MANAGING NETWORKS OF SUPPLIER AND CUSTOMER RELATIONSHIPS FOR TECHNOLOGICAL INNOVATION: INITIAL CASE STUDY FINDINGS

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Abstract

This paper concerns the problem of how companies, who seek to develop new technology, can successfully capitalise on the whole pool of resources and technologies available within their network, whilst at the same time cope with the problem of loss of control of knowledge and technologies to other parties in their network. Taking point of departure from their previous conceptual and empirical work (e.g. Johnsen and Ford, 1999; 2000), the authors begin by briefly introducing the conceptual framework, and its theoretical foundation, forming the basis of the case studies. This framework includes a set of 'collaboration activities' that are reported in major bodies of empirical work to be key to managing both customer and supplier collaboration.

The paper reports the initial findings from the first of four in-depth case studies of collaborative innovation in networks. This section includes an outline of the overall project methodology and elaborates on some methodological problems experienced during the facilitation process of the cases studies; this section also discusses the steps that were taken to overcome the problems. The first case centres on an automotive fuel tank supplier (whose name cannot be revealed for confidentiality reasons) and its development project of a new fuel tank in which a new fuel tank technology has been applied. Initial analysis of the case study interviews, reveals the different perceptions of the set of collaboration activities during the project and how the complex network in which the actors operate simultaneously enabled and constrained each activity in different ways and to different degrees.

Introduction

It is becoming increasingly accepted that companies need to collaborate, or 'partner', with other companies, such as customers and suppliers, for mutual benefit (see for example the UK Competitiveness White Paper, DTI, 1998). This idea is also being advanced within the context of innovation management where concepts such as 'early supplier involvement in product development' (e.g. Bonaccorsi and Lipparini, 1994) and 'innovation networks' (e.g. Freeman, 1991) are flourishing. This is, of course, a

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phenomenon long discussed and cultivated by the IMP. However, the IMP have also been characterised by pointing not only to the positive effects of working in networks but also to the negative effects that inevitably occur.

A series of IMP scholars (e.g. Håkansson, 1987, 1989; Håkansson and Snehota, 1995; Lundgren, 1995) have analysed how networks may impact positively and negatively on the process of technological innovation, including both product and process developments. However, the majority of work to date has largely described the general effects of networks; to date these effects have not been examined at the level of specific activities which companies carry out when managing collaborative innovation projects. Therefore, how and to what extent different activities are affected by the network has not yet been fully examined. Our work aims to bridge that gap by identifying a set of key collaboration management activities and analysing how individual activities may be positively and/or negatively affected by the network in which they are performed.

Conceptual Framework

The conceptual framework which has been constructed during the course of this work is founded on both analysis of existing literature and initial empirical work (e.g. Johnsen and Ford, 1999; 2000; Zheng *et al*, 1998). The framework centres on a set of what are here termed 'collaboration activities' that are reported in major bodies of empirical work to be key to managing both customer and supplier collaboration (e.g. Håkansson and Eriksson, 1993; Håkansson, 1989; Wynstra, 1998; Imai *et al*, 1985; Takeuchi and Nonaka; 1986; Womack et al, 1990. These are:[2]

- *Uniting*: identifying and selecting collaboration partners
- *Timing*: Involving partners early in the project
- *Mobilising*: Establishing ground rules and arrangements for sharing of risks, benefits, and objectives
- *Communicating*: Exchanging e.g. ideas, concepts, policies, and performance information
- *Exchanging knowledge*: Exchanging e.g. technical knowledge, and end customer demand knowledge
- *Exchanging human resources*: allocating staff to development projects e.g. resident design engineers
- *Synchronising*: mutually adapting activities, resources, systems and procedures; aligning supplier and customer objectives and technology roadmaps

