

# The Role of Social Capital and ICT in Inter-Firm Collaboration on Syndicated Development Loans: An Empirical Study of the Finance Industry in Sri Lanka

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## ABSTRACT

Social capital is an influential concept in understanding why and how some organisations do better in inter-organisational relations. It has been recognized as an important factor in developing relationships of trust, forming the foundation for greater collaboration among individuals, groups, and organisations. This paper presents findings from an empirical study that investigates the effect of multiple dimensions of Social Capital and Information and Communication Technologies (ICT) on inter-bank strategic collaboration in a developing context. Moreover, the study explores the moderating role of ICT capability in the inter-bank industry domain. This paper develops and presents a new theory on how social capital and ICT drive inter-firm partnerships. The theoretical model is validated using a quantitative approach to analyse survey and secondary data using Partial Least Squares Structural Equation Modelling. The findings of this study suggest that there is a strong positive combined effect of social capital and ICT towards inter-firm strategic alliances. The results contribute to both social capital theory and theories of ICT for development. It will also contribute to a more holistic perspective that incorporates social, technical, and organisational aspects for building effective strategies.

**Keywords:** Social Capital, ICT, Inter-firm Collaboration, Inter-Organisational Relationship (IOR), Banking, Developing Country, Developing Economy, Global Development, PLS

## INTRODUCTION

Inter-firm collaborations, alliances, joint ventures, partnering and the like, including syndication loans by banks for development projects (the topic of this paper), are all important to developing economies. Social capital is recognized as an important factor in developing relationships of trust, those relationships forming the foundation for greater collaboration and successful collective action [1]. Social capital is a multidimensional, relational concept that turns into a powerful tool when combined with the network theory approach [2-4] to study inter-firm relationships [5-8]. Recently, IS researchers have increasingly become interested in the link

between social capital and ICT. Scholars have also recognized the important role of ICT as an enabler of the development of Social Capital [9-13].

This study investigates the effect of multiple dimensions of social capital in Inter-Organizational Relationships (IORs) using data collected through a survey in the banking sector in a developing context, Sri Lanka. It is focused on a specific type of strategic IOR in the banking industry – syndicated loans. A syndicated loan is a large loan jointly offered by a group of banks to a single borrower. Syndication is comparable to forming an inter-firm strategic alliance in many ways. It is a form of long term partnership between two or more firms to achieve a shared goal while sharing the associated risks. Wright and Lockett [14] define syndicates in the venture capital industry as inter-firm alliances where at least two firms co-invest and share joint payoffs. Chung et al [15] focused on syndication alliances of U.S. investment banks in a study of inter-firm strategic alliances and revealed that social capital is an important factor in alliance formation. Forming a syndicate requires identifying suitable partners and negotiating terms of the agreement regarding sharing of risks and benefits. While banking firms mainly desire forming syndicates due to capital constraints, syndication loans also provide a range of other benefits, such as geographic and industry diversification, improved loan portfolios, mitigating risks of lending large sums, and avoidance of regulatory taxes through secondary intermediation [16]. Moreover, participating in syndicated loans allows small banks to make a loan to a large borrower, which is otherwise not possible. It gives small banks a chance to lend to borrowers in regions and industries to which they might otherwise have no convenient access.

The scarcity of monetary and infrastructure resources, the growing presence of global players, and globalization in general increasingly pressurize banking firms in developing contexts. Being the financial backbone across industries, banks in developing economies must become more agile, innovative, collaborative, and customer-centric. These forces progressively mean that collaboration outside company boundaries is essential. In the post-civil-war development era, the Sri Lankan government has intensified its investments on infrastructure development. The banking industry has a vital role to play in this unique emerging market opportunity. However, individual banking firms, particularly small ones, are often not able to cater to such high demands. Consequently, this research also addresses a timely need in a developing context, while contributing new knowledge to the theories of social capital, ICT and IORs in global development.

To investigate this phenomenon, the literature review section develops six hypothesised relations between three dimensions of social capital, ICT, and the dependent variable of inter-organisational relationships, in this case in the form of syndicated loans. The methodology section then describes how the research presented in this paper gathered secondary data from public sources as well as survey data from the banking organisations of Sri Lanka. Analysis of the data is then presented using Partial Least Squares Structured Equation Modelling (PLS-SEM) on an initial research model incorporating only social capital constructs, then on a second model further incorporating ICT. Following the analysis section, the paper interprets the results in the context of the literature, describes limitations, and draws conclusions.

## **LITERATURE REVIEW**

### **Social Capital and Inter-Organisational Relationships (IORs)**

The idea of social capital is that individuals or organisations possess capital (i.e. something of value) in the form of their social (and other) relationships with other individuals or organisations. Social capital provides a distinctive answer to the question of why some people and some organisations do better in inter-organisational relations [17]. There are a number of reasons for choosing social capital as a lens to study inter-firm relationships. While it is a relational concept that focuses on connections between actors, it is also multidimensional in nature. It integrates different facets of inter-firm relations, including both the structure and the quality of their ties. Social capital can be applied across different levels of analysis, from individuals to organizations to industries. It therefore provides a valuable way to characterise a firm's complete set of relationships, including those that cross institutional boundaries [18].

There is a growing body of research investigating the role of social capital in IORs [18-22]. In adopting the social capital concept, scholars seek to focus on the value of social connections by describing them as capital [17]. Following the definition of [23][24], Tsai and Ghoshal [21] studied the resource exchanges among 15 business units in a multinational company and identified that social capital positively affects resource exchange and product innovation of units. They suggested that future research is needed to investigate different types of value creation outcomes of social capital such as inter organizational strategic alliances. In a review of social capital in IORs, Nahapiet [17] theoretically explains that social capital could positively affect IORs specially in the areas of 'Partner selection' and 'Performance of IORs'. In a study of

investment banks in the US, Chung [15] identifies that social capital positively influences alliance formation between firms. Tabbaa and Ankrah [25] show that social capital is a useful tool in facilitating University-Industry collaborative relationships in the UK. However, there is a lack of understanding on how different dimensions of social capital affect the formation of IORs and the moderating role of ICT towards effect of social capital on inter-firm collaboration. Although such an investigation may have a higher impact in developing contexts, especially in the banking domain, this has not been investigated in the available literature.

There is a lack agreement on a single definition of social capital. This study focusses on the ‘degree of formal, strategic collaborations’ of a firm as its dependent construct, which can be viewed both as a firm-level and as an industry-level benefit. Therefore this study adopts a definition of social capital that matches the firm and industry levels.

