**Work-in Progress Paper for IMP 2004**

# The Appropriateness of Delegation and Intervention Strategies for Managing Product Innovation in Networks

Thomas Johnsen and David Ford

University of Bath School of Management
Bath BA2 7AY, UK
E-mail: mnstj@management.bath.ac.uk
Tel: +44 (0)1225 383 361

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## Abstract

This paper seeks to generate insights into how delegation and intervention strategies can be applied to manage product innovation within networks. Hence, it concerns the main theme of this year's conference: influencing and strategizing in networks. The paper commences with a brief introduction to the literature background and explains the concepts of network delegation and intervention. It reports on the findings from four in-depth case studies, and focuses specifically on the appropriateness of the delegation and intervention strategies in different situations. The paper concludes with a note on managerial implications.


## Introduction

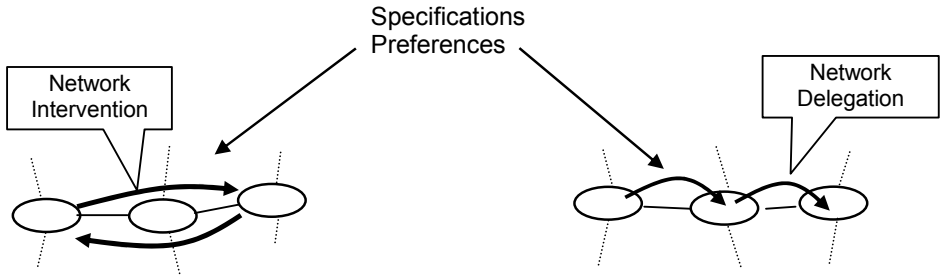
During the last couple of decades an increasing amount of research is indicating that some companies are adept at co-ordinating and exploiting the capabilities of their immediate suppliers and also of a wider network of other suppliers. A network perspective of innovation management implies that companies look beyond their direct dyadic relationships and seek to capitalise on the wider network in which they are embedded.

In the 1980s and 1990s a number of studies reported how large powerful companies in industries, such as automotive and computers, 'organised' their suppliers into structured tiered networks. For example, Takeuchi and Nonaka (1986) and Imai *et al* (1985) showed how lead manufacturers divided suppliers into 'primary' (or first tier) and 'secondary' (or second tier) subcontractors, thereby enabling the innovation process to gain more momentum. In a similar vein, Womack *et al* (1990) described how *lean* Japanese car assemblers assigned the design and development of whole modules to a group of first tier suppliers who in turn usually utilised a team of second tier suppliers, conducting the detailed development and engineering. Lorenzoni and Baden-Fuller (1995) and Jarillo (1988) reported similar findings on a range of firms in different industries, including Apple, Benetton, Corning, McDonald's, Nike, Nintendo, Sun, and Toyota.

More recently, Lamming (1996) and Lamming *et al* (2000) discussed different strategies of managing in supply networks. They describe the cascade strategy as the imposition of initiatives and performance requirements from the customer to the supplier, and thence to sub-suppliers (Lamming *et al*, 2000). It offers a strategy for drawing on several layers of suppliers and sub-suppliers and is based on the assumption that customers have a simple supply chain logically divided into 'tiers'. The customer firm, often a large OEM, perceives that its power may be cascaded throughout its supply base. At its basic level cascading is a way for a customer to delegate responsibility to its suppliers; in practice, it has been contended that it often takes the form of a more imposing style of leadership (*ibid*.). They describe the 'intervention' strategy as similar to the cascade strategy but entailing a customer directly becoming involved in its indirect supplier's activities (e.g. 'second tier' suppliers) and thereby effectively converting an indirect relationship into a direct one. According to Lamming *et al* (200) it may be applied in cases where the customer seeks to help out an ailing supplier, applying its management skills to operational problems (Hines, 1996). They also argued, however, that intervention may be practised because the customer does not trust the supplier, for example, to implement operational improvements itself. The customer therefore engages directly in the supplier's activities to ensure proper implementation.

As suggested by Lamming (1996) and Lamming *et al* (2000) the problem with both strategies is that they assume that customers hold a position of knowledge and operational superiority, and hence sovereign power (Lukes, 1974). To counter this problem we have re-conceptualised the two strategies as 'network delegation' and 'network intervention':

**Figure 1. Conceptualisation of Delegation and Intervention Strategies**




Following Figure 1 'network intervention' entails a network actor actively involving itself in an 'indirect' relationship and thereby effectively disintermediating, or converting an indirect relationship into a direct one by circumventing a direct supplier to reach an indirect supplier. This may be for the purpose of providing, for example, design specifications or sub-supplier preferences (e.g. safety and environmental standards). 'Network delegation' entails a focal actor instructing another actor to disseminate or forward the focal actor's specifications and preferences. It is similar to the cascade strategy, although it does not rely on the arguably restricted interpretation of structured vertical supply chains. As the models illustrate, both the intervention and delegation strategies may work from supplier to customer as well as *vice versa*.