Although there is substantial evidence that the set of activities identified in our work, is important to managing the process of innovation with customers and suppliers, little work has attempted to examine how the activities are affected by the network in which individual actors are embedded. As the IMP research indicates the effect of networks on innovation is a double-edged sword; networks may both enable and constrain the process (see for example Håkansson, 1987, 1989). These positive and negative effects

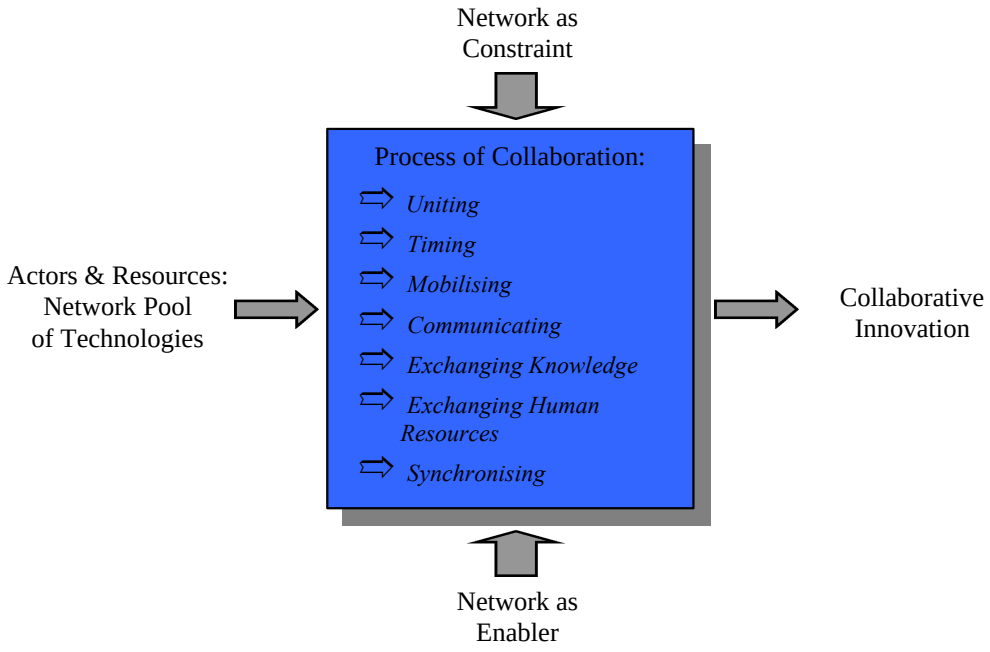
[2] See Johnsen and Ford (1999) for further details of the literature support for the collaboration activities.

may manifest themselves in many ways. Our work focuses specifically on how the network:

a) may increase dependency on other actors
b) implies a risk of dissipation of sensitive knowledge to third parties
c) may function as a conduit to other relationships
d) may potentially be deliberately exploited through co-ordination strategies e.g. intervention and cascade strategies

The point of interest in our work is on positive and negative effects on individual collaboration activities. This is important because whereas much research to date has enriched our knowledge of different forms of network effects, little work has examined how these different types of effects relate to particular collaboration activities for managing customer and supplier relationships for innovation. The questions here are whether some activities are affected more than others, whether some activities are less or not affected at all, and in which cases effects are positive and/or negative. Figure 1 illustrates the logic of this approach.

Figure 1. A Conceptual Model for Managing Collaborative Innovation in Networks



Initial Case Study Findings

This section reports the initial findings from the first of four in-depth case studies of collaborative innovation in networks. This case centres on an automotive component supplier (whose name cannot be revealed for confidentiality reasons) and a technological innovation project which provides a platform for a variety of product applications.

Methodology

This research is principally Realist (Easton, 1998) and thus mostly qualitative. This means that despite the fact that this research seeks to analyse 'positive and negative network effects' this is carried out in a predominantly qualitative manner. However, this does not mean that the case studies to be conducted are purely exploratory; rather they are analytical and thus entail a moderately higher level of concept and construct operationalisation than purely exploratory cases.

