**The social foundations for innovation collaboration in business to business relationships**

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# Abstract

Innovation is a recognised source of competitive advantage for commercial organizations and is a cornerstone of European Union (EU) economic policy and business growth assistance programmes. Collaboration in turn is an essential enabler of innovation, particularly in a business to business context. This grounded theory study of collaborative social processes, highlights the importance of personal competences and social compatibility, above organisational compatibility, for new relationship development. The research has implications for new relationship formation in supply chains and peer alliances, especially in an innovation context where diverse experience and knowledge sources are required.

# Keywords

Innovation, Collaboration, Social Capital.

# Introduction

Innovation, particularly among SMEs, is a prominent feature of public policy for economic growth. This importance is illustrated in Europe by the current round of European Union investment. The European Commission (EC) and the European Investment Bank (EIB) are dedicating €33.5Bn of direct investment, as part of a €500Bn programme, designed to promote economic development, including help for an estimated 290,000 SMEs (European Commission, 2017). Eight billion euros will flow directly to SMEs that have an ambition to grow, irrespective of their research orientation (European Commission, 2016).

Collaboration provides the platform through which innovation relationships are formed and developed, and as such has been described as the *sine qua non* of innovation management (Dodgson, 2014). Collaborative relationships expose firms to diverse knowledge sources, new ideas and complementary resources through which radical and even market changing product and process developments occur (Berghman, Matthyssens, & Vandenbempt, 2012). Although the process may sometimes be unwieldy, under the right circumstances innovations can lead to significant improvements in business performance (Kanter, 2012).

The establishment of appropriate collaborative relationships is complicated in an innovation context, because countervailing forces act to narrow the range of appropriate partners. On the one hand the most radical, novel and potentially valuable ideas arise from distant, exploratory relationships (March, 1991). On the other hand, an organization’s ability to learn from, and use such knowledge, its absorption capacity, is related to what the organization already knows (Cohen & Levinthal, 1990). Therefore, there is an optimal point at which collaborators are sufficiently distant that novelty exists, but close enough such that the cognitive distance does not compromise the exploitation of an idea (Enkel & Heil, 2014; Nooteboom, Van Haverbeke, Duysters, Gilsing, & Van den Oord, 2007). The more that potential collaborators share in common, the more knowledge they can absorb.

Through social capital theory, we know that extensive networks increase the prospects of links being established with innovative sources (Burt, 1992), but less well established, especially in a business context, are the social processes through which ties are formed and developed into effective and productive collaborative relationships.

Much of the literature relating to innovation collaboration is based in University to Business (U2B), rather than Business to Business (B2B) studies, particularly in ‘high velocity’ sectors such as biotechnology, electronics and telecommunications (Eisner, Rahman, & Korn, 2009). Biotechnology is a particularly popular research context because of prevalence of researchable patents (Howard, Steensma, Lyles, & Dhanaraj, 2015). Much less is documented about how contacts across networks of B2B organisations can be better developed into productive relationships that in turn, will realise the outcomes envisaged by public policy makers.

Collaboration research is also typically undertaken at an organisational actor level, despite collaboration being fundamentally a social phenomenon, such that the role of individuals and social processes in collaboration has “largely escaped scholarly attention” (Schillebeeckx, Chaturvedi, George, & King, 2016, p. 1494). Collaborative relationships are not all equally effective (Al-Laham, Amburgey, & Baden-Fuller, 2010; Vlaisavljevic, Cabello-Medina, & Pérez-Luño, 2016) and an understanding of personal characteristics and social intricacies can provide insights into the reasons for those differences.

The underplayed role of individuals (Emberson & Storey, 2006; Gligor & Autry, 2012) assumes organisations are populated by a homogeneous, malleable and randomly distributed group of individuals (Schillebeeckx et al., 2016) that ignores individuals’ characteristics and preferences. In order therefore, to increase the number of, and efficacy of collaborative B2B relationships, it is vital that knowledge relating to the social processes underpinning business collaboration is extended. The research therefore adopts a social perspective to address the question: how may we increase the number of business collaborations and the innovation potential of those relationships?