Analysis of the literature suggests that it is particularly large and powerful companies that are in a position to apply the strategies of delegation and intervention (e.g. Womack et al, 1990; Dyer and Nobeoka, 2000; Imai *et al*, 1985; Lamming *et al*, 2000). It is unclear, however, whether these companies operate in a particular set of circumstances, which allows them to exercise such control of their network. Also, even if the circumstances exist to enable this type of strategy, it is unclear whether it is always appropriate for firms to try to exert control over their network through different network strategies. The research question explored in this paper is therefore: In which situations might delegation and intervention strategies be appropriate?

## Methodology

The following discussions are based on the findings from four in-depth case studies. These spanned two industries, automotive and telecommunications, and involved 39 interviews with focal companies and key suppliers and customers in addition to three case study facilitation meetings and four follow-up meetings with the main focal company contacts for validation of case findings. The nature of the four cases was as follows.

The pilot case concerned the development of a fuel tank module for a Japanese vehicle manufacturer's new car development project. The fuel tank applied a recently developed

material technology. The focal company, 'EuroPart', which operated as a 'first-tier' supplier to the automotive industry, is a joint venture between a UK company and a continental European company. The data collection comprised twelve semi-structured interviews: seven internal and five external interviews.

The second case concerned the development of a car; the focal company in the case, AutoEngineer, had the full turnkey responsibility for vehicle design and engineering, and plant construction in Asia. The car project applied a new material technology and was further complicated by involving the simultaneous development of a plant and supplier network in Asia. The case study was based on seven semi-structured interviews within AutoEngineer and three external interviews with two key suppliers and the customer, a vehicle manufacturer.

The third case study revolved around the development of a new component for base stations manufacturers, referred to as the 'RFC' project. The project was a new application of proven technology. 'TelePart'; the focal company in the case, was a telecommunications 'first tier' supplier. The TelePart case was based on twelve interviews: eight internal and four external interviews.

The fourth and final case study was distinct from the other cases as the project concerned the development of interception technology for data transfer on telecommunications networks, a technological shift from second generation to third generation technology. The focal company in the case was 'NetCom': a telecommunications OEM. Hence, it was a differently positioned focal company compared with the focal companies in the other three cases. In addition, this case differed from the other cases in that the project concerned, from NetCom's point of view, a component technology, rather than a product. The case was based on five interviews in total: four focal firm interviews, of which one was conducted by telephone as it was with a USA-based respondent, and one interview with the key supplier of the interception technology.

A number of situational factors were investigated in the case studies. Some of these were explored as part of the interview guide structure, but other situational factors emerged from the cases and were identified through a process of annotation, coding and categorisation (Miles and Huberman, 1984). Hence, although related to the *a priori* defined constructs, some situational factors simply emerged from the case analysis (Eisenhardt, 1989). The following section discusses these factors and their apparent impact on delegation and intervention strategies.

**Situations of Appropriate Intervention and Delegation**

The four case studies, whilst sharing some common denominators, differed widely in terms of situational characteristics. An apparent difference concerned the nature of the focal companies. One of the cases had as its focal company an assembler, NetCom, whereas in the three other cases the main roles of the focal companies were as suppliers to assemblers, or 'first tier suppliers'. As a differentiator, however, it is imperfect. For example, AutoEngineer's role was not only a 'first tier' supplier, as it frequently operated as a vehicle assembler in other projects. In the project studied, AutoEngineer would not have final assembly responsibility but its turnkey role not only included setting up a plant, but also managing, or convening (Lamming *et al*, 2000), the development of an industrial network, or at least part of it. Furthermore, as a situational factor the role of the focal companies may be

an inappropriate differentiator, because it does not differentiate the cases but merely the focal perspective within each case.

A key situational factor related to the actual projects constituting each case study. The interception gateway project involved the development of a component technology that would form part of telecommunications networks. Hence, it would form part of a large and complex system: itself a technological network. This was in many ways comparable with the base station equipment development project. The Asian car development project concerned the development of a car, or in other words an end product, although the focal perspective was that of an engineering supplier, with a wide-spanning role. In comparison, the case of the fuel tank development project focused on the development of 'parts' for a relatively simple end product: a car.