One area of disagreement is that social capital can be either external or internal. Internal social capital comes from social networking among individual members within a firm, whereas external social capital derives from the social networking relationships and connections between a firm and its key external stakeholders. This study focus on the **external social capital** in relation to firms.

A second area of disagreement is that the traditional view of ‘individual’ social capital [26] considers social capital to be a private good of an actor, while the ‘collective’ social capital school [27-30] views it as a public good of all members in the network. Furthermore, Acquaah et al (2014) point out that corporate disciplines usually prefer broader, combined definitions such as the ones provided by Adler and Kwon [19] and Nahapiet and Ghoshal [24]. Adler and Kwon [19] define social capital broadly as “the goodwill available to individuals or groups that is derived from the structure and content of an actor’s social relations”, while Nahapiet and Ghoshal (1998, p. 243) define social capital as “the sum of actual and potential resources embedded within, available through, and derived from the network of relationships possessed by individuals or social units”. These definitions encapsulate both the ‘individual’ and ‘collective’ properties of social capital. Following these definitions, this research defines social capital as ***“the sum of actual and potential resources embedded within, available through, and derived from the external social networks possessed by firms”*** (i.e. that of Nahapiet and Ghoshal, 1998).

Following Nahapiet and Ghoshal [24], we also focus on the distinction between three dimensions – structural, relational, and cognitive – and discuss the highly interrelated nature of the features they present. Several empirical studies attempted to identify the nature of these interrelations [21, 31-34]. While the structural dimension has been found to be an antecedent for the relational dimension [21, 31], both the structural and cognitive dimensions have been found to influence the development of relational capital [33].

The process of alliance formation can be roughly divided into a pre-formation stage and a post-formation stage. Pre-formation involves deciding ‘whether or not to collaborate’, ‘with whom to collaborate’, and ‘how to collaborate’, whereas the post-formation stage involves maintaining the conditions required to keep the collaboration alive. We identify four key phases in the pre- and post- alliance formation stages, namely: motivation, partner selection, agreement and management. In the following sections, we build two important arguments. First, we theorise how different facets and qualities associated with different dimensions of social capital may affect formation of syndicate alliances among groups of banking firms. Second, we theorize how ICT use may moderate the relationships between each dimension of social capital and the dependent variable, the degree of inter-firm collaborations.

### *Structural Dimension and Collaboration*

The **structural dimension** of social capital is comprised of the actual links that provide the opportunity for accessing resources or acting together in the network. It focuses on the properties of the network of relations as a whole [24]. Links can be formal or informal. The presence or absence of ties between actors [24, 35] and the network configuration [36] are commonly identified facets of the structural dimension. Characterisations of the locations of nodes in the network have been considered as measurements of the structural dimension [37]. Some positions are more beneficial than other positions [38]. In particular, “bridging” [39] and “closed” [28] network positions have often been linked to the improvement of firm performance.

The social ties have been further classified based on the strength and diversity of the ties (bonding, bridging and linking) [19, 40-42], the direction (horizontal and vertical) and the formality (formal and informal). Bonding social capital refers to horizontal, cohesive ties between individuals or groups sharing similar characteristics in homogeneous networks (e.g. attending the same institution). Bridging social capital, refers to ties that cut across different

social groups (e.g. relationship between managers in two organisations) [42, 43]. Linking social capital refers to vertical ties connecting individuals across different vertical social levels (e.g. between a subordinate and the top executives in the same company) [42, 43]

Social Interaction ties are channels for information and resource flows [21, 24]. Through social interactions, an actor may gain access to other actors' information, resources and knowledge. Social relations may also play an important role in creating and reinforcing identity and social solidarity [17]. Biggart and Delbridge [44] suggest that exchanges can be based on social solidarity, shared identity, and bonds. While social relations lead to collective engagement [29, 45-47], they can also be a powerful enabler of inter-firm entities [48],

In the domain of IORs, social interactions among firms may blur the boundaries between firms and stimulate the formation of common interests, leading to collective actions. Professional and occupational communities that cut across organisational boundaries [49] provide important implications for understanding patterns of exchange in IORs [20, 50, 51]. Leung et al [52] revealed that social networks provide a valuable resource for reducing partner search costs. In IORs, structural social capital is a particularly potent explanation of the transfer of explicit information [53, 54]. Walker et. Al. [8] demonstrated that formal network formation is significantly influenced by the nurturing of social capital. Inter-firm interaction has been shown to support the creation and diffusion of innovations within multi-unit organisations [55-58]. Informal managerial ties with other firms and outside stakeholders have been linked to the firm performance (Acquaah 2007; Acquaah 2012; Kim 2007; Peng and Luo 2000; Park and Luo 2001). Tsai and Ghoshal [21] provide evidence that inter-unit social interaction ties positively influence inter-unit formal resource exchanges and strongly suggest that future research apply the same concept at the inter-firm level.

An actor that is central in a network of social interactions likely has greater potential to formally collaborate with other actors because of its locational advantages in the network. Therefore, we propose the following hypothesis.

**Hypothesis 1. The centrality of a firm in inter-firm social interaction network will be positively associated with the extent of the formal collaboration the firm engages in with other firms in the domain.**

### *Relational Dimension and Collaboration*

The **relational dimension** of social capital refers to assets that are rooted in relationships, such as trust and trustworthiness [21, 29, 59]. Trust can act as a governance mechanism for embedded relationships [60]. It considers affective qualities that serve as motivation for individuals to act collaboratively toward others [61]. Relational assets develop through a history of interactions [62]. Among the other facets of this dimension are norms and sanctions [28, 29], obligations and expectations [28, 63, 64] and identity and identification [65].

Seppänen et. al. [66] suggested that trust is a multi-dimensional, reciprocal and context-specific concept. They identified some common indicators of trust between two parties: competence, reliability, predictability, contractual trust, lack of dependence, and information sharing. In the case of high trust, the expectations that others will reciprocate are high and people tend to follow the civic norms [67]. Institution-based trust reflects the security one feels about a situation because of guarantees, or other impersonal structures [68].