# Literature Review

Innovation potential is recognised to be highest where individuals are exposed to new ways of thinking, and different experience (Corsaro, Carla Ramos, Henneberg, & Naudé, 2012) and diversity among its technical partners (Lucena & Roper, 2016). For firms, this means that contacts outside their normal sphere of collaborative relationships may have the greatest potential for inspiring product, process or technology related changes that may improve their competitive position.

Whilst, existing ideas can be incrementally *exploited* to realise their full innovation potential, the most radical, novel and valuable ideas arise from distant, exploratory relationships (March, 1991). The more distant the source of knowledge, the more innovation potential it may have, but also the more difficult it becomes to understand and to realise that potential. This distance has been termed the *cognitive distance*, exhibits an inverted ‘u’ shaped relationship with organisational learning (Enkel & Heil, 2014). An organisation’s ability to absorb knowledge is its absorption capacity, and is highest where that knowledge most closely relates to knowledge already absorbed by members of the organisation (Cohen & Levinthal, 1990). Inverted ‘u’ shaped results are also reported between innovation performance and innovation search strategy (Laursen & Salter, 2006), where again a point is reached, beyond which, it is more expensive to search for innovation potential that can be absorbed.

## Absorptive Capacity

Given the potential inherent in distant contacts, even large organisations should no longer consider innovating alone (Pisano & Verganti, 2008). Organisations need to ensure that they seek ideas from broad enough sources, both internally and externally (Hansen & Birkinshaw, 2007), whilst also ensuring that they have an absorptive capacity appropriate to the complexity of knowledge being assimilated. The absorptive capacity needs to be sufficient not just to transfer the knowledge into the organisation, but also so translate this into tangible value, something which many companies do poorly (Hansen & Birkinshaw, 2007).

Absorptive capacity differs between firms and is enhanced by a firm’s ambidexterity (Lucena & Roper, 2016) and the establishment of social capital. Vlaisavljevic et al. (2016) show, for instance, that relational social capital can extend an organisation’s ability to absorb knowledge from diverse partners, where trust leads to a greater willingness to bridge cognitive gaps. Through direct and prolonged collaboration, groups not only establish trust, but also are able to exchange complex tacit knowledge based on “intensive, repeated interaction” (Molina-Morales & Martínez-Fernández, 2009, p. 1015). Rich social ties, in which individuals are connected through multiple routes, further enhance innovative knowledge transfer (Aalbers, Dolfsma, & Koppius, 2014). The dependency on close relationships also explains why firms that attempt to access technical innovation by buying-in technical resources, fail to develop an internal capability capable of accessing the critical tacit knowledge that is the basis for genuine competitive advantage (Al-Laham et al., 2010).

Whilst complex knowledge transfer depends on close inter-personal links, weak-ties are sufficient for the transfer of highly codified information, and indeed the sharing of innovative ideas is better facilitated through weak-tie networks (Hansen, 1999).

## Social capital theory and innovation

The tension between location of innovation sources and the potential to absorb complex knowledge from those sources illustrates the two primary mechanisms underlying social capital theory. The first relates to weak-tie networks through which innovation sources may be located, whilst in the second, close inter-personal bonding capital provides the basis for complex knowledge exchange.

Social capital theory distinguishes the weak social links of acquaintances (weak-ties) from the close, social bonds of cohesive groups (strong-ties), and proposes that weak-ties provide superior access to new knowledge and contacts, where these links bridge previously disconnected groups (Granovetter, 1973). Members of closely knit groups share much of each other’s knowledge, but weak-tie bridges give members of connected groups access to new contacts and information (Granovetter, 1973, 1983). These weak-ties are a source of informational power to the bridging individuals. Weak-ties require much less time to establish and to maintain than strong ties, so that considerably more ties may be maintained, as long as they remain weak (time spend developing those relationships will be at the expense of extending that person’s weak-tie network). Individuals with many weak-ties are best placed to diffuse ideas quickly to the largest number of targets (Granovetter, 1973). Bridges are most valuable when diffuse social networks contain structural holes that the weak-ties bridge (Burt, 2000).

Strong-tie group relationships also confer advantages on group members. Groups of closely linked individuals share information sources and develop social capital through shared meanings and normalised values (Coleman, 1988). This bonding form of social capital leads to the development of trust among group members that facilitates commitment and responsive action.