Being the first case study, this case effectively works as a pilot study. The case study is planned to involve approximately five semi-structured interviews with managers at different levels and from a variety of functions within the focal firm and with a selection a key suppliers and customers. Furthermore, a performance questionnaire is to be collected from key focal firm respondents which seeks to establish process and output performance of the chosen innovation project. To date five internal interviews have been carried out, involving the General Manager, the Purchasing Manager, the Project Engineering Manager, the Commercial Co-ordinator, and the Manufacturing Manager. The General Manager primarily provided the context of the company and project in focus; other interviewees primarily provided information regarding collaboration activities.

The process of collaborative innovation forms the central unit of analysis. The original intention was to capture this process by focusing on a specific technological innovation project, however, as this turned out to be problematic, it was later decided to focus on a product development project and capture underlying technology issues through the product project as a context issue rather than a unit of analysis in its own right.

Initial Findings

The first case study is to be analysed at both intra-focal actor and inter-actor analysis, however, to date only internal interviews have been conducted. Therefore, the present paper concentrates on internal aspects. Based on transcripts of interview data a matrix has been used to gain an aggregated picture of each collaboration activity and respective network effects (see Table 1). This analysis represents the aggregated or general pattern of understanding within the focal firm but also the differences in perceptions that can be identified within the focal company. Initially, however, a brief introduction to the context of the case study is appropriate.

Context[3]

The focal company in this case is a relatively recent joint venture between a UK company and another European company. The actual JV is fairly small so far, however, both JV partners are very large organisations that are primarily automotive component suppliers.

[3] Some details of this case have to be concealed for confidentiality reason, including the identify of the companies, technologies and products concerned.

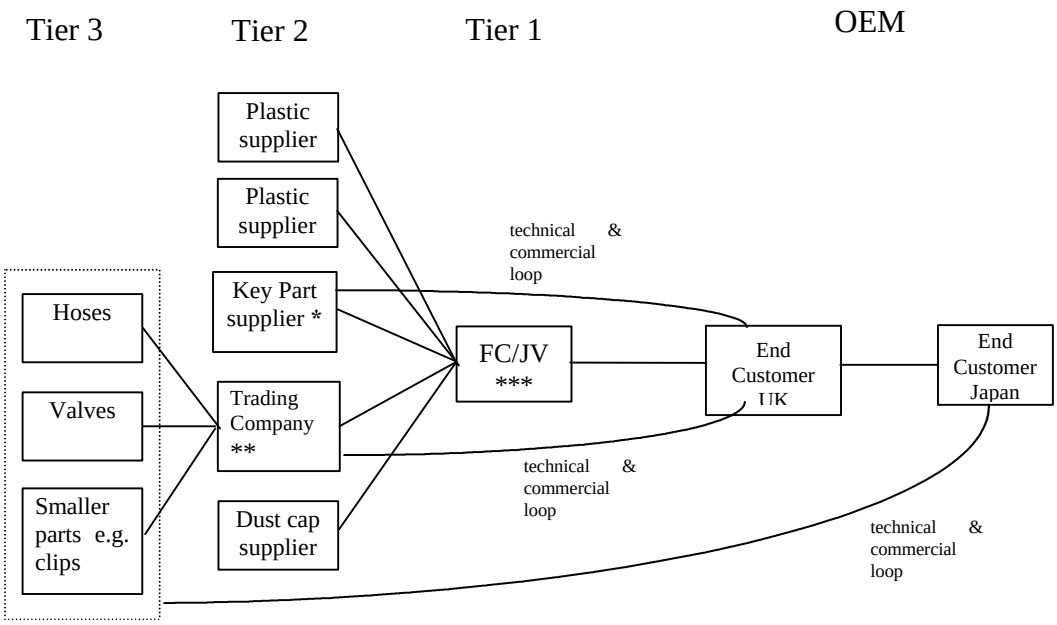
The JV has a fairly small product portfolio, concentrating on the manufacture of parts for vehicle manufacturers. The JV is based on a fairly new and unique technology which has only been applied in a few products to date; the JV has some level of input in design and development of product applications of the technology, but was not directly involved in the development of the technology itself.

