Networking for collaborative innovation: contrasting face-to-face and virtual

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Innovation is the key to maintaining competitive advantage and requires new combinations of knowledge to create new products. This means that most small firms need to extend their resources, knowledge and contacts by collaborations and through networking. Moreover, because innovation is risky and small firms are vulnerable, innovative collaborations with customers are especially useful (Jack et al., 2008). Indeed, business environments are increasingly dynamic with technology and innovation more widely distributed and complex (Shin and Park, 2010). The need to network in conjunction with the increasing availability of ICT leads to the issue we investigate. We wish to better understand what happens in networking facilitated by ICT and identify what advice can be provided for practitioners.

The importance of vertical relationships between suppliers and customers is recognised as an important source of innovation (Gassmann and von Zedtwitz, 2003). Customers can, for example, specify the need for, and influence the design and development of an innovation. Competence in customer-networks has been linked with the ability to generate innovation (Danneels, 2002). Pittaway et al (2004) demonstrated that networking with customers was an important source of generating incremental product innovation. Another benefit of collaborating with customers for innovation is that many innovations fail in the early stages and working with customers helps focus efforts, thereby reducing uncertainty and risk (Kristensson et al., 2004). Thus it is evidently productive for small businesses (Anderson et al., 2010) to network with customers when seeking to develop new innovations.

In technical sectors, product innovation is increasingly reliant on collaboration in dispersed networks drawing on complementary knowledge (Tolstoy and Agndal, 2010, García-Morales et al., 2007). In investigating networking processes for innovation, biotechnology provides an interesting context (Chiaroni et al., 2009). The sector is renowned for innovation and is key for growth (BIS, 2010). In Europe, the UK is ranked top for bio-tech research and development, second only to the United States worldwide. Moreover, the majority of biotech firms are small or medium sized businesses (Ahn and Meeks, 2008). Thus for our investigation of the role and practices of networking facilitated by ICT in innovation generation, we concentrated on small biotech businesses, and their collaborations with their

customers. Our purposeful sample is drawn from within clusters of small biotech businesses in Dundee and Aberdeen, Scotland. Although the sample may not be truly representative, the respondents have the characteristics that we want to investigate (Anderson and Smith, 2007).

But biotech, like many other sectors, has become increasingly global in scope. Over the past two decades, the business use of email and other ICT technologies has expanded considerably, partly in response to the problems of distance. There is now a range of tools available for promotion, making contacts, having discussions, entering into collaborations and working with partners. With the increased availability and adoption of these virtual means for communication and collaboration, businesspeople might consider that many, if not all, information and knowledge exchange activities could be handled virtually. There is however some evidence that this may not always be the case (Hendry and Brown, 2006).

Consequently we seek to better understand what is taking place, why and what can be achieved when owner managers of small businesses collaborate virtually with their customers. While our focus is biotech, we believe that similar findings may apply to any technology or science-based sector concerned with the process of collaborating with customers to generate innovations. We have concentrated on email and briefly on video conferencing to the extent that it was used by our sample. While there are other tools available for business and social networking, email is the most widespread and appropriate to study, not least because email is by far the most common tool used in business. Email is cheap, widely available and offers efficient one-to-one linkages with a good degree of privacy and confidentiality. Other tools may be transient but email has stood the test of time.

We thus use emailing to explore issues in collaborative networking and to develop an explanatory framework. Furthermore, many of the issues considered (using email) also apply to other tools. For the purposes of clarification, we shall henceforth use the term ‘virtual networking’ but it should be interpreted as outlined above.

The objectives of our study are:

- To understand the role of virtual networking in product innovation
- To determine what can be achieved and the limitations
- To identify the factors influencing the use of virtual networking

Methodology

A qualitative approach was employed given our objectives of gaining insight into the process of virtual networking. The data collection entailed two stages. Firstly participant observation was undertaken by one author spending a week in a small biotech business watching how networking was conducted in context, including gaining access to emails between the business and its customers. This stage enabled an informed interview schedule to be prepared to capture data on the key issues. The second stage consisted of 17 in-depth interviews conducted across 12 firms using purposeful sampling with senior managers, usually the owner-managers. Because 2 of the firms did not fully meet our sampling requirements, we report on 10 firms.