## Effectiveness of the bridging and bonding forms of social capital

The relative merits of bonding versus bridging forms of social capital are widely discussed in the literature. From a contingency perspective, it has been suggested that each has merit depending on the nature and uncertainty of the task. Social closure (high bonding) is better suited to complex and uncertain problem solving, however, where tasks are more certain but information or resource access are concerns, then network bridges provide for a more cost-effective means of access to a wider range of resources (Adler & Kwon, 2002). In an inter-organisational context, the tie-strength between collaborating groups in each organisation is an important consideration. Whilst weak-ties are sufficient for the transfer of highly codified knowledge, strong-ties are needed to enable the transfer of complex and non-codified knowledge (Hansen, 1999). Rich-ties, in which multiple links are established between collaborating groups, have also been linked with enhanced transfer of complex knowledge (Aalbers et al., 2014).

Ultimately however, the effectiveness of social capital is contingent on factors beyond structural network conditions and tie-strength. The existence of a bridge across a structural hole is not in itself enough to generate social capital: “Brokerage opportunities do not by themselves turn into success, and people are not equally comfortable as brokers between groups” (Burt, 2000, p. 383). Actors must be willing to utilise their social capital; they must have the opportunity and capability (Adler & Kwon, 2002), and have an expectation of success (Nahapiet & Ghoshal, 1998). The establishment of social capital is therefore contingent on personal as well as network and task factors.

Social capital should not be regarded solely as a beneficial resource (Adler & Kwon, 2002; Nahapiet & Ghoshal, 1998), as forms useful for one purpose may be ineffective or detrimental to other purposes (Coleman, 1988). A preoccupation with contrasting the relative benefits of the bonding versus bridging perspectives has meant that negative facets of social capital are underplayed (Portes, 2000). Close bonding can lead to the exclusion of outsiders and isolation from outside information, whilst social norms can restrict initiative (Portes, 2000). These factors can stifle external collaboration and preserve the status-quo in businesses. It has also been suggested that close bonding leads to a convergence of ideas, beliefs and knowledge that stifles creativity.

# Method

This research considers how the number of business collaborations may be increased, especially those featuring innovation, via a better understanding of the social processes through which such relationships are established. The context is provided by European Union strategic policy, in which innovation and collaboration involving SMEs is at the heart of plans for economic development.

This inductive, qualitative study explores inter-organisational collaborative practices across a broad range of contexts including: vertical supply-chains, horizontal peer-peer collaborations, and complex consortia featuring both vertical and horizontal relationships. A qualitative study is suitable to the exploration of complex social phenomena where even the more obvious behaviour may depend on intricate social organisation (Silverman, 2013). An emergent inductive design was chosen for its flexibility in exploring relevant but unexpected insights. Grounded theory was adopted because of its social process focus, sampling approach and theory generating capability. Established grounded theory recommended practices were adhered to throughout (Gephart, 2004; Kaufmann & Denk, 2011; Suddaby, 2006). Grounded theory is well suited to interactional research (Goulding, 2005) and for researching complex, dynamic social processes in a business context (Flint, Larsson, Gammelgaard, & Mentzer, 2005). The constructivist version of grounded theory was used because of its high relevance to collaboration contexts in which truth is highly subjective and socially constructed.

The context of the study includes but is not limited to SMEs. Selected organisations ranged from small companies to global corporations and regional, national and international collaborations were reviewed, to explore the social processes through which collaborative relationships are formed and developed.

The study was undertaken in two phases. In the preparation and scoping phase, field notes were compiled on collaboration issues observed during 990 hours of direct engagement with six SMEs, as part of a business collaboration and innovation programme, funded by the European Commission. In the second phase, data collection proceeded through open-ended, semi-structured interviews with twenty-nine senior managers/executives from twenty-seven different organisations. An active interview (Holstein & Gubrium, 1995) approach was adopted and open-ended questions were used to “encourage unanticipated statements and stories to emerge” (Charmaz, 2014, p. 65). Interviews typically lasted 1-1.5 hours, were digitally recorded, and fully transcribed to ensure that the respondent voice was accurately represented during initial coding. The interview protocol was revised as the study proceeded, in accordance with the method principles, to focus on emerging topics of interest and to explore categories in progressively greater depth as the analysis progressed through focused coding into theoretical coding (Saldanha, Mello, Knemeyer, & Vijayaraghavan, 2015). Data gathering continued until the properties and dimensions of the core categories were fully established and it was considered that further data gathering would be unlikely to add further insight (Kaufmann & Denk, 2011).