The innovation project in focus of this case concerns the second product application of the technology. This project was primarily chosen because it is the one that has been most recently completed, entering production ramp-up in the beginning of 2001. The underlying technology is regarded by the company as 'very' innovative, although a few competitors have now developed similar technologies. The actual product application is not viewed as particularly innovative, although some of the processes used, e.g. unique testing technology, were first developed for this application.

The structure of the network is illustrated below. Some of the components are included, although the details are disguised to retain confidentiality. Of significance is also that there is only one customer in this case: a Japanese vehicle manufacturer, with a headquarter and R&D centre in Japan, and a UK sales office.

The network map highlights some of the inter-connections between key actors; the effects of these will be discussed in more depth later.

Figure 2. Network Map



*: Engineering, Design, and Manufacturing in Japan, Sales Office in UK. Focal company communicates with UK Office.
**: Not classified as a 'tier supplier' i.e. only facilitate and pass on parts
***: Assemble all parts (from 2nd tier)

Table 1: Initial Analysis of Intra-Company Perceptions of Collaboration Activities with Key Suppliers and Customer

	Project Engineering Manager	Commercial Co-ordinator	Manufacturing Manager	Purchasing Manager
Uniting	FC told which key suppliers to use by customer: nomination. Commercial problem: pricing is set/negotiated by customer for key components. Only allowed to choose Lesser value parts. Customer made decision to go for a plastic tank and developed a specification, a cost pack, putting out for tender. FC sends out quotations but has good idea of result due to past experience. Network influence: not looking for suppliers who will only supply parts to FC - looking at proven track record.	Key component supplier nominated by customer. FC only allowed to choose lesser value items. Other key components carried over from other customer projects. Lack of ability to set price because of nomination – opens up for blaming. Also lack of ability to choose preferred local suppliers. Customer sends cost pack to 3 or 4 potential suppliers. End up with many previous suppliers. Avoided known problem suppliers. Quotation process complicated network complexity	Not personally involved in process, only provided information on supplier performance through managing Operations. Customers nominated key suppliers but opportunity for FC to present case for different supplier, however, alternative must be substantially better than nominated source. FC got involved with customer through tendering process. See little of this as Manufacturing Manager.	Little latitude for FC as key suppliers are nominated by customer. Only low value added suppliers chosen by FC (where FC seen as expert): chosen on quality, locality and price. One key supplier effectively part of customer company: link to 3rd tier. FC remote from Japanese suppliers. Small proportion of child parts suppliers used before. Didn't avoid any particular suppliers or customers. Suppliers' or customers' other relationships didn't affect FC's choice as choice was limited because of customer nomination. Didn't co-ordinate choice of wider pool of suppliers and customers: may nominate indirect suppliers.
Timing	Key component supplier involved in parallel with FC: at design/concept stage (prior to nomination). FC didn't deliberately delay involvement of any suppliers or customers: once project hit UK potential for anyone to be overlooked is too big a risk. List of preferred suppliers for project: these would have been at least aware.	Key component supplier would have joined very early days. FC doesn't try to influence at what stage their suppliers involve their suppliers in the project: generally provide time schedule for part requirements.	Key suppliers became involved through concept stage; customer involved FC same stage i.e. from first initial approach: FC needed support/prices from supplier base in putting quote together.	Nominated suppliers involved at the design stage: done in Japan. Believes FC involved too late by customer, causing problems e.g. not being aware if design has been fixed. FC suppliers involved asap. Didn't try to influence when their suppliers were to involve their suppliers.
Mobilising	Tooling and prototype costs incorporated in piece price or reimbursed by customer. Key milestones part of cost pack incl. requirements, market information etc. Ground rules established at nomination but don't believe it's ever laid down in black and white. FC followed customer's rules and objectives, setting targets accordingly. Motivating of suppliers not normally a problem due to the volume, value and prestige of the business.	Overall development costs usually incorporated into piece price. FC rarely pay suppliers lump sum for development cost apart from tooling cost. Customer ultimately pays for tooling: claim back from customer. No difficulties motivating key suppliers to commit to project as they want the business. Also good relationships help motivation. Would like to try to influence how FC's suppliers motivate their suppliers in project, but don't have resources.	Customer's master timing plan was broken down by FC into own project timing plan, however, as suppliers follow customer's plan and timings this creates problems for FC Operations. Lack of ownership of supply base, due to nomination, causes problems: FC effectively get paid handling charge but no profit.	Development costs financed by customer. Some packaging costs shared with supplier. FC formulated project objectives at beginning of project. Key supplier didn't recognise FC as customer – seen as problem. Also FC felt de-motivated because of customer's dual sourcing, sometimes favouring other supplier. No real problems motivating suppliers due to prestige and volume, some suppliers more motivated because they can see historical increase in business. Didn't try to influence how suppliers motivated their suppliers in the project, finding it difficult enough to involve 2nd tier: effort on 2nd tier. FC hasn't got resources to go further down chain: only exceptionally.
Communicating	All requests go to Customer's UK office who don't always make own decisions: requests forwarded to Japan, R&D centre or HQ (FC no direct involvement). FC issue supplier guidelines, terms and conditions when issuing orders/quotations: key supplier's conditions may ultimately apply due to close relationship with	FC has supplier guidelines which are issued when issuing orders. Arguments over whose terms and conditions to apply due to. FC experienced difficulties in flow of information because they may be circumvented. FC wouldn't talk to the 3rd tier.	Communicate supplier delivery performance information: more forgiving during development, however, due to number of changes. May accept poor delivery or parts out of specification. Volume analysis (scheduling) information sent directly to indirect suppliers. Information held back from suppliers or the	Customer 'Are You Ready' reviews. All suppliers go through FC's supplier approval process, including supplier guidelines. Also quarterly review of all suppliers. Would hold back information on individual supplier performance from other suppliers. FC struggles with time lack between customer's UK office and Japanese HQ. Felt out of loop when design changes, annoyed by late notices.