In the context of IORs, relational social capital is identified as a vital resource, which facilitates motivation, partner selection and collective decisions. The significance of trust in developing long-term relationships has been emphasized in the alliance literature (Jennings et.al. 2000; Parkhe 1998; Smith 1995). Indeed, trust is considered the “cornerstone of strategic partnership success” [69]. Relational capital is seen as more influential for complex, uncertain, or tacit knowledge in IORs, compared to structural social capital [54, 70]. The existence of trust in a relationship reduces the perception of risk associated with opportunistic behaviour [71]. Thus, trust can facilitate exchanges in alliances [18] and can induce joint efforts [31]. Partners that trust each other generate greater profits, serve customers better, and are more adaptable [72]. Barney and Hansel (1994) argue that when exchanges are governed by trust, the transactors can reduce transaction costs (e.g. bargaining and monitoring costs). A buyer’s trust in a supplier firm is associated with reduced negotiation costs, reduced conflicts and better supplier performance [73]. Studies suggest that one critical factor determining alliance performance is the degree of trust between alliance partners [74]. In the absence of direct experience, an actor’s reputation is established through the prominence and status of their associates, who provide proxy measures of quality and potential for success [75]. Trust is believed to play a more important role in business dealings in East Asia [76]. Intangible aspects such as ‘Guan Xi’, which relates to the relational dimension [24], play a vital role in Chinese inter-firm collaboration [77-79] and

enhance a firm's competitive advantages by providing access to resources of other network members [80]. Personal connections and loyalties sometimes outweigh the importance of organisational affiliations and legal proceedings [80].

When two parties begin to trust each other, they begin to lower the walls of self-defence against potential opportunistic behaviour from others. Hence they become more willing to share their information, resources and knowledge, thereby allowing space for cooperative or collective behaviour. Therefore, it is reasonable to anticipate that a more trustworthy actor is more likely to be a popular partner in the 'partner selection' stage. Hence, differences in levels of perceived trustworthiness may cause different levels of formal collaborations among firms. This discussion leads to the following proposition.

**Hypothesis 2. The level of a firm's perceived trustworthiness is positively associated with the extent of the formal collaborations that the firm engages in with other firms in the domain.**

#### *Cognitive Dimension and Collaboration*

The **cognitive dimension** involves the means that enable interactions between actors and the ability of people to act together. Nahapiet and Ghoshal [24] identified shared code, shared language, and shared narratives as indicators of the cognitive dimension. Cognitive social capital, which includes shared norms, values, attitudes, and beliefs, inclines people towards mutually beneficial collective action [81]. Norms can be viewed as a social contract or unwritten rules. One important norm is reciprocity [82], in which people act for the benefit of others and expect to receive help in return when it is needed. Shared vision, common goals, and collective values help promote collective action [83]. Cognitive and structural forms of social capital are commonly connected and mutually reinforcing [84].

Tsai and Ghoshal [21] revealed that units that shared a common vision with other units and with the overall vision of the firm did better in inter-unit resource exchanges. Several studies have shown that a shared vision (or a similar construct, such as goal congruence) may hold together a loosely coupled system and promote the integration of an entire organisation [85]. In the context of IORs, a shared understanding symbolises the collective goals, shared norms and shared knowledge among the firms. Nooteboom et al. [86] demonstrated that 'cognitive proximity', which indicates the extent to which two firms share the same knowledge base, is indeed an



important determinant in R&D alliances. When firms have the same perceptions about how to interact with one another, they can avoid possible misunderstandings in their communications. Through effective communication, firms may have more opportunities to exchange ideas, information, knowledge, or resources freely. This may also facilitate collective agreements and collective decisions. Effective communication also may allow resolving of conflicts effectively and faster. The common goals or interests may also help them to see the potential value of their partnerships. As a result, firms who share a vision will be more likely to become partners. We can view a shared understanding as a bonding mechanism that helps different firms to collaborate.

**Hypothesis 3. The extent to which a firm has a shared understanding with other firms will be positively associated with the extent of formal collaboration the firm engages in with other firms in the domain.**

### **ICT and Social Capital**

The interactions between ICT and social capital in organisations and society have drawn both researchers' and policy makers' attention. Yang et al. [61] categorised the studies that focus on the link between social capital and ICT. The research using social capital as a dependent variable explores the role of ICT in social capital building and maintenance. Impacts of ICT on social capital at both the individual [10, 12, 87] and collective levels [9, 11, 13, 88] are discussed here [89, 90].

The rapid development of ICT has made it easier and more efficient to build and use inter-firm networks in several ways. It enables interaction across time, space, and contextual boundaries [91], better access to required information [18], reduction of interaction costs [92], creation of "quick connect capabilities" [93] of actors in the value chain, and the increasing use of modular product architectures [94] as a way to compose and orchestrate distributed production processes. Fountain [82] claimed that the ability to collaborate both within and among firms and other organisations appears to be a necessary condition for firms to take advantage of new technologies. Some studies explore the role of social capital in relation to various forms of virtual organisations enabled by ICT and e-commerce in an organisational context [12, 24, 95, 96]. Existing relationships between partners can both enable and constrain the effect of IT on inter-organisational collaboration [97]. In addition, IT reinforces and stabilises already existing

inter-organisational structures and arrangements [97]. Even though it is evident that social capital and ICT are mutually complimentary and individually affect the inter-firm collaboration, the interplay between Social Capital dimensions and ICT still remains unexplored. Furthermore, the effect of ICT and social capital on inter-firm collaboration in developing contexts still remains unexplored.

#### *ICT and the Structural Dimension of Social Capital*

ICT facilitates social interaction, enabling social capital formation [98]. ICT may facilitate frequent and easy ways of communication between partners across time and space [91], extending human communication capability (Ling and Haddon (2001). Interaction is a precondition of maintenance and recreation of social capital at both individual and collective levels [99]. ICT enables people not only to exchange information faster, but also to communicate with people while doing something else [100, 101]. Social networks, wireless communications, and the Internet help people overcome interaction difficulties caused by spatial separation [101, 102]. ICT-mediated communication enables people to easily interact with others regardless of their contexts [101]. Many scholars agree that ICT lowers interaction costs both within the firm and between firms [103, 104], which makes it cheaper to maintain interfirm relationships.

At the same time, the existence of ICT creates networking infrastructure, such as Inter-firm or Inter-Organisational Systems (IOSs), that encourages the formation of social capital [105]. Such systems may streamline communications and decrease the transaction costs. Therefore, the availability of IOSs may increase the chance of further inter-firm collaborations. Modularisation of ICT products (software) may also lead to an increased use of interfirm networks [106-109].