## Data analysis

As transcripts and supplementary materials became available they were loaded into NVivo® 10 and coded. Coding and analysis processes followed three stages of coding: initial coding, focused coding and theoretical coding (Charmaz, 2014). Initial coding is a wholly inductive process allocating emergent codes as indicated by the data. In accordance with the study objectives, the focus during initial coding was on identifying action, actors and situations, rather than less insightful passive, descriptive codes (Saldana, 2016). In focused coding the enquiry is narrowed to focus on categories abstracted from the initial codes and it is from this stage that the first-order concepts were established. In the final (theoretical coding) stage the first-order concepts are examined in relation to each other and by a theoretical explanation of the phenomenon sought. Through this abductive process, the second-order concept (Saldana, 2016) of collaborative compatibility was established and presented as interpretive theory (Charmaz, 2014).

In the development of the process typology, reported as a first-order concept, action and process-related initial codes were collated into categories and elaborated during focused coding. Commonalities and differences in situations, activities and outputs were considered when selecting, structuring or reforming the categories. Codes that were not considered to represent social interaction were excluded, whilst duplicate codes were merged. Complex codes that covered more than one fundamental process were deconstructed. The structure and descriptions of sub-categories stabilised as the properties were elaborated during subsequent data gathering. The final structure of the social process category is presented in the findings as a typology, before the details of the second-order concept of collaboration compatibility are presented.

Research rigour was a priority and criteria appropriate to inductive research (Gioia, Corley, & Hamilton, 2013) were adopted to ensure that process validation was not subverted by positivist predilections (Johnson & Duberley, 2015).

# Findings

From this study of the social processes underpinning collaboration, a set of eight fundamental categories of collaborative process are recognised that are used across three phases of a relationship. A set of situational and behavioural factors are also identified that moderate the effectiveness of collaboration processes. These elements are presented as first-order concepts (directly traceable into coded data) and depicted in Figure 1. The analysis of inter-relationships between process categories, and the factors that promote or inhibit them, also led to the definition of *collaborative compatibility* as a second order concept (Table 1).

|  |  |  |  |
| --- | --- | --- | --- |
| **Initial codes (examples)** | **First-order concepts** | **Description (of 1st order concepts)** | **Second-order concept** |
| AllyingAnonymisingAnticipatingArbitratingArguingBenchmarkingBrokeringConsultingContributingDelivering …ValuingTrading environmentCollaboration forumCollaboration structureNetwork structureRelationshipRelevance of contactsSocial settingCollaboration skillsIndividual traitsContactsStakeholder issues | *Process categories** Contributing
* Learning
* Influencing
* Problem solving
* Exploiting
* Socialising
* Brokering
* Allying
 | A typology of eight categories of social processes through which all encountered collaborative action can be described (see Table 2) | *Collaborative compatibility:*Personal competences* Skills
* Willingness
* Risk attitude
* Knowledge & experience

Social compatibility: * Identity proximity
* Shared cognition
* Trust

Organisational suitability |
| *Collaboration phases:** Prospecting
* Extracting
* Leveraging
 | A temporal dimension defining the phases through which relationships progress |
| *Situational factors** Formality
* Relevance
* Social diversity
* Cognitive distance
 | Structural and environmental circumstances impacting effectiveness |
| *Behavioural factors** Skills
* Motivation
* Risk orientation
 | Personal competencies and behaviour impacting collaboration processes |
| *Outcomes** Benefits
* Tangibility
* Locus
* Extent
 | Nature of benefits arising from a social process. Locus identifies benefitting actor(s)  |

Table - Conceptual development

In the following sections the process categories are presented as a typology in Table 2, and the effect of the situational and behavioural factors is discussed. The second-order (abstract) concept of collaborative compatibility is subsequently presented. The higher explanatory power of second-order concepts is used to explain the preeminent importance of personal and social factors in widening business participation in collaborative relationships.