	customer. Supplier performance communicated through supplier development: delivery & quality. Terms & conditions known from previous programmes. Communication with wider pool of suppliers responsibility of 2nd tier. FC may intervene beyond 2nd tier if wanting to ensure suppliers are on critical path.		customer on FC's real operating performance, to get business. Communication not affected by suppliers' or customer's other relationships.	Suppliers having relationships with FC's competitors doesn't affect communication: seen as informal way of getting information on competitors. During bidding information is tighter.
Exchanging knowledge	Design change information normally comes through FC's Commercial department: passed to Engineering and Purchasing, then forwarded to supplier. Customer makes specific requests rather than airing ideas for discussion. During design / concept stage FC only given relevant information, avoiding details of whole vehicle. Customer's UK office may be unaware of changes, made by its R&D department in Japan, discussed with key supplier: informal route of information for FC.	FC forwards customer's drawings to suppliers but left one key supplier and customer to exchange design issues e.g. drawings between themselves without getting involving.	Only knowledge exchanged concerned processing knowledge on test equipment, where FC has unique system: shared with the customer but not suppliers. Suppliers' and customer's other relationships didn't affect Manufacturing but knowledge related to FC's core technology was held back when customer was over-interested. Previous experiences with suppliers and customer wouldn't affect amount of engineering or market knowledge being exchanged by Manufacturing.	Drawings issued to FC from Japan to customer's UK Office and forwarded to FC and then suppliers. Also technical and material specifications exchanged: seen as way of communicating end customer/consumer needs down supply chain. FC give suppliers all technical information: no real knowledge exchange limitations.
Exchanging human resources	FC had resident engineer (from its HQ) on customer's development team in Japan: informed of requirements and consulted on technical issues. Customer didn't allocate staff to FC's team. No exchange of resident engineers between FC and 2nd tier: basic design would have been done within FC.	Customer didn't allocate staff to FC's development team	Not aware of resident engineers	Key suppliers allocated resident engineers to customer's development team, not FC's: making drawings. Not seen as necessary to allocate more staff due to FC's limited involvement in customer's design. No indirect suppliers or customers involved in project.
Synchronising	Key supplier set in its ways and a global player: adapts to customer rather than FC: can only inform them of its requirements. FC wouldn't align its technologies to any key suppliers, but sees technical collaboration with key supplier as possibility. Past experience on previous projects allowed FC to look out for road blocks and pitfalls.	Don't think key suppliers synchronised development procedures. Relevant adaptations with suppliers already in place because of previous project experience, therefore much more aware of their systems, and any pitfalls that FC had experienced before.	Key suppliers synchronised phase builds and test builds procedures. Relevant adaptations all in place: matter of timing. Didn't avoid synchronising with anyone. Suppliers involvement with many customers, running several projects, affects priorities and causes FC to fail to meet phasing. Suppliers' responding to customer's demand rather than FC's mean that suppliers end up with different standards and different performance objectives.	Key suppliers don't always synchronise development procedures– supposed to: suppliers thus not always ready in time for production. Suppliers all way down supply chain have to align with end customer, although possibly large suppliers don't. Future technology development seen as FC HQ responsibility. Most physical adaptations in place from previous project. Not seen as problem to synchronise with suppliers involved with other companies: FC insist on having their systems adhered to or combine systems. Don't synchronise with indirect suppliers.