Closely related to the nature of the projects of the four case studies, was the level of innovation involved. Despite the ambition to identify and focus on innovative projects, critical assessment of the projects revealed that only one of the projects, the Asian car development project, involved what could be described as radical innovation. This was in the form of the application of a new to the industry material (Gobeli and Brown, 1987). The other three cases concerned innovations that could most accurately be described as incremental, even if one of them, the interception gateway project, was part of a major systemic innovation (Teece and Chesbrough, 1996) moving from voice to data transmissions.

A number of additional factors emerged from the analysis as 'causal powers' (Easton, 1998). Indeed, the patterns of delegation and intervention seemed to relate to a specific combination of these pre-defined and emergent contingent factors. These are summarised in Table 1 and discussed in the following.

**Table 1. Key Contextual Factors Across the Four Case Studies**

| | Fuel Tank Development Project | Asian Car Development Project | Base Station Equipment Development Project | Interception Gateway Development Project |
|---|---|---|---|---|
| Innovation | Recent material / process technology applied in car project: incremental product development/ introduction | New body-in-white material applied first time in high-volume vehicle production: radical innovation (in auto industry) | Updating previous product: incremental product development/ introduction | Part of major systemic shift from (2G) voice to (3G) data transmission: specific project is incremental innovation, as builds on previous product technology |
| Network Power | J-Car is powerful Japanese vehicle manufacturer: dual sources & hence limits dependency on FC. J-Car exerts power through sub-supplier nomination. | VM very powerful but JV limited power due to lack of experience in Asia, single-source strategy with FC, & FC portfolio of customers: FC customer highly dependent on FC – limits customer power. | TM is global telecoms network provider. Its power reduced in particular project by TM single source strategy & TM's large use of FC. FC has 60-70% of business with TM: FC highly dependent on TM but elements of mutual dependency limits TM power. | FC customers are national law enforcement agencies (LEAs) & network operators. FC powerful: several customers. FC uses one supplier of product/single source. Supplier powerful as only one of two international players. |
| Supplier Competence Trust | FC customer (J-Car) has limited competence trust in FC: trusts long-term Japanese suppliers (culturally closer). FC trusts some suppliers but mistrusts key supplier nominated by J-Car (mutual). | FC JV customer is partly global vehicle manufacturer, partly Asian JV partner: JV limited experience, relies on & trusts more experienced FC. FC trusts prototype suppliers (long-term relationships) but has limited experience with/trust in new Asian production suppliers. | FC customer (TM) lacks complete trust in FC's ability to manage project but trusts its technological capabilities. FC trusts few of its suppliers, particularly in relation to technological capability. | FC trusts key supplier's technological capabilities but not its ability to manage project. Different national cultures seem to restrict trust. |
| Product Architecture | Modular architecture | Modular architecture | Modular architecture | High software content. Complex integral architecture |
| Product/Part Criticality | Fuel tank a (safety) critical component & highly specified. | Most parts of car low cost 'minimum' specification, but contains safety-critical parts. | Driven by cost & minimum specifications: relatively limited criticality. | Driven by legal requirement, cost & minimum specification / commercial criticality. |

Note: FC: Focal Company

*Power*

The literature indicates that companies may often favour intervention if they are in a position of power and/or possess the capability to intervene (Harland *et al*, 2001). The explanation for the different levels of customer intervention in sub-supplier specification across the cases may well lie in the relative dominance or power of the respective customers. A common feature of the customers of the three focal companies, EuroPart, AutoEngineer, and TelePart, was that they all were, or were part of, major global OEMs. In the case of the Asian car development project the customer company consisted of a joint venture, involving a global vehicle manufacturer as one of the partners. However, the joint venture itself was not very powerful due to its limited experience in setting up a new plant, supply base, and developing an innovative new vehicle, all at the same time. Hence, the managerial and technical systems