As the research was investigating aspects of the innovation generation process, it was important to ensure that we were in fact dealing with business that developed innovations. The innovative characteristics of the companies participating in the research are given in Table 1 below.

Table 1 Characteristics of the Biotech SMEs

Firm	Year established	Business	No. of Employees	Number of Product Innovations
BiT	1985	Biotech manufacturing	25	240 plus several in progress
CMBL	1985	Biotech production	38	No accurate history, but extensive and 4 in progress
Cyp	1989	Biotech manufacturing	7	50 plus several in progress
Cly	1996	Biotech manufacturing	63	90 plus several in progress
Rmd	1999	Biotech manufacturing	8	2 plus several in progress
Alb	2000	Biotech manufacturing	5	2 plus 2 in progress
CR	2001	Biotech production	30	2 plus several in progress
KinS	2002	Biotech product,	2	40 plus several in progress
Hptg	2002	Bio-pharmacy product manufacturing	20	12 plus 3 in progress
PK	2002	Biotech manufacturing	5	1 plus 7 in progress

Findings

A staged view

The analysis of our data showed patterns indicating that networking interaction could be categorised within development stages. This shows a progression as the networking processes developed stronger links. This progression can be envisaged as developing from one point of contact to building several links. Each stage was characterised by a deepening of the relationship and might be conceived as coming closer through a series of steps leading to the possibilities of innovation. This deepening of the relationships took place on two fronts; increasing exchanges of technical information but also increasing the sharing of personal and social information.

As knowledge about the technical problems and the concomitant capability of the networked collaborators increased, the scope for innovation also became clearer. But in parallel to the technical exchanges, social knowledge about each other was increasingly shared. Indeed the formalities of a legal agreement to collaborate were only concluded when the parties seemed convinced of the social and technical integrity of each other.

The stages evolved from a first contact, then moved towards establishing the relationship through the development of the connection. For our respondents, the completion of the second stage usually resulted in a formal contract for innovation. But although this formalisation was a critical legal point in the relationship, the networking process continued, and we regard this as a further ongoing stage. Moreover, it was also clear that this stage provided a platform for further developments and further innovative products.

First Stage- Initiating contacts

This first stage in the networked collaboration was typically initiated by the customer. The contact was usually prompted by a website, at a conference or from mail shot brochures.

Thus this first contact was a response to some general presence, often in a media. We see this preliminary activity as akin to the respondents broadcasting information about their capabilities and the potential customers identifying and reacting to possibilities within that information. The first contact by the customer and the respondent's response marked the beginning of the exchange relationship. For example,

"In terms of the stage of networking, it would be the initial approach 'can you help us identify this …' within an email, normally we'd respond back 'yes, we can help you with that …" (G, CR)

But note how the enquiry prompts a need for more specific information about the nature of the problem. Furthermore the quote indicates that a richer channel of communication is needed to "understand" the problem. So a conference call or a meeting is proposed.

"Then I may phone to arrange a particular event, either a meeting or a conference call … so we get together that's basically to understand the problem, the technical detail of the problem" (G, CR)

The role of the virtual is apparent as an enabling technology. In each case, we see a complementarity between the different modes of communication, where one augments the other. The web provides general sets of information which are deployed to elicit requests for more specific information. These requests are beginning of the relationships. But importantly, we note how personal contacts play a critical role in establishing the technical foundations for the collaboration.

Second Stage- Building the relationship

This second stage in the relationship is about establishing what can be done and how it will be done. In other words, building from the initial connection. This process involves developing a deeper understanding of the technical aspects and building a much closer relationship between the collaborators. In the following example the process from initiating is described. But as the relationship develops we see how a face to face meeting is preferred, as one respondent puts it, "it's better round the table". If distance intrudes, a conference call is substituted.

"… At that first meeting technical experts will be there either around the phone or around the table. It's better around the table, but a lot of these companies are far away, so we do it through the phone, remember no money exchanges or any agreement. It's what we can do for them at this stage … basically to understand the problem, and the technical detail of the problem." (G, CR)

This respondent also told us why this sort of fuller understanding was so important for developing the innovative solution.