**Hypothesis 4: The extent of ICT use of a firm will positively moderate the relationship between structural dimensions of social capital and inter-firm collaboration.**

#### *ICT and the Relational Dimension of Social Capital*

ICT may positively affect the building and maintenance of trust in IORs by facilitating frequent, easy, cost-effective, and multiple ways of communication between partners, which enables them to be more informed, closer, and able to predict behaviour of other parties. Stump and Sriram [110] provide empirical evidence that the use of ICT is associated with the overall closeness of buyer-supplier relationships. Grover et al. [111] suggest that the use of ICT within a dyad

(bilateral relationship) could encourage commitment to establishing relational behaviour. ICT may help in establishing initial trust between unknown partners through facilitating faster and easier access to information on partners during the initial stages of collaboration, which in turn may increase overall visibility and reduce uncertainty. A popular belief is that IT can increase the information processing capabilities, thereby enabling greater inter-firm cooperation in addition to reducing uncertainty [104, 112]. A number of research studies on electronic data interchange (EDI) revealed a positive link between EDI and buyer-supplier relations [113, 114]. ICT may facilitate secure ways of communication between partners, allowing them to share critical information. Successful buyer-supplier relationships are associated with high levels of information sharing [115]. More open information sharing indicates the commitment of both parties to share important, even proprietary information [115]. Moreover, in the globalised economy, a firm with high ICT capacity may better comply with international and industry standards and may be viewed as both reliable and prestigious, and become an attractive candidate in IORs. Firms that exhibit readiness for IOSs indicate long term commitment and transparency, leading to more trustworthiness. For example, banks with higher levels of ICT usage may better adopt industry-wide process automations. In sum, ICT may strengthen the effect of the relational dimension of SC on IORs by providing increased visibility between potential partners through effective communication and means of information sharing and by acting as a source of attractiveness as a potential partner.

**Hypothesis 5: The extent of ICT use of a firm will positively moderate the relationship between relational dimensions of social capital and inter-firm collaboration.**

#### *ICT and the Cognitive Dimension of Social Capital*

ICTs may also support creation of shared knowledge and shared visions in IORs. ICT-supported communication enables unification of concepts such as shared meanings and shared procedures or processes through standardised communication [92]. In the case of IOSs or industry-wide ICT standards, this is essentially the case. That, in turn, may serve as a precondition for the formation of shared explicit knowledge such as best practices. Availability of shared knowledge may help the members understand and accept new ideas. Such unifications allow more easy and fruitful conversations between parties leading to better IORs. Shared knowledge, standards and ICT together may enable the formation of inter-firm links in a very short timeframe [116, 117]. This

is referred to as “quick-connect capability” [93]. Standardisation of inter-firm communication is an important prerequisite for a quick connect capability [118]. A quick connect capability consists of two aspects: 1) a technological infrastructure that facilitates communication, exchange of information, and transactions and 2) an inter-organisational systems (IOS) that connects the two firms. In sum, ICT may strengthen the effect of the cognitive dimension of SC on IORs by providing unified communication, shared knowledge spaces and quick connect capability.

**Hypothesis 6: The extent of ICT use of a firm will positively moderate the relationship between cognitive dimensions of social capital and inter-firm collaboration**

### **Measurements**

In general, the measurement of collective social capital involves using instruments such as the Name Generator, the Position Generator, and the Resource Generator [119-121]. However, the measurement of individual social capital can be focused on variables indicating the network position of an individual inside a social network [27]. In the present study, network theory is used to operationalise some aspects of social capital. Network science provides a useful toolkit to study aspects social capital, as described below.

A network is viewed as a set of nodes and relations (possibly directed) between the nodes. A meta-network, which is a network that encompasses multiple networks with different kinds of nodes and relationships, can be analysed with the support of computer-based tools, such as ORA [122, 123]. One of the most common network analyses involves identifying particular locational properties, such as the centrality of individual nodes. Centrality measures identify the most prominent actors, who are extensively involved in relationships with other network members [124, 125]. In general, centrality indicates one type of “importance” of actors in a network. Closeness centrality is based on the notion of distance. If an actor is close to all others in the network, then she or he is not dependent on any node to reach others. Betweenness centrality is the number of times an actor connects pairs of other actors. It is a measure of the potential for control as an actor who is high in “betweenness” is able to act as a gatekeeper controlling the flow of resources between the others that he or she connects. In-degree centrality indicates the

degree of incoming links or nominations for a node. Tables 1 and 2 summarise the network measurements used in this study.

Table 1: Measures used for the dimensions of social capital

Dimension	Meaning	Measure	Original Author	Similar Application
Structural social capital	Degree of social interactions with other firms	Betweenness centrality	Freeman 1979	[21]
Relational social capital	Perceived trustworthiness of firm	In-degree centrality	[35]	[21]
Cognitive social capital	Degree of shared understanding	Closeness centrality	Freeman 1979	None

Table 2: Description of Network Theory Measures Used

Measure	Reference	Description	Input
Betweenness centrality	Freeman, 1979	Across all node pairs that have a shortest path containing v, the percentage that pass through v.	Square Node Level Matrix with DataType=binary
Closeness centrality	Freeman, L.C. (1979).	The average closeness of a node to the other nodes in a network.	Square matrix with DataType=binary.
In-Degree centrality	Wasserman, and Faust 1994	For any node, the in-links are the connections that the node of interest receives from other nodes.	Square Agent by Agent Matrix with dataType=real.

## METHODOLOGY

As theory for how social capital and ICT together influence inter-firm collaboration was lacking at the start of this study, it can be characterized as an exploratory study to develop and provide an initial validation of a new theory, with empirical investigation in a specific context – the banking industry of a developing economy, Sri Lanka. The study follows the research design proposed by Tsai and Ghoshal [21]. It develops measures of the mooted constructs, collects data from public secondary sources and through a survey conducted among the 34 banking firms in Sri Lanka, and uses Structured Equation Modelling (SEM) to analyse the data and provide empirical evidence of the validity of the hypothesised relationships among the proposed constructs in the developed theory and model.