FC: Focal Company

Collaboration Activities

Uniting
This activity refers to the process by which the focal company identified and selected the customer in the project and the key suppliers (or *were* identified and selected). The main theme in this case concerned the issue of supplier nomination i.e. the end customer, or vehicle manufacturer, specifying suppliers for key components. This implied that the focal firm had little influence over which suppliers with whom to work and resulted in the company being landed with relationships which were not of their own choice. As a consequence, the company had no ownership of the supply base meaning, for example, that the focal company's opportunities for making a profit for itself, were limited in those relationships:

> *"If you're giving nominated suppliers the customer already knows the price, so you can't put any profit on there. In other ways it does benefit us because we can turn around and say 'You nominated them."*

The practise of supplier nomination exemplifies one type of network influence in this activity: intervention in the supply base. The initial indications in this case are that the this is largely seen as a damaging exercise which neither helps individual relationships nor, apparently, the effectiveness of the network. There did not seem to be any active 'co-ordination' of the supplier network apart from intervention.

The influence of history, another network effect examined, seemed to be significant in this case, both in terms of the importance of primarily ending up with suppliers which the company had worked with in previous projects, and in terms of the importance of suppliers being able to show a track record, a portfolio of relationships to their benefit:

> *"By the nature of the components we supply, we're not looking for suppliers who will only supply parts to [FC]. We'll be looking at their proven track record."*

The initial analysis shows some discrepancy regarding whether the focal company deliberately avoided any suppliers or customers; one respondent reported that a problem supplier had been avoided, another that no particular suppliers had been avoided. It would seem that this effect was limited.

Timing
This activity refers to the decision at which stage in the project to involve the key actors. The picture so far appears to be that the focal company was keen to involve its suppliers as soon as possible in the process; no suppliers were involved later in the project for any reasons. However, concerning the customer relationship the question was not when the focal company wanted to involve the customer but rather when the customer wanted to involve the focal company; the Purchasing Manager considered what he believed to be the late involvement of his company to be a source of many problems during the project.

The focal company did not try to influence the moment of involvement of its suppliers, however, it was regarded as important to involve suppliers early in the project in order to put together the quote for the business.