**Phases:**

Prospecting

Extracting

Leveraging

Subset of processes used varies with phase and with different contexts

Allying & Brokering

Problem Solving

Set of collaboration processes

Influencing

Learning

Exploiting

Socializing

Contributing

Situation

Value

Actor compatibility

Figure : Collaborative social processes

## Social processes

A typology of eight categories of collaboration processes (Figure 1) was identified through the analytical aggregation process described in the method. Many of these fundamental processes, described in Table 2, have implications in an innovation context.

Collaborative learning, a cornerstone of innovation, occurs in many forms, including: didactic forums; explicit knowledge media; discursive interaction; site visits; trade shows and during regular commercial interaction. Collaborative influencing bodies (e.g. trade associations) improve innovation potential through political lobbying to affect trading environments, as well as through intra-sector influence to establish and regulate industry specific standards. Problem solving processes are most relevant during the (value) extracting and leveraging phases of collaboration and depend on bonding social capital.

Socialisation processes either, may increase bonding capital associated with existing relationships, aiding knowledge transfer, or enable the development of weak-tie social capital. It is through weak-tie socialisation that firms are most likely to access new contacts and innovative ideas. Examples encountered in this study included the development of a new metal treatment process, arising indirectly from an earlier overseas engagement, and a new business line developed by a steel fabricator, in which a new composite material solution to an existing business problem was identified during a chance social interaction.

|  |  |  |  |
| --- | --- | --- | --- |
| **Collaboration process**  | **Description** | **Outputs (org. value and social & human capital)** | **Indicative quotes** |
| Contributing | Unusual form of collaboration in which one party is contributing knowledge, experience, time or other resources with no immediate expectation of gain. Motivation mainly seems to be repayment of a perceived social debt. Group affiliation may also increase an individual’s feeling of indebtedness.  | Increased reference value to the donor, with some increases in social capital but most benefits accrue to recipients. | UR “First time I went it was great ... It allowed me to develop a network that really helped me. 18 months later we were the ones presenting … it was a way of putting something back …” [GlobalCo Manager]UK “… I mean / any effective network or association can't just rely on taking out can it, so there has to be putting in …” [SME TD] |
| Learning | Collaborating with the purpose of acquiring new information, or new knowledge. Examples noted covered: Technical: knowledge of new technology, techniques or new application, acting as a source of innovation; Market: information about competitor proposition, competitive environment; Relational: contacts, access points and opportunities. *Learning* may be an active, purposive process, or passive as a by-product of other collaborative activities.  | Individually centred human capital leading to organisational intellectual property when absorbed. Individual social capital also increased during learning. | MS “In the industry it's called stealing with pride … so we'll look at something and … look at introducing something like that in our line”. [SME Works Manager]DG “you never know what you're going to pick up from when you walk around a company … you get best practice sharing … things that may spark off ideas for you”. [Broker CEO] |
| Influencing (incl. lobbying & persuading) | *Lobbying* seeks to affect the macro-economic business environment for the benefit of a group. Changes in tax, regulation, investment policy are examples. Change is sought but not guaranteed. *Persuading* is the code used to distinguish collective collaborative effort designed to affect the micro-economic environment, such as through agreeing industry standards. Here influence is exerted on peers and the group potentially has power to effect change. | Vanguards increase social capital, power, reference, and human capital. Organisations benefit from reduced costs and increased market activity where action succeeds, but activists may incur higher costs, motivating others toward freeloading.  | QA “the Chief Exec … we've kind of … targeted him to things like opening links with Government and … lobbying activists and things like this …LG “… we have agreed with the World Trade Organisation that when these issues are discussed … at governmental level that we should be involved … An import/export ban … those bans have been lifted quite quickly after we've complained”. [Broker CEO] |
| Problem Solving  | *Fixing*, *sourcing*, *solutioning*, exemplify a variety of codes covering design, resourcing and remedial activities that either enable new value streams or stem value losses. The mind-set of creative engineers was a recurrent theme in several interviews.  | Group members increase human capital and bonding social capital. Organisations gain intellectual capital, but value timing is variable.  | TA “there must be some new technologies that would help us … we would then go out to the market … to come up with ideas …” [UKGov Prog. Manager]QB “We've solved some of our customers' problems … This goes back to having an interest ... Solving problems is an interesting challenge. That's maybe why I do crosswords …” [SME MD] |
| Exploiting | Collaborative commercial exploitation of an opportunity. Accessing additional resources. Driving revenue and value. Once established, the interaction may persist for an extended period in this ‘run’ state. It is this state to which much existing literature limits its attention. | Organisationally centred, commercial value | DG “Yes, because it is all about commercialisation. So suddenly the challenge is … do you get others involved, how do we ensure that we're getting … money in to companies locally …” [Broker CEO]TA “You would then work with them … speak to relevant people … then take it to the next stage ...” [UKGov Prog. Manager] |
| Socialising (incl. Networking) | Social relationship development relating to formation or development of business relationships. Value objective & locus may be vague. Includes *networking*, the process of developing business contacts.*Socialising* is a more general interaction between business contacts in any setting, including private social settings.  | Individually located bridging social capital (new contacts) and bonding capital (enhanced existing relationships). Not readily absorbed by firms, so remains located in personal relationships. | ML “… national figures, I've been able to chat to them, when they're a bit more relaxed” [Broker CEO]LE “I've tried different ones [networking forums] … whilst I don't get loads of work from it, I do find it really beneficial. … most people face the same challenges and problems [SME MD] |
| Brokering | Effecting connections between people and therefore organisations. Provides access to knowledge, funding and other resources. Often undertake by third-party organisations such as trade associations; business development programmes; social enterprises; large organisations promoting innovation into their supply chains. Varies from light-touch introductions to active consortium construction. | Individual leaders of broker organisations develop social capital, power, reference and human capital. Linked individuals also may develop human and social capital. Org benefits are indirect.  | ML “It's more brokering … some might be intuitive … I've sort of linked people by e-mail and thought … you'll really get on and have a productive relationship … [for others] it is more sort of planning and positioning” [Broker CEO]DG “because of our contacts, and because we have a good understanding of what each of our member companies are doing, we have the ability to build consortia for whatever type of opportunity ... engaging internationally or nationally” [Broker CEO] |
| Allying | Connecting process leading to peer alliances, from simple dyads to new associations. Bottom-up aggregation process in contrast to *brokering*. Alliances may be short-term bid collaborations or longer-term associations that may then lead to subsequent lobbying and brokering activity. | Vanguards increase social capital, power, reference, and human capital. Organisations benefit from reduced costs and increased market activity. | QR “… we established the trade association because we've all got this common problem …” [SME MD] |

