet common tool requirements by certain customers.

In the study, in Table 3, there is a wide variance in relationship with investors ranging from *None* to *Very Strong*. The relationships are particularly strong in the case of private equity or angel investors at the early stage and growth stage of a firm. In Firm 1, initially the relationship with angel investors was *Strong* but as the company is transitioning, the relationship with investors is *Weak* but may again become *Strong* at the next stage of investment. In Firms 3 and 6, there are no outside investors. In Firm 5, there is a *Very Strong* relationship with private equity investors. In Firm 7, which is a reputed public limited company in the information technology sector, the relationships with investors are *Medium* and limited to quarterly meetings. Firm 8, which is privately held, has *Very Strong* relationships with banks for its funding requirements.

In the study, in Table 4, the network relationships with investors are effecting innovation in *NSC, TPI, API, SPI and NRM*. In Firms 3, 4, 6 and 7, investors have no influence on any aspect of innovation. In Firm 2, investors are encouraging technological process innovation, in order to drive down the costs. In Firm 5, which has private equity investment, a lot of ideas come from investors who may even influence pricing of services and help in developing new revenue models. Investors may also provide insights into new practices and thus help in developing new service concepts.

In the study, in Table 3, relationship with government and regulatory agencies is varying from *None* to *Weak* for most of the firms. In Firm 6, which provides accounting and auditing services, the relationship is *Medium* as there is a need to deal with agencies such as Reserve Bank of India, Telecom Regulatory Authority of India and Comptroller and Auditor General of India. In Firm 7, which is a leading information technology firm, the relationship varies from *None* to *Medium*, and is mainly compliance related or industry needs related such as working with the government on visa requirements and immigration issues.

In the study, in Table 3, relationship with universities and research institutions is ranging from *None* to *Medium*. Firm 1, initially tried in developing the relationship with universities, but still the relationship is *Weak.* In Firm 2, the relationship is *Medium,* but the firm doesn't find sufficient support in new intellectual property creation. In Firms 3, 4 and 8, the relationship is *Medium* but mainly from a recruitment perspective. In Firm 5, the relationship is *None* and is limited to recruitments.

Implications and Interpretation

Existing literature points that collaboration with external partners can result in new innovations (Brettel and Cleven, 2011). Frequent external contacts facilitate generation of new ideas and opportunity exploitation (Jong and Vermeulen, 2003. There is a need to study innovation networks in emerging economies (Ren et al., 2013) particularly the different aspects of innovations including non-technological innovation related to changes in organizational and management practices and processes. This study focuses on the effect of network relationships on both technological as well as non technological aspects of innovation. The different aspects of innovation considered in the study are: *NSC, NCI, TPI, API, SPI, NRM.*

As emphasized in the literature, customers play a key role in innovation in KIBS. Relationship with key customers varies from *Strong* to *Very Strong.* KIBS deeply engage with customers and the relationship with customers effects all aspects of innovation: *NSC, NCI, TPI, API, SPI, NRM*.

Relationship with suppliers varies from *Weak* to *Very Strong*. It is *Weak* to *Medium* for tactical suppliers while *Strong* to *Very Strong* for strategic suppliers. Collaboration with suppliers is particularly required when turnkey or bespoke solutions need to be provided to customers. The relationship with suppliers effects innovation in *NSC, NCI, TPI, SPI* and *NRM*.

Relationship with competitors varies from *None* to *Very Strong*. The relationship varies from *Strong* to *Very Strong* when there is a need to collaborate for a specific project or client requirements. Sometimes the competitors need to work as a part of a global alliance. In some cases, large customers require their vendors to comply with common processes and specifications thus making it necessary for them to collaborate. The relationship with competitors effects innovation in *NSC, NCI, TPI, API, SPI and NRM*.

In the study there is a wide variance in relationship with investors ranging from *None* to *Very Strong*. The relationship is particularly strong in the case of private equity or angel investors at the early stage and growth stage of a firm. In a privately held firm, the relationship with its bank is *Very Strong* and helps in its funding requirements. In a large public limited company in software services, the relationship with investors is *Medium* and limited to quarterly meetings. The relationship with investors effects innovation in *NSC, TPI, API, SPI and NRM*.