Structured Equation Modelling (SEM) allows theoretical frameworks with a number of structural relationships to be validated using collected data [126]. Currently, there are two approaches to SEM: (1) covariance-based approach (CBSEM) and (2) the component-based approach (PLS SEM). These approaches differ in objectives, statistical assumptions, and the nature of the fit statistics they produce [127]. While CBSEM is recommended for theory testing, PLS can be used for new theory development and predictive applications [128]. According to Hair et al [129], “If the research is exploratory or an extension of an existing structural theory or if the goal is predicting key target constructs or identifying key “driver” constructs, use of PLS-SEM is recommended”. Other frequently cited reasons for choosing PLS-SEM relate to small sample sizes, non-normal data, data sets with multi-collinearity, single-item constructs, the use of formatively measured latent variables, significant need for predictive accuracy, exploratory research objectives, lack of prior theory and established questionnaire, and difficulty in specifying a correct model [130-134]. The PLS-SEM approach was chosen for this study for several reasons. First, this work involves building a new theory based on available literature, rather than testing a well-known theory using a pre-existing data collection instrument. Second, there are only 34 banking firms in this domain, which may not be enough for CBSEM to achieve high statistical significance. Third, the data is not normally distributed. Fourth, accuracy and predictability are paramount in this study.

As the first step, a literature based model was developed which is presented later, in figure 1. This involved defining theoretical constructs, the dependencies between them and identification

of observable measures for each construct based on literature. While some data, notably the dependent variable data and ICT variables was collected directly through existing sources such as annual reports and websites of banks, the primary data collection involved a survey. This significantly reduced the possibility of common method bias. A survey instrument was developed by mapping the identified indicators to survey questions. The survey instrument was reviewed by a panel of experts consisting of bankers, and peer researchers to obtain feedback in terms of readability, format, content, and time consumed for completion. The improved version was then used to conduct pilot studies with 4 bank managers from two state banks prior to the main survey. There are 34 banking firms currently operating in Sri Lanka. All of the banks were invited to participate in the survey and a 100% response rate was achieved with follow-ups. The survey was carried out manually as well as in online form. Participants of the main survey were the senior management staff in banks with long-term service in banking.

## Measurements

To measure the three dimensions of social capital, the survey included a set of questions with regard to the above mentioned indicators. Questions were designed using the resource generator instruments [119-121] as a basic guide and by reviewing the questions used by Tsai and Ghoshal [21]. In each question, participants were given a list of banks from which they had to choose banks.

For the **Structural Dimension**, we measured the top executives' social links with other banks through professional associations and other inter-bank associations. We identified representations of each bank's directors in well-known banking industry associations in Sri Lanka. Similarly, we identified representations of each bank's directors in 18 professional bodies related to banking in Sri Lanka. We refer to both professional associations and industry associations as 'industry bodies' hereafter in the text. Following Tsai and Ghoshal [21], we constructed two "socio-matrices" among banks through links of top executives : **Professional network** and **Industry network** and transformed them into a Bank X Bank matrices using the network analysis tool named 'ORA'. These new networks between banks were used to generate per-bank centrality measures such as 'betweenness centrality'. Betweenness tells us which node is the most connected to other parts of a network. Other researchers have identified the

‘betweenness index’ as the most suitable centrality measure for capturing the information or access benefits within a social structure [21]. Previous scholars have considered managerial ties as indicators of social capital at the firm level [135].

For the **Relational Dimension**, we used two questions to measure ‘Trust’ between banks: ‘**Non opportunistic behaviour**’ (“Please select the banks that you can rely on without any fear that they will take advantage of you or your bank even if the opportunity arises”) and the ‘**Reputation based trust**’ towards a bank (“Please select the banks with a good industry reputation so that you would be willing to trust this bank to get a job done properly even without your monitoring”). These items were based on similar questions used by previous researchers [68, 136-138]. We created two relational matrices measuring inter-firm trust. We used in-degree as a measure of trustworthiness as it counted the number of nominations each firm received in the inter-firm trusting relations matrix.

For the **Cognitive Dimension**, we used a two-item measure to assess the level of shared cognition of a bank with other banks: **Shared Vision** (“Please select other firms that share similar vision and ambitions as your firm”) and **Shared Work Understandings** (“Please select the firms that you have a good work understanding with so that it’s easier to work with them compared to other firms”). Again, we followed the same procedure as for the relational measures above. Here we used the closeness centrality measure of each bank for each of the two networks.

To measure the degree of engagement in syndicate relationships with other banks (the dependent variable/construct), we used the data collected from the survey question. (“Please select the banks that you have engaged with in syndication relationships during the last 3 years”). We also requested each bank to provide a list of syndications they participated in during the last three years. We only requested the year of each loan and its participant banks. Sensitive finance information such as the amounts of loans was not collected in order to avoid non-responses and because the amounts of loans largely depend on each individual banks’ capacity. We asked for three years of data because only a few syndications occur per year (and some years might be more or less than other years). However, we didn’t seek more than three years of data to avoid non-responses and to conform to our snap-shot view of other, survey-based data. We identified and corroborated the mutually confirmed ties from both parties and used “the number of partners” and “the number of partnerships” for each bank as the dependent variables.



ICT capability level was measured using a measure similar to the organisational ICT level indicators presented in the literature [97, 139, 140]. Given the amount of variety of technologies and the banking-industry-specific nature of ICT, we developed a list of the most representative technologies used in the banking domain in the Sri Lankan context, including ICT-based communication tools, ICT-based banking services, ICT-based social media, participation in ICT-based inter-bank systems, ICT infrastructure capability, ICT human resources capability. We used the firm size as a control variable in this model. It was measured using the total assets as disclosed by the firms in their annual reports.

## **ANALYSIS AND RESULTS**

### **Unit of Analysis and Aggregation of Data**

As noted earlier, social capital can be conceptualised at different levels of analysis, including individuals [141], organisations (Burt, 1992), inter-organisational arrangements [142], and societies [47]. The theory and the hypothesis proposed in this study is framed at the level of firms. In organizational research, it is common practice to use proxy data from informants when firm level data are not available from existing sources (Kumar, Stern and Anderson 1993). In such cases, a multiple informant approach yields superior quality than the single informant approach (Hill 1982). In social capital research, individual managers' or executives' networking relationships are generally used as a proxy for the networking relationships that create social capital for an organization (Acquaah et al. 2014).