"Once scientists know the problem, then can go to handle it basically and think of solutions. That's a big innovative step … the whole solution to the problem." (G, CR)
Another respondent explained,

"… Innovation is then about implementing more customer needs into technology that has previously been applied in this area." (R, PK)

The expression "serious" was used by several respondents to indicate that they recognised the basis for continuing was now established.

"… you are serious now, let us go and sit down, so we travelled to wherever they were … then came up with more concrete proposal, send that by email with all the costs and the associated timings … so over about 3 months we built up a relationship between business development people but also the scientists, we got to know each other …" (J, CL)

However, this process is not just the clarification of the problem, but also has an element of discovery.

"… *(in face-to-face meeting) until we get the expert in front of the customer, some of them don't realise they have problems, once experts speak to them, until we ask them 'do you do this, why do you do that?', we'd say 'if you don't do X, Y would happen', they realise they have problems …" (J, CL)*

But this stage is not entirely technical, it also has a strong social dimension. In one international case, the social preceded the technical. This international collaboration was shaped from the social relationship.

"…The contacts of Japanese companies … they were looking at the test we did, and the products we made … were assessing potential partners in the UK to work with. Before they discuss any work, they will talk about your family or everything else other than work … it's almost like a social thing first …" (I, CL)

More typically, the social dimension develops in parallel with the technical. Nonetheless it is an important element in the relationship building, as described by this respondent.

"…we talk about their lives, their wives, their firms, because most of our customers are firms, and we know each other, probably have been to their houses…" (D, Bit)

This emphasis on building a social connection was echoed by most respondents.

"Social events out of working time, yea … we have visitors we'll go for dinners in the evenings stuff like that … part of working in the evening is very social … that's very good (laughs)." (A, Htg)

"There is a graduation of getting to know somebody … It makes it a lot easier when you meet someone." (R, PK)

It seems that the second stage marks the progression towards a stronger set of linkages; a technical connection based on the customer's needs and the ability of the biotech company to find solutions for these problems. This dimension is based on sharing more information. But note the simultaneous social linking, getting to know each other. For example, this quote clearly identifies the process of getting closer together, again couched in terms of getting "serious".

"…you get that the initial meeting, then emails, then they are interested, then there is another face-to-face, you are serious now …" (J, CL)

As one respondent commented,

"… you become more familiar with the customer … which is the process." (G, CR)

This personalising process was described as follows,

"… once you know people, there would be more personal things going (in emails), how are your kids, what's the weather like ... (laughs) things just become more personalised as you know people better." (G, Cly)

We note how this shift to getting serious seems to require more personal contact. Importantly, it also seems that the knowledge in play is also shifting to more tacit knowledge. By this we mean the specific knowledge that will be employed by our respondent to address the client's requirements. Nonetheless we also note how the convenience of email is employed to speed up the transfer of codefiable information. Again it seems that face-to-face and virtual augment and supplement each other; but in this stage, face-to-face has priority.

Third stage- formalisation and legalisation

For the collaboration to continue there is a need to formalise the arrangement is some legal form. This stage is obviously important, but based on the knowledge and understandings that have developed in earlier stages. A respondent described it,

"then we went on to the stage where we produced a legal agreement, so … backwards and forwards with the email drafts …" (J, CL)

It appears that this operation can be conducted virtually using emails,

"… that is usually done with PDF file or Word file of an email … sort of thing, when you do contracts, they will be discussed as word documents and amended …" (A, KS)

Interestingly on the whole, the three stages above variously used meetings, telephone calls or virtual connections. Nonetheless, it was very clear from the respondents' comments that the modes were complementary. Each channel was used to achieve particular purposes and sometimes interchangeably. But the relationship in the network could not have developed on one channel alone.

We note how the advantages of the virtual, especially email, was used to speed up interaction. Moreover, the capacity of email to share specific pieces of information, often as documents, was obviously very useful. Typically this was codified knowledge, although tailored for the particularities of the situation. When the nature of information sought, or to be exchanged, was less explicit, tacit information exchange largely took place during personal meetings. We argue that it is this tacit information that forms an important basis for the collaboration. The tacit exchanges are enabled by the social. Trust, in the form of understanding each other, forms the basis for shifting into the exchange of the specialised knowledge that provides the inputs for the collaborations to create innovation.