Mobilising
This activity focuses on the motivation process and includes issues related to the sharing of risks and benefits and the formulation of project objectives.

The sharing of development costs seemed to be incorporated into piece costs and/or claimed back throughout the supply chain (in the case of tooling or prototype costs).

> *"[During the project] we have to put together the physical part [prototype] so we actually procure parts from another part of the global project. Those development costs are shared because we'll include those costs and they'll pay us for that part. That cost will be forwarded to [the end customer]. For each build phase they'll know that that is going to cost them."*

> *"If we had asked [the key supplier] for a prototype [part] that would have been e.g. handmade and could well have cost £1000 whereas production cost may be £20 or whatever. And they would pull all that cost in. Same with us, if we had to produce a tank, to actually blow mould a [part], there's obviously a lot of cost going into that. That cost is then put into the [part] cost."*

The focal company had few problems motivating suppliers due to the volume, value and prestige of the business. However, the key, end customer nominated supplier, did now regard the focal company as its customer; it saw the end customer as its customer (despite the fact that it supplied through the focal company). The focal company considered this somewhat de-motivating and even frustrating:

> *"We had pre-meetings with [the key supplier] in the early days and they insisted on having those meetings in the presence of [the end customer] in the UK. They didn't recognise us as their customer, they recognise [the end customer] as their customer and treated us quite differently. So we had to use some kind of coercion with [the end customer's] agreement to get them into line. They are very reluctant to deal with us direct, they want to go through [the end customer's UK Office] rather than talk to us direct."*

This quote illustrates not only the damaging effect on motivation but also on communication. It relates to the different perceptions of the roles and responsibilities of different actors within the network and again the effect of supplier nomination i.e. intervention appears to be negative. For example, this confusion led to suppliers ignoring the focal company's project manufacturing planning:

> *"[The end customer] will obviously issue a master timing plan, which we will then break down into our project timing plan which, for simplicity, will suggest if [the end customer] wants parts in June, we'll try to get delivery for those parts for May, suppliers will then delivery of those parts for April. But what tends to happen is that our timing planning gets a lot priority in the supplier base, they'll concentrate on delivering parts for June for [the end customer]. They tend to forget our business. That's a common problem."*

Communicating

A key theme of the focal company's communication with key suppliers and the customer, was the effects of the complexity of the network; the end customer having a close direct relationship (also in Japan) with the focal company's most important supplier which subsequently did not recognise the focal company as its customer. This meant that the focal company was often cut out of the communication between these two companies. In fact, in some ways the key supplier's relationship with the end customer appeared to be closer than

the relationship between the end customer's head quarter and its UK office; the key supplier, in this supply chain being second tier, would often have information before the focal company as well the end customer's UK office (see Figure 2). The following quote illustrates this complexity:

> *"Japan has spoken to the supplier, especially in the case of [the key supplier]. So I'm requesting [the key supplier] to supply what I think is the latest level because [the end customer] has sent me this drawing, and they say 'Oh no, you don't want that, there's been design change since, you want this level'. So [the end customer] is not telling me what I should buy."*

Suppliers having relationships with the focal company's competitors did not appear to affect the level of communication, in fact it was regarded as an informal way of obtaining information on competitors:

> *"People are quite open, it's happens, it's quite an incestuous industry, so you know who deals with who……. we all know each other basically. I bump into our competitors representatives at our customers place all the time."*

Communication beyond the second tier was regarded as the responsibility of the second tier i.e. a typical cascade strategy. The focal company would only intervene if wanting to ensure that suppliers were on the critical path i.e. able to meet project deadlines.