As per the previous description of the survey, most of our variables were relational and were measured at the dyadic level. For each relational measure, each respondent had to pick, out of the 34 firms listed in the survey, the firms with which his or her firm enjoyed that specific relationship (e.g. which banks do you trust?). To improve the reliability of these dyadic measures and to preclude a single respondent biasing a whole firm's data, we asked six respondents per bank to provide their opinions on such measures. Afterwards, it was necessary to aggregate the multiple responses within each firm into a firm-level measure. With relational measures, it is not possible to establish the appropriateness of such aggregation using standard tests of interrater convergence [21]. Instead, we used the convergence indexing method followed by Tsai and Ghoshal [21] to check the extent of consistency in the responses from each firm before aggregating them. The index was defined as  $C_{kx} = A_{kx}/B_{kx}$ , where  $C_{kx}$  is the index of

consistency for measure  $k$  for firm  $x$ ,  $A$ , is the number of firms selected by at least 66.66% of the respondents of firm  $x$  for measure  $k$ , and  $B_{kx}$  is the number of firms selected by at least 33.33% of the respondents of firm  $x$  for measure  $k$ . The value of  $C_{kx}$  can range from 0.0 (perfect inconsistency) to 1.0 (perfect consistency). In this study, the value of  $C$ , varied from 0.5 to 1.0, across all relational measures. We simply computed the average of three to six responses from each bank to obtain a single, per-firm measure. This is also known as the ‘Unweighted mean’ approach in previous literature [143]. Afterwards, the socio-metrics were created, matrix data was input into ORA [123], and locational properties of individual firms were generated. In adopting this approach, we followed many earlier studies that have used a similar research design to considerable advantage [21].

### Structured Equation Modelling - SEM

The structural model developed for this study, which is presented in the figure 1, was estimated using the PLS algorithm, which is supported by the software tool SmartPLS [144]. In the model, the theoretical constructs are shown with ovals, whereas an arrow is drawn from one theoretical construct to another if there is a dependency relationship among the constructs [126].

### Reliability and Validity of the Measurement Model

The first step of PLS-SEM analysis is focused on the assessment of the measurement models. Following the guidelines of Straub et al. [145], we tested the reflective measurement models for internal consistency reliability, indicator reliability, convergent validity, and discriminant validity by applying standard decision rules. Table 3 summarizes the validity criteria used in this research to assess the validity of the study’s measurement model. To further improve the reliability of the research instrument used in this research, multiple indicator variables were initially used to measure the theoretical constructs in this research. Using multiple indicator variables to measure theoretical constructs is useful for improving the reliability of the measurement instruments [146]. Many of those selected indicator variables were chosen from previous research.

Validity Type	Criterion	Expected Threshold	Authors
Internal consistency:	Composite Reliability (CR)	Proposed threshold value for confirmative (explorative) research: $CA > .800$ or $.900$ (0.700). Values must not be lower than $.600$ .	[147] [148]

Indicator reliability:	Indicator Loadings	Values should be significant at the .050 level and higher than .700. For exploratory research, lower thresholds are acceptable. The significance can be tested using bootstrapping	[149]
Convergent validity:	Average Variance Extracted (AVE)	Proposed threshold value: AVE > 0.500.	[150]
Discriminant validity:	Cross-Loadings	The loadings of each indicator is higher for its designated construct than for any other, and each of the constructs should load highest with its own items	[149]
Discriminant validity:	Fornell-Larcker criterion	AVE of each latent variable (LV) should be greater than the LV's highest squared correlation with any other LV.	[150]
<b>Table 3: Criteria Used to Evaluate the Measurement Model</b>			

Tables 4 and 5 present the Smart PLS output for Composite reliability, AVE and Discriminant validity, based on the Fornell-Larcker criterion, which show that the measurement model shows adequate validity.

	<b>Composite Reliability - CR</b>	<b>Average Variance Extracted - AVE</b>
Cognitive	0.873	0.775
Relational	0.936	0.880
Structural	0.916	0.845
Collaborations	0.986	0.972
<b>Table 4: Internal Consistency</b>		

	<b>Cognitive</b>	<b>Relational</b>	<b>Structural</b>	<b>Collaborations</b>
Cognitive	0.880			
Relational	0.682	0.938		
Structural	0.514	0.700	0.919	
Collaborations	0.643	0.816	0.782	0.986
<b>Table 5: Discriminant Validity</b>				

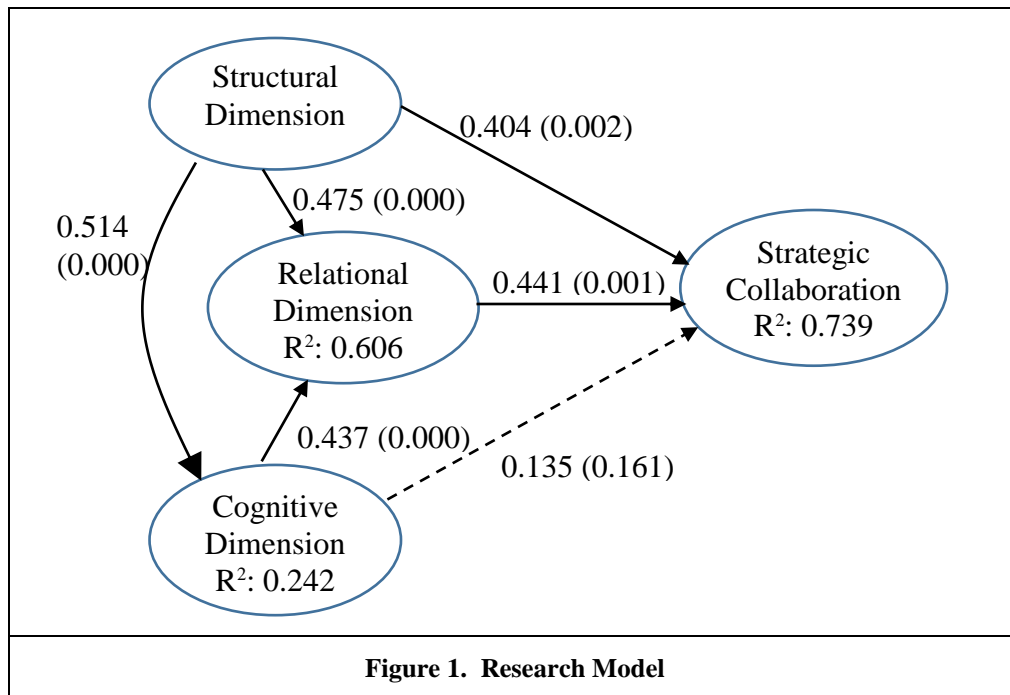
### Validity of the Structural Model

After the measurement models have been validated, the structural model can be analysed. When based on valid empirical measurement data, estimated parameters and P values provide measures

of the significance of the structural relationships [126, 151]. Established Goodness-of-Fit (GoF) indices are not yet available for PLS, even if first steps into this topic have been identified [152]. The *a priori* structural model, which was developed based on a comprehensive literature review, was estimated from the collected data using PLS-SEM. The criteria used to assess the validity of the structural model are given in Table 6 [128, 131, 133, 149, 153-155].