capabilities (Leonard-Barton, 1992), of AutoEngineer were relatively superior to those of the joint venture in managing this complex project. These factors contributed to placing AutoEngineer in a position of power, and thus influence, in relation to the joint venture customer. In the case of the base station equipment project, the customer 'TM' was an equally large global actor and its position was not compromised by any joint venture partners. It had significant power over the focal company, TelePart, not least because of its high dependence on TM. The dependence, however, was to some extent mutual as TM relied on TelePart as a single source for the development of the base station equipment. This was a common strategy by TM in its relationship with TelePart, which would usually, in other projects, be balanced with a dual source to avoid a high degree of dependency. In comparison, the powerful network position of EuroPart's customer, J-Car, in the fuel tank development project was much more straightforward. J-Car pursued a deliberate dual sourcing strategy to enable it to shift supplier if required and dependency was much more unidirectional. J-Car exerted and thereby manifested its power through its intervention strategy, for example, in sub-supplier nomination. Its power was thus sovereign and utilitarian (Lukes, 1974). The case of the interception gateway project did not have any one powerful sovereign actor. The national law enforcement agencies naturally possessed some power given their regulatory position. The focal company NetCom, however, was also a large global and powerful actor. Its supplier in the case study was relatively small, but its strong duopolistic position in the market as only one of two international suppliers was a significant source of power. Power was thus more dispersed in the interception gateway development project compared with the other projects, particularly the fuel tank development project.

The significance of power seemed to be linked to different patterns of network delegation and intervention and thus a key situational factor. The case in which network intervention was most evident was the case with the most obviously powerful customer relative to the focal company being subjected to intervention. In comparison, the other cases included more examples of what appeared to be predominantly implicit use of delegation strategies, for example, in supplier nomination, or 'uniting' (Johnsen and Ford, 2004), and communication of, for example, technical specifications and performance requirements.

The cases also illustrated the different workings of power when applied to network intervention. As identified by Frazier and Antia (1995) power may be applied either coercively or in a collaborative way. The intervention in the cases exemplified what could be interpreted as coercive power and it seemed that such power was particularly applied in relatively non-collaborative relationships e.g. in the relationships surrounding EuroPart in the fuel tank development case. The following quote illustrates the contrast between the power of the vehicle manufacturer J-Car and suppliers and the amount of deference shown by suppliers in the face of powerful customers:

*[The Japanese rubber suppliers] are not so flexible, we're a long way away and even if my colleagues in Japan go to see them it's them as J-Car Commerce Japan. If J-Car Japan are going to see them, then the flags will be out and everybody will be sweeping the streets and things*. (EuroPart Supplier)

The exertion of power in other cases seemed to be more collaborative. For example, although dealing with powerful customers in one sense, TelePart and AutoEngineer were still able to assume very proactive roles in the sub-supplier nomination process, or uniting. This is consistent with the suggestions by Ford *et al* (2003) that coercive power is mostly of relevance to low-involvement relationships.

It is interesting to note that in concurrence with Ford *et al* (2003) the case studies featured power as a key explanatory factor despite the fact that the case studies concerned collaborative innovation projects. This supports the notion that collaboration by no means implies that power and indeed conflict become less important. As discussed in this section it would appear that the exertion of power through intervention strategies is linked to the level of collaboration within network relationships. This leads to the second apparent situational factor: competence trust in suppliers.

*Competence Trust in Supplier*

There were signs that the perceived competencies of the focal firms vis-à-vis the customers and suppliers affected whether intervention or delegation was favoured. The fuel tank development case, in which there was extensive customer intervention, was characterised by a lack of competence trust (Sako, 1992) in EuroPart. There were indications that the limited competence trust by J-Car related not only to EuroPart but also to European suppliers in general, although the limited and possibly biased statements on this by respondents means that this could not be verified. It seems reasonable to assume, however, that J-Car had a higher level of competence trust in its domestic long-term suppliers in which much time and effort had been invested. Nevertheless, the explanation in that particular case may be that trust between different cultures may be difficult to establish (Johanson and Vahlne, 1977; Ford, 1980) and thus encourages the application of network intervention strategies. In comparison, there seemed to be relatively more competence trust in the other three case studies. In the Asian car development project, there appeared to be an element of trust in the relationships between AutoEngineer and VM and AutoEngineer and its prototype suppliers. AutoEngineer did not trust many of its new suppliers, however, and applied network intervention, by virtue of narrow product specifications, in the uniting with some sub-suppliers. The different national cultures of Asian production suppliers may be an added factor in explaining the lack of competence trust, but also the immaturity of the relationships. In the base station equipment case TelePart's customer, TM, evidently lacked trust in TelePart's ability to manage the project. Nevertheless, it did not appear to lack trust in its technological capabilities. This seemed to be a key factor in explaining the joint TM and TelePart nature of the intervention that was conducted in the base station equipment case, for example, in selecting, or uniting with, the focal company's sub-suppliers. The situation in the interception gateway project was similar in many ways, as the focal company trusted the technological capabilities of the key supplier, but had little trust in its ability to manage the project. Also in this case there was limited network intervention, and 'implicit delegation' seemed to be the dominant strategy. The cases therefore indicate that there is a possible link between the level of competence trust in suppliers and the form of network strategy applied by network actors.