Exchanging knowledge

The exchange of knowledge focused on 'technical engineering' knowledge, such as drawings and specification, and also market knowledge. The picture here appeared to be very similar to communication, the focal company again negatively affected by the close relationship between the key customer nominated supplier and the end customer. Although the Purchasing Manager did could not think of any limitations to knowledge exchange the Manufacturing Manager mentioned one example where they had become concerned about the end customer's 'over interest' in its unique testing technology:

> *I'm aware with [the end customer] that at a point they were far over-interested in our technology and beyond product quality basis. They were very interested in all our operating parameters – the actual [core] technology. This was beyond was required.*

Exchanging human resources

This activity concerns the exchange of technical staff, most notably resident design engineers, to the project team; the focus is on secondments rather than mere human interaction such as meetings.

The interviews to date have revealed little knowledge of this activity, the majority of respondents only aware that they allocated a resident design engineer to the end customer's development team in Japan.

Synchronising

This activity concerns adaptations and alignments of systems and procedures, as well as technology roadmaps. Most adaptations seemed to be in place from previous projects and past experiences also allowed the focal company to look out for possible problems and pitfalls e.g. with particular suppliers.

Generally, it was viewed as the suppliers' job to adapt to customers rather than *vice versa*, however, one respondent admitted that it was sometimes a matter of using whatever appeared to be the best system:

> *"We try to be pragmatic about it in so much that if they have got a system which works and which has all the elements which our system requires then we'd use their system, from a quality point of view, because if they know their system they are less likely to make mistakes. But if their system is completely non-capable of what we want, then we insist on them following certain patterns or rules We have a document in place in that instant when companies are not capable of carrying it out [using their own system] and we tell them "Well, you have to follow this document". And spoon-feed them to a certain extent."*

The focal company did not attempt to synchronise with any indirect suppliers and some respondents expressed concerns about aligning its technologies with any suppliers. It was generally recognised, however, that a key decision for the focal company concerned the problem of not being a real full systems, or module, supplier, because of customer intervention in its choice of key collaboration partners. Therefore, although the focal company effectively supplied a whole module it neither had full control over the design and production of the module, nor the commercial part of it:

> *What happens is that the customer will negotiate direct with the [key supplier] and they'll say to [the focal company] 'You've got to use that [key component], and that's how much it's gonna cost you'. So all you do is that you get that [key component] and stick it in your [module]. The opportunity for making any money is very limited, other than a handling charge.*

Some respondents recognised that it might be a viable strategy to develop some form of partnership with key component suppliers, thus maintaining control of the choice of collaboration partners. It was conceded, however, that end customers were likely not to be happy with such a decision as it would imply that they would then lose control of the supply network:

> *They'd be horrified, absolutely horrified. They would have no control over the costs. And I don't think it would ever work with [the end customer] because they're too close to the supplier base to allow that to happen; we'd never be close enough to the likes of [the key supplier] or whoever to make a system.*

Discussions and Conclusion

The initial analysis of this first case study has revealed some of the ways in which the network affects individual collaboration activities, both positively and negatively. The complexities of the network, not least in terms of direct activities between otherwise indirect suppliers and customers, have shown some of the problems the focal company has faced trying to manage the project effectively and collaborate with suppliers and the customer in the best possible way. The more specific network effects on individual activities are difficult to identify from the initial findings, however, they indicate that the focal company was in a very difficult position during the course of the project, trying to cope with suppliers who were not of their own choice; this is an example of network intervention by the end customer (not the focal company) and it appears that this caused more problems than benefits, at least from the

point of view of the focal company. Importantly, the effects on performance have not been measured yet as performance questionnaires are still to be returned. Also, as so far only internal interviews have been carried out only one side of the story has been collected; the perceptions of collaboration partners remain.

This leads to the final point: the problem of the extent of collaboration, or lack of it, in this case. Although the perceptions differed, the general view of the respondents was that the involvement of the focal company in the end customer's project was limited (although here, it was not the end customer's project that was in focus i.e. the whole car, but the focal company's own project). There is little doubt that the actors there a high level of interaction between the key actors tool place, however, the relationships were not viewed as collaborative by some respondents. From a methodological perspective the problem is how to identify whether a project involves real 'collaborative' relationships. This is one of the emerging lessons of this first case study.

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