Validity Criterion	Description	Literature
Coefficient of determination (R <sup>2</sup> )	Attempts to measure the explained variance of a latent variable (LV) relative to its total variance. Values of approximately .670 are considered substantial, values around .333 moderate, and values around .190 weak.	Chin [149] Ringle [156] Hensler et.al.[128] Hair et.al [153]
Path coefficients	Path coefficients between the LVs should be analysed in terms of their algebraic sign, magnitude, and significance	Huber et al. [157]
Effect size (f <sup>2</sup> )	Measures if an independent LV has a substantial impact on a dependent LV. Values of .020, .150, and .350 respectively indicate the predictor variable's low, medium, or large effects in the structural model.	Cohen [158] Chin [149], Ringle [156]

Table 6: Structural Model Validity Criteria



The resulting model is shown in the Figure 1, including the R<sup>2</sup> values within latent constructs, path coefficients on the links, and P values within braces on the paths. There was no significant

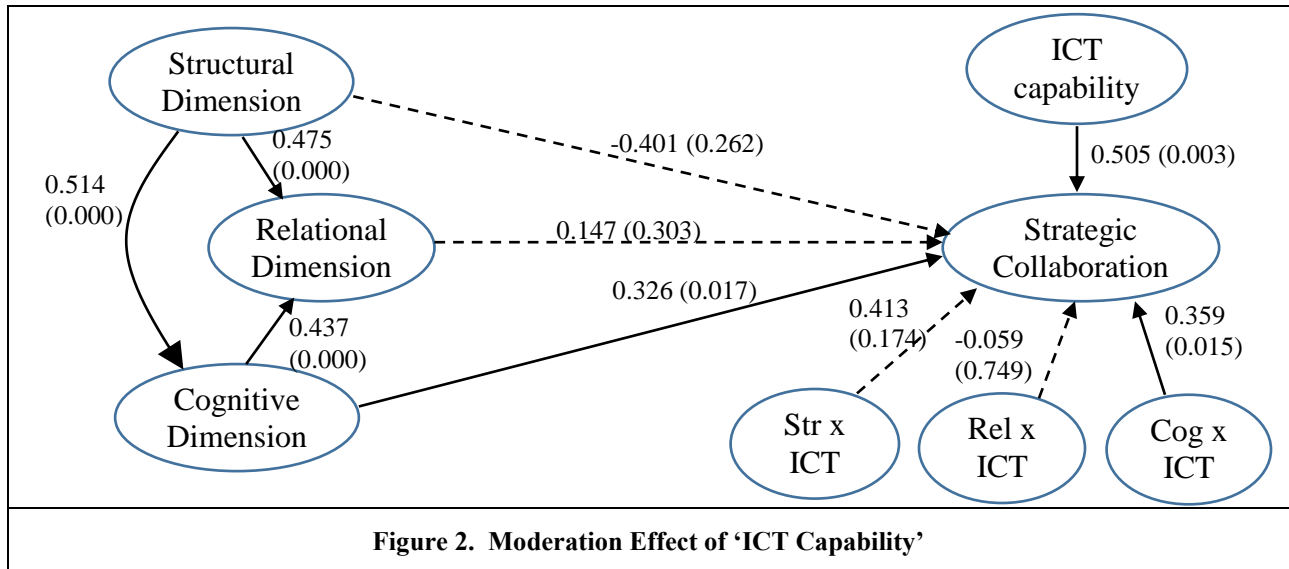
effect of firm size on the dependent variable. The arrows with dashed lines represent non-significant paths. In addition, to make a stronger case for predictive capability, the effect size ( $f^2$ ) is given in Table 7.

	<b>Cognitive</b>	<b>Relational</b>	<b>Structural</b>	<b>Collaborations</b>
Cognitive		0.381		0.041
Relational				0.304
Structural	0.360	0.448		0.349
Collaboration				

Table 7: Effect size ( $f^2$ ) in the research model

We further assessed the model fitness using the standardized root mean square residual (SRMR) which allows assessing the average magnitude of the discrepancies between observed and expected correlations as an absolute measure of (model) fit criterion. A value less than 0.10 or of 0.08 [159] are considered a good fit. Henseler et al. [160] introduce the SRMR as a goodness of fit measure for PLS-SEM that can be used to avoid model misspecification. The SRMR for this model was 0.060 which indicates acceptable fitness.

Having tested a model including social capital alone as the independent latent variables, next, we tested a second model incorporating the moderation effect of ‘ICT capability’ on the basis of arguments raised in the literature review. As discussed earlier, the ICT capability was measured based on an identified list of ICT systems and ICT-related capabilities of firms. Bagozzi, Baumgartner, and Yi [161], argue that when variables are measured as continuous, it is preferable to model moderated variable effects as multiplicative interactions to retain the full information. This involves forming a new variable which is the product of two variables, one of which is the moderator variable [162, 163]. In this study, three new variables were generated multiplying the three original latent variables with observed ICT level. The model including the moderation effect of ‘ICT capability’ is presented in the Figure 2.



### Interpretation of Results

Results from the initial model reveal that both the structural and relational dimensions have a significant positive effect on the degree of strategic collaborations of a bank, as expected. This means that both the social connections between higher management and the perceived trustworthiness of a bank play an important role in successful formation of formal alliances between firms (in this context). While, strong, high-level social connections in the immediate network may deliver information plus some degree of influence over a firm to engage in syndications, preexistent trust supports the partner selection. Trust is an essential component when establishing long term alliances that involve high financial risks. Banking firms predominantly rely on their internal assessment of trustworthiness of potential partners due to fear of opportunistic behavior. Pre-established trust between two parties could serve as a valuable resource that enables both parties to collaborate and explore opportunities together and minimise the costs of lengthy legal and formal processes.

Also the results reveal that there are strong interrelations among the three dimensions of social capital, as expected. The social interactions in higher management over a period of time or at a higher frequency may lead to identification with the other parties and result in increased trust between banks. Also such interactions lead parties to share ideas and enable forming similar or collective perceptions. Such preexistent, shared understandings make it easier for banks to trust each other. When two firms share the same vision, interests, knowledge, and norms of work procedures, those firms are already sharing the same foundation for establishing trust.