*Product Architecture*

A further factor in explaining the different levels of customer intervention in sub-supplier nomination seemed to be the product architecture and thereby structure of the *supply network* (Harland, 1996; Gadde and Håkansson, 2001; Johnsen *et al*, 2000). The case with the most obvious network intervention was the fuel tank project. In this case the part (i.e. the fuel tank) and the end product in which it was to form a part (i.e. a car) were both characterised by a high level of modularity. Similarly, the Asian car development and the base station development projects featured examples of network intervention, although in a more collaborative style involving both the focal companies and their customers.

The interception gateway development project case was unique in its virtually complete lack of sub-supplier intervention. It emerged from discussions with respondents in the interception gateway project that the large proportion of software components in addition to the complex non-modular or integral product architecture rendered customer intervention in, for example, sub-supplier 'nomination' obsolete. Sub-supplier 'nomination' would have been problematic because the integral product architecture implied a high level of component inter-dependency and thus a tight rather than a loose coupling between individual components (Sanchez and Mahoney, 1996; Ulrich, 1995). Thus the substitution of one supplier for another would have been highly problematic.

This supports the notion of modular *supply network* architectures featuring multiple, interchangeable suppliers, standardised interfaces, systems sourcing, and volatile geography (Gadde and Jellbo, 2001; Araujo, 2003).[1] The inter-changeability of suppliers appears to be key to understanding network intervention; it is related to the characteristics of interactions between modules being well-defined (*interfaces*), which allows design change in one module without changes in other modules (*decomposability*) (Ullrich, 1995). Hence, network intervention strategies may only be feasible and practicable in modular product and network structures. Conversely, non-modular integral product and hence supply network structures do not appear to offer the flexibility required for network intervention.

*Product or Part Criticality*

The lack of commercial necessity seemed to be the final factor that contributed to the preclusion of attempts to intervene. The findings indicated that intervention requires availability of or investment in resource; hence if a product or part were dominated by cost considerations, the benefits of intervention would be unlikely to justify the costs. The Asian car project showed that the product or part criticality in terms of quality and technical performance was an added factor for companies considering whether to rely on an intervention or a delegation strategy:

*Fortunately, this product doesn't have very exacting performance requirements. Our strategy would have been very different if it was a luxury car or a high end of the market car. This is very much entry level so performance of seals and mechanisms and locks and latches isn't as demanding as it would have been if it were a European organisation. [Then] we would've had to go to level 2 and 3 and it would have cost VM a lot more and it would have taken a lot more time and a lot more resource from [us] or whoever.* AutoEngineer

As this quote indicates product or part criticality, products or parts involving a relatively 'high level' of technical specification at the expense of cost, may favour network intervention to safeguard against potential critical problems, such as safety risks. As there is increasingly a need for innovating companies to control the nature of the parts and technologies that enter their offerings, and the processes used to develop and produce these, there is a significant incentive for intervention. Hence, the need to obtain a high level of control may not only be a regulatory but also an ethical and environmental requirement (Smart, 1992).

## Conclusions

[1] It is important to bear in mind the difference between supply networks and wider industrial networks. It is not suggested here that the wider industrial network structure is a result of product architectures.

This paper has discussed how network delegation and intervention strategies have been applied in four product innovation projects. We sought to identify the particular situations in which these strategies may be more likely to occur.

Table 2 summarises the situational factors that emerged from the case study analysis and which appeared to influence the two strategies of delegation and intervention.

**Table 2. Conditions of Network Delegation and Intervention**

| | Delegation Strategy | Intervention Strategy |
|---|---|---|
| Power | Actor requires some network power/influence | Actor requires high degree of network power/influence |
| Supplier Competence Trust | Actor has some competence trust in supplier | Actor has limited competence trust in supplier |
| Product Architecture | Integral or modular product/component architecture | Modular product/component architecture |
| Product or Part Criticality | Product/part critical | Product/part critical |

The findings indicate that the strategies of delegation and intervention may be more likely to be conducted if the focal firm has a high degree of network power and influence, limited trust in the competencies of other actors, modular product architectures, and highly specified products or components. The indication is that such focal actors may seek to exert their control over the network by direct intervention or explicitly delegating, for example, their design specifications and preferences; they may also seek to negotiate directly through such network strategies. If these factors are not present, the findings indicate delegation and intervention strategies are seen as less important to control the innovation process.

As this paper has indicated the focal