Fourth Stage – Continuing the relationship

We did not see the legal commitment as an end point in the networking. Instead, the networking collaborations continue by building from the primary stages. Interestingly these are facilitated by both virtual and physical meetings. However the distinction between tacit and codefiable knowledge in the content of the mode of exchange becomes more blurred, but the tendency to use electronic for codefiable knowledge and face to face for tacit remains. The following examples show a mixture of modes and types of knowledge exchange in the continuing relationships.

Once the relationship was in place, there appeared to be more efficient information flow and knowledge exchange, often by email:

"… when the relationship is there, it avoids the need to spend 10 or 15 minutes chatting about non-essential things … You just send a quick message and get feedback. Most of those messages are only 2-3 lines rather than 150." (W, PK)

Generally, relationships were continued in a lean interaction mode with less frequent face-to-face meetings:

"It takes a lot of personal visits initially, but once we get the relationship established, we then rely heavily on electronic communication … probably visit once or twice a year …" (G, Cly)

"… within that relationship that has been established, then you should be able to use email to maintain relationships … however, that should only come from a relationship …" (R, CML)

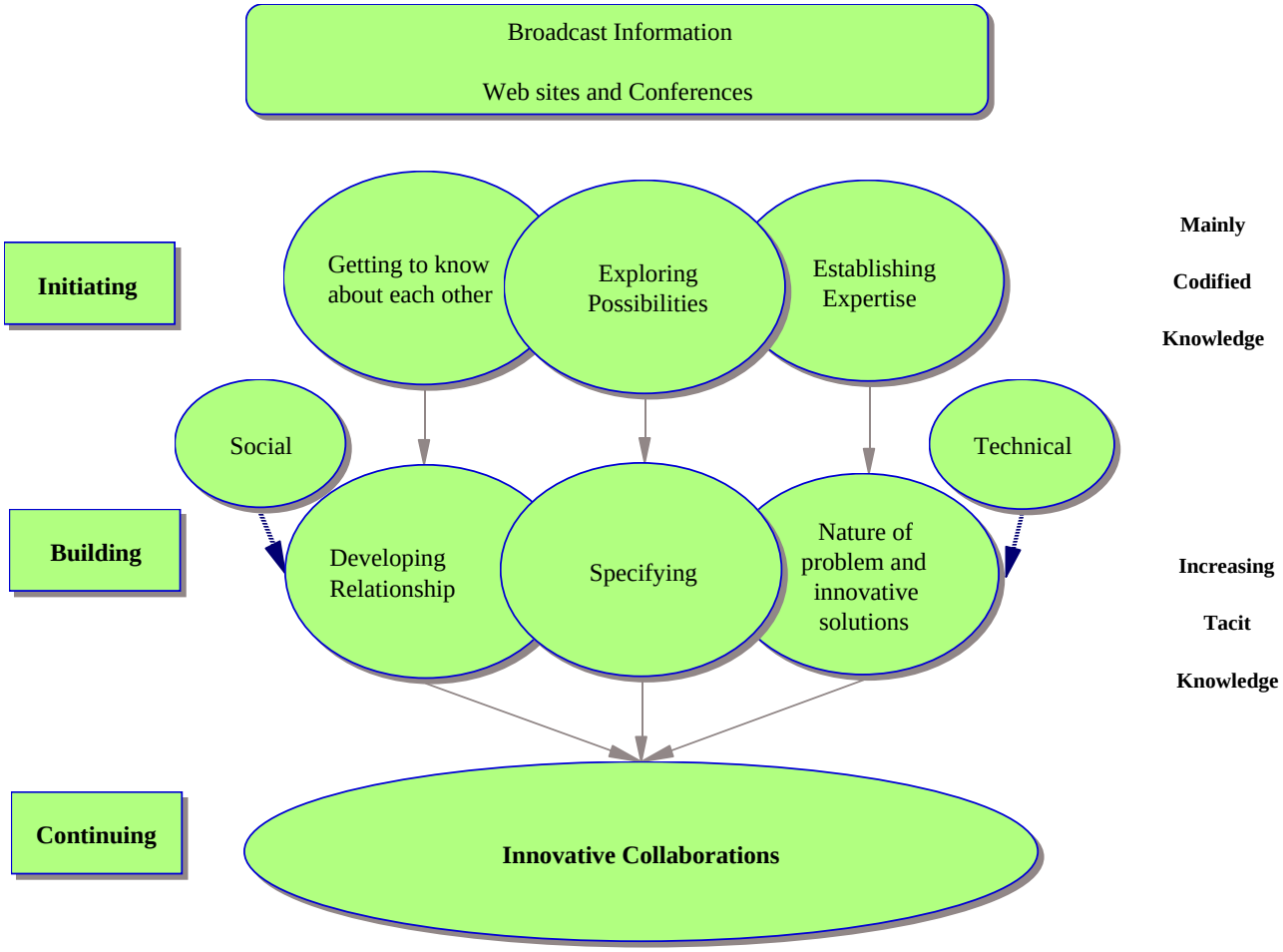
However email is not always enough *"… have to meet when they have problems, product problems, bad debts …" (D, Biot).* But also:

"… They will demand a certain amount of meetings each year, and if you don't do that, it's very much like out of sight … the relationship will decrease very rapidly if you try to do it only by email in the Middle-East …they like to see you …have fish meals in the restaurants … things like that …" (I, CML)

Interestingly, more face-to-face meetings appeared to be required by Middle-Eastern customers. The reason seems to relate to their ways of maintaining trust, individuals needed reassurance and to refresh reliability and intimacy through personal visits.

We illustrate the process in Figure 1.

Figure 1 The process of collaboration for innovation



Implications for practitioners

Understanding the processes

The importance of collaboration for innovation facilitated by networking with customers is widely accepted and that networking is a key skill for SME owner managers. Increasingly virtual technologies provide additional means and options to facilitate networking. Therefore it is important for SME owner managers to understand the process of virtual networking so that they can take cognisance of and apply the approaches to full advantage.

In examining when face-to-face meetings and virtual interactions are used and what goes on when a small business and its customer collaborate for innovation, we found that the process has a number of elements.

1. The business process may be conceived as operating in stages as illustrated in figure 1 above. These represent stages in the development of the business relationship.

2. Knowledge exchanged may be explicit or tacit at the various stages in the relationship. But most often, tacit is exchanged in face to face meetings.

3. To achieve the collaboration at the various stages, it is necessary for the interactions to include both technical and social dimensions.

4. Interactions may be face-to-face or virtual. The mix of these depends upon the stage of relationship, the nature of the knowledge and the extent to which the social side aspect has been developed.

Implications

Despite the advances in recent years in virtual means of interacting, there is still a need for face-to-face interaction when aiming for innovation. Therefore practitioners should not assume that all necessary exchanges can be achieved at a distance and through the convenience of virtual technologies alone. For tacit information exchanges, the social dimension needs to be developed and this is best achieved through face-to-face encounters.

The technical and social dimensions complement one another throughout the business relationship. Small business practitioners need to pursue both aspects if they are to be successful in pursuing innovation with their customers.

Once a contract is agreed and the parties are working together, the relative role and frequency of the virtual mode in maintaining the social dimension can be increased. When a sound business relationship has been achieved, the necessary social component does not need the same extent of face-to-face engagement to facilitate and maintain the technical exchanges.

The appropriateness of the exchanges for different purposes in the relationship may be summarised in Table 2 below.

Table 2 Uses of the virtual and face to face

	Technical	Social
Face-to-face	Tacit info exchange, especially in the early stages.	Building trust. Exchanging tacit information
Virtual	Exchange of codified material throughout. Some tacit info exchange during the Continuation stage.	Continuing the relationship (maintaining and extending)

In summary the small business owner needs to aware of the various variables at play in collaborating with a customer to achieve incremental innovation. By being aware, the owner manager will be able to take a more structured approach to developing the business relationship. This will help ensure not only that progress is achieved, but also that it is achieved efficiently, avoiding over-reliance on either potentially wasteful face-to-face meetings or potentially ineffective virtual interactions.

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