However, the results reveal that the cognitive dimension does not significantly affect the formation of syndicate loan arrangements. Although we expect that shared understandings between banks to play a supportive role in long term partnership formation in general, the effects of the cognitive dimension may be different in the banking domain, which relies significantly on regulatory constraints. Also, the particular type of alliance measured in this study (syndications) may not require shared understandings and vision, which may be the case in other types of partnerships such as joint ventures.

According to the results, the ICT capability of banking firms alone seems to have a strong positive effect on the level of the firm's strategic collaboration. ICT capability not only enables firms to process, search for, and disseminate information faster, but also makes firms more attractive in partner selection. When the use of ICT increases, the communication and flow of information becomes faster, increasing accessibility and visibility for all, with or without personal links or contacts. Interestingly, the presence of ICT significantly strengthens the cognitive dimension such as shared understandings, which did not have a significant effect on its own in the initial model. The availability of shared communication protocols and shared ICT infrastructure enables firms to develop strong shared perceptions, understandings and directions, which predispose firms to select those partners with shared ICT infrastructure and systems when forming of future alliances and collaborations, indicating the ICT-based 'quick connect capability' described in the hypothesis building section. Shared cognition, also strengthened by ICT, enables firms to communicate effectively. However, it is also interesting to see that ICT capability does not produce a significant interaction effect on inter-firm alliances when combined with structural and relational dimensions, contrary to the propositions. This result could be attributed to the specific domain. In banks, a higher ICT level may not enable social interactions with external parties due to the regulatory and security constraints. Rather the ICT level may restrain inter-firm social interactions in this domain unlike in other domains.

It is speculative that the relational dimension resembling trustworthiness is also not strengthened with ICT capability. Although the ICT level of a bank may increase its attractiveness and trustworthiness as a potential partner in general, due to increased information security and standards, ICT level may not play a significant role in the domain of syndication partnerships, which was the focus of this study. It is reasonable to believe that ICT would strengthen the

relational dimension's effect in any other type of collaboration such as ICT infrastructure sharing agreements and joint ventures. Such effects could be explored in future research.

## **LIMITATIONS**

It is important to recognise that the inter-bank domain is highly dependent on economic conditions, government policies, and regulations of the central bank as the supervisory body of the financial system, and is highly profit driven. The results may not be directly generalisable to other industries. Sri Lanka has its own local culture, which will differ from other developing economies' local cultures and the findings may not generalise well to other developing economies. Although we surveyed the entire population of banks which included 34 banks, the smaller number of data points may have affected statistical procedures such as resampling techniques. PLS-SEM was used to minimize the effect of the limitation of sample size.

## **CONCLUSION**

The banking sector in Sri Lanka has become the driving force of the post-civil-war economic development. This has created a promising platform for this research and the findings could be directly applied through the reforming of strategies and policies that recognise the effects of social capital and ICT on a specific type of strategic alliance, i.e. syndication loans for development projects. In a cohesive society such as Sri Lanka, relationships among top management, together with their shared understandings, could strongly influence successfully establishing strategic partnerships between firms. Social capital of a firm provides influence, information, and accessibility to opportunities, helps establish trust, and enables effective communication, thereby laying the foundation for successful strategic collaborations. The comparison of the initial model and the model including ICT element interestingly indicates that ICT plays a strong role in as a moderator, strengthening the effect of Social Capital on strategic collaboration.

Government, the central bank, and intermediate organizations all have important roles to play in enabling conditions for social capital formation within (bonding) and across (bridging) industries by working towards maximising informal networking opportunities, maximising shared understandings, reducing uncertainty, reducing power asymmetries, and adopting new technologies. While institutions with a single sectorial focus can enable conditions for social



capital formation within the industry, the intermediary institutions such as business associations, regional development agencies, or alternative facilitating agents and providers of business development services can promote formation of bridging social capital across firms from different sectors. Informal networking allows weak ties to form between parties, hence creating new paths for social capital transactions in the future. Sessions of informal interaction after formal meetings can be the best time to have bonding and bridging interactions. Other opportunities for informal networking include professional associations, clients' events, trade unions, shared educational institutions, alumni associations, social clubs, skills development groups, cultural and religious groups, sports groups, and special interest groups. Banks have similar objectives when it comes to global best practices on environmental and social issues, corporate governance, knowing your customer norms, and combatting money laundering. Identifying common goals, continuous exchange of views, and incorporation of common terms in documentation would be very helpful for creating common understandings and smooth execution of collaborative transactions. Also, through knowledge sharing sessions, industry organizations could enable increased communication across firms in terms of business approaches and business opportunities. To improve the business collaboration environment, efforts need to be undertaken to encourage information sharing, a reduction in the barriers to smaller and new firms, provision of a level playing field for every firm, reducing restrictions, and enhancing government services and support (such as consultation). Adopting new technologies and global standards will help enhance the success rate of both international and local inter-firm collaborations. R&D approaches should be revamped to focus on the network view, in order to increase communication across firms in terms of business approaches and business opportunities.

Individual banks could (should) assess of their position in their corporate social network and work to better position themselves within the evolving market. To do so, firms should enable opportunities for key people to establish bonding, bridging and linking ties with key stakeholders, such as customers, suppliers, competitors, business partners, local communities, and government officials and policy makers. In doing so, it is more important to strengthen the links between personnel in boundary-spanning roles (working directly with other organizations) and the strategic leadership of the firm. While catering for staff's personal needs for external linking, it is also vital to maintain sufficient proximity to internal members and groups, who can translate the flow of knowledge and other resources into competitive advantage.

This research has contributed to the theory of social capital, ICT, and IORs and provides empirical evidence supporting a model of how social capital together with ICT affect strategic alliances within the banking industry, providing insights for the development of effective strategies. The Sri Lankan Government and the Central Bank could (should) harness the new knowledge to create effective policies and regulations for the finance sector, which in turn affects the economy as a whole. Financial authorities in emerging markets and developing economies similar to Sri Lanka could also gain value from the findings, providing the opportunity to analyse the applicability of the identified mechanisms for their specific circumstances. Finally, this work provides new knowledge in both social capital theory and network theory, contributing to a more holistic perspective that incorporates social, technical and organisational aspects for a wide audience of researchers in the future.

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