Table - Collaboration process typology

Brokering and allying processes can facilitate each of the other collaboration processes. Proactive brokers particularly, can significantly enhance collaborative interaction, even to the point of building consortia. Brokering actions however, may also inhibit innovation where brokers undertake ‘match-making’ between similar, rather than dissimilar contacts.

## Personal and behavioural factors

Relationship formation was noted in many instances to be limited by personal and behavioural factors. Weak social skills, an unwillingness to socialise widely, and risk aversion, were each noted to compromise severely an individual’s potential for developing weak-tie networks or strengthening closer ties. The director of one company described themselves as “not very pushy people”. The company had briefly attempted to strengthen forward and backward supply chain relationships but quickly retreated [Phase 1 field notes]. People’s perception of their social skills however, was not necessarily indicative of performance. In the case above, negative perceptions of social skill may have contributed to a reluctance to network, but in two other cases, two SME directors, each of whom described themselves as ‘unsociable’, were clearly very effective networkers.

## Situational suitability.

Few interviewees described any particular strategy for establishing new collaborative relationships and many reported negative experiences of networking, either due to their own naivety: “It's a very complicated dynamic which SME's don't always realise …” [Trade association head], or due to poor event organisation: “sometimes you can be invited along to business networking, and it's just shabby … put together with the wrong people and there isn't enough thoughtfulness behind it” [Social enterprise CEO]. Concerns about the perceived suitability of attendees at events led some to seek out those with a similar identity. One SME owner, for instance, identifies himself as an “engineer” and courts “…like-minded engineers and manufacturing people” to collaborate with on new projects and products.

Suitability of interactants is complex. In the first example below an unexpectedly productive conversation occurred at a social event, whereas in the second a professionally organised networking forum was unproductive. At the social event a new marker for use in international cotton regulation was identified during a discussion on problems of authentication, between a banker and a cotton regulator. In the second case however, the marketing director of an ICT company who attended many networking events in the maritime sector lamented: “nobody was interested … we never got a single sale out of it”. Their services were potentially of interest to all companies, but maritime company directors had little interest in ICT and little understanding of the issues. In the first instance, despite their different backgrounds, a productive dialogue was established, whereas in the second case common ground was not established.

## Collaborative compatibility

Collaborative compatibility is reported as a second-order (abstract) concept that helps to explain how the identified social processes are moderated by behavioural and situational factors. Compatibility is a complex concept that considers ultimately how individuals establish legitimacy in each other’s right to participate in collaborative action, and how individuals establish agency in relation to subsequent interaction. The concept is represented (Figure 2) in three dimensions to represent the personal, social and organisational factors that collectively determine the competence, commitment and cohesion with which a collaborative interaction is undertaken.

**Social** compatibility:

* Social identity & homophily
* Shared cognition
* Trust

**Personal** competence:

* Skills
* Willingness
* Risk attitude
* Knowledge & experience

Perceived inter-**organisational** compatibility

1

2

Organisational

Personal

Social

Figure - The 3 dimensions of collaborative compatibility

*Personal dimension:* Firstly, collaboration depends on personal competency and commitment. Individuals must be competent in both the subject matter and in social interaction. Only then will connections be established; social rapport be built, and effective communication established, enabling potential innovations to be identified. Each collaborating individual in a situation must have these skills and be willing to collaborate.

*Social dimension:* An actor’s willingness to collaborate depends on their perception of the legitimacy of that interaction. The potential to interact (agency) is enhanced where social identity, previously established social capital, or newly perceived common cause encourage actors to explore further their collaborative potential.

*Organisational dimension:* This is a subjective assessment by individual actors that their interaction could lead to commercial value for their respective organisations. It is an assessment of potential suitability that could be a vertical supply-chain relationship or a potential peer-to-peer collaboration.

Collaboration effectiveness is optimised where the greatest congruence occurs between the three dimensions (area 1 in Figure 2). Congruence occurs when two or more competent and socially compatible individuals, representing two or more organisations, are fully committed and empowered to interact. However, collaboration between compatible and competent individuals is also possible when organisational compatibility is not perceived (area 2). Individuals collaborating at industry events and even in social settings are creating value which may by-pass their parent organisations. Conceptually, this is noteworthy because it suggests that of the three dimensions, only organisational compatibility, the unit of analysis for many studies, is optional.

# Discussion

The study identifies the basic social processes through which people collaborate and proposes a model, through which, the way personal and social factors affect those processes can be explained. This richer understanding of how people collaborate, especially in the formative stage, will help organisations to identify appropriate collaboration personnel, and help to increase the likelihood of innovation collaborations arising through business networking.

The development of new collaboration relationships, founded on innovation, is complex, being affected by the way people learn, the way they connect, who they connect with, and how competently they forge new social links. Each of these facets may exhibit contrasting forces. The learning literature, through the concepts of absorption capacity and cognitive distance, establishes the benefits of relationships with more distant knowledge sources, but only as far as those ideas remain understandable and accessible (Enkel & Heil, 2014). People need broad, rather than deep knowledge, to engage diverse sources in productive dialogue, to identify relevant new ideas. However, those responsible for developing and exploiting ideas need deeper technical knowledge, and the capability to develop close social relationships.

The way people connect is reflected in their accumulated social capital. In an innovation context, those with extensive weak-tie networks, are much better positioned to access rare and valuable innovation opportunities. Contrastingly, those with strong-tie connections are better positioned to collaborate deeply over an extended period to develop knowledge. Innovation *prospecting* is best performed by relationship managers with broad, rather than deep, human capital, and extensive (and therefore weak) social networks, whereas the exploitation of relationships, once formed, requires people with deeper knowledge and the development of strong-tie relationships. Exploitation resources are most likely to exist in design and/or operations functions, but organisations need to consider where the best prospectors are likely to be situated. In larger organisations, strategic sourcing professionals, with extensive networks of external contacts, are potentially ideally qualified prospectors, but in smaller organisations, only the entrepreneurial heads may have sufficient social and human capital.

The effectiveness of innovation-oriented business networking; the way people connect, is also affected by their social inclinations. The more people have in common, the more inclined they are to interact socially. Homophily (McPherson, Smith-Lovin, & Cook, 2001) describes the natural tendency for those with common traits to aggregate. The SME owner who identifies himself as an “engineer” and courts “like-minded” people to collaborate with on new projects, exhibits homophily and a social identity (Ashforth & Mael, 1989). Such groups benefit from common knowledge and a shared language that facilitates the exchange of complex technical knowledge. However, homophily also runs the risk of closing, rather than widening people’s networks, reducing their chances of innovation encounters. Sector based membership organisations, such as trade associations, may therefore constrain their members exposure to radical innovation sources. Networking events need to group people from diverse organisational backgrounds, but who share enough in common to be willing to interact.

## The importance of collaborative compatibility

Social compatibility needs to be recognised as having pre-eminence over organisational compatibility. For effective dialogue to occur, individual competences and social compatibility are essential, whereas organisational compatibility acts as an influence on assessments of social compatibility but is not essential; individuals can develop their own business relationships. Potential collaborators need to have the requisite social skills, technical knowledge and motivation to collaborate, yet even the most competent individuals will not form an effective relationship unless social compatibility is established.

Structuration theory (Giddens, 1993) suggests that the power of would-be collaborators to interact (agency), influences, but is also constrained by their social environment (structure). In a business context, both individual and organisational perceptions by each party, of each other party, contribute to this social environment. Each party’s judgement of the legitimacy of the interaction will be based on assessments of the other’s status and influence, and perceptions of the status and relevance of the organisation they represent. Although competent individuals influence their environment, ultimately agency is linked to the establishment of shared language, a compatible power-regime and recognition by the other party(ies) of the legitimacy of the interaction (Giddens, 1993). This social compatibility is illustrated by two contrasting examples reported in the findings. In the first, the absence of a common language between an ICT executive and maritime sector businesses, the technical importance was not understood, legitimacy was not established, and relationships failed to develop. In the second, a valued innovation was developed following an initial encounter at a social event in which two individuals, from different business sectors, quickly established a rapport enabling them to discuss common issues from which an innovative application of technology was generated.

## Contribution to theory

Collaborations are not all equally effective (Al-Laham et al., 2010) and this research contributes to theory with a topology of distinct social processes through which collaboration is undertaken, and identifies behavioural and situational factors that moderate the effectiveness of those processes. This breakdown of collaboration processes then enables the contrasting benefits of the bridging and bonding forms of social capital to be revealed, thereby highlighting the contrasting skillsets required at different stages of relationship development. For the development of new relationships in an innovation context, where the initial social interaction is by necessity with an acquaintance (weak-tie) from a dissimilar organisation, the research reveals a set of personal, social and situational factors through which collaborating parties firstly establish the legitimacy of the interaction and subsequently establish an effective dialogue. These factors are collated in an abstract model of collaborative compatibility that complements and extends recent work on personal collaboration motivation (Schillebeeckx et al., 2016), by highlighting the pre-eminent importance of the personal and social dimensions of collaborative compatibility, without which inter-organisational potential would not be identified or realised.

## Practical implications:

The collaborative compatibility model has implications for how organisations plan and execute B2B collaboration. Organisations need to consider that the personal attributes, experience, social status and accumulated social capital will all affect the efficacy with which innovation potential is realised. Strategic sourcing managers (SSMs) with extensive industry contacts (weak-tie networks), are well placed to identify new sources of innovation, at the prospecting phase of relationships, whereas supplier relationship managers (SRMs) and technical experts, with fewer but more closely-bonded relationships, are suited to exploiting innovation potential but would be less effective in a scouting role. Given that the greatest innovation potential lies in more distant relationships, SSMs need to establish links outside their established sector supply-chain network, by engaging similar firms that work in other sectors, or firms with synergistic capabilities but with products and services that contrast with those of established suppliers. Innovation in existing products and services may arise through this broadened supply-chain perspective, whilst new products and services may arise through horizontal as well as vertical collaboration. Organisations need therefore to consider which roles are best suited to innovation sourcing, and SSMs, with broad subject-area knowledge and extensive business networks, may be particularly well positioned to fulfil this role through both horizontal and vertical relationships.

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