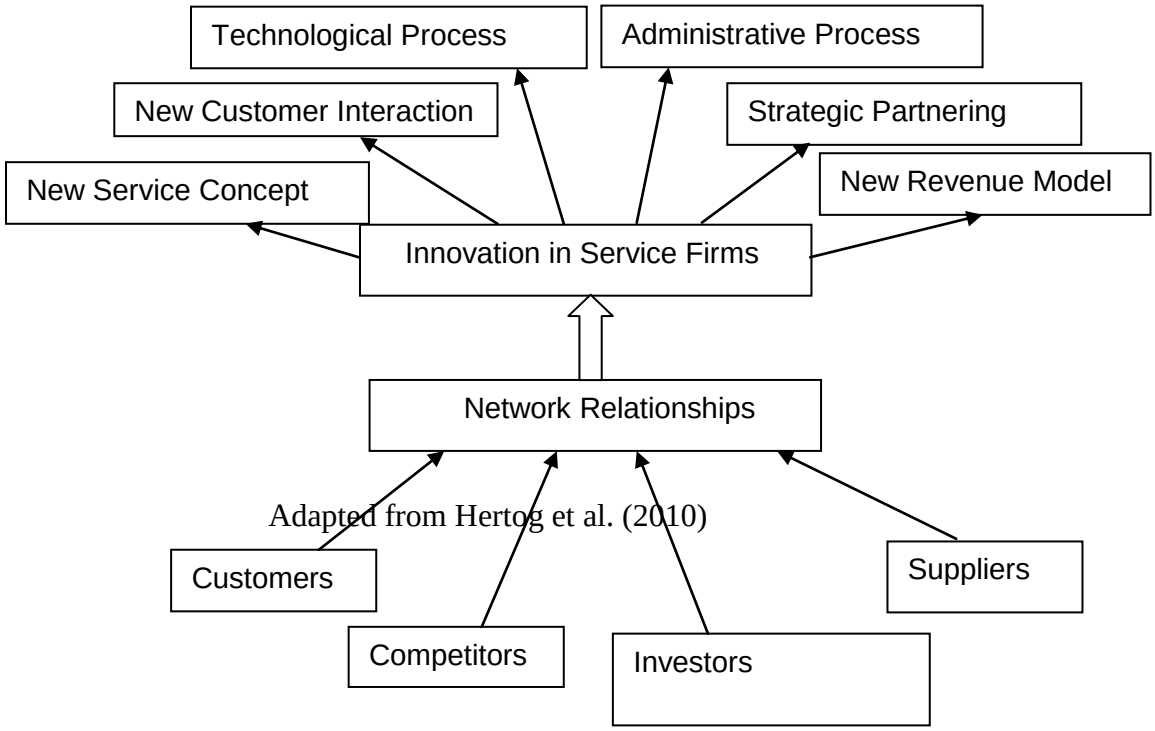
The relationship with government and regulatory agencies is varying from *None* to *Weak* for most of the firms. The relationship is mainly compliance related or industry needs related such as working with the government on visa requirements and immigration issues. Although relationship with government agencies and regulators

effects some aspects of innovation, as in Table 4, since the relationship is mostly *None* or *Weak*, the effect on different aspects of innovation may not be significant.

In the study, we find that relationship with universities and research institutions is ranging from *None* to *Medium* for all the firms. In Firm 2, the relationship is *Medium*, but the firm doesn't find sufficient support in new intellectual property creation. In most of the firms the relationship is mainly from a recruitment perspective. Thus the relationship, in the Indian context, is driven by not by research and intellectual property creation but mainly by recruitment needs and its effect on innovation may not be significant.

Thus the key partners which effect various aspects of innovation in KIBS are: customers, suppliers, competitors and investors. The same is depicted in Figure 2. In future studies it would be important to research how network relationships with different partners effect different aspects of innovation in KIBS.

Figure 2: The effect of Network Relationships on Innovation in KIBS



Adapted from Hertog et al. (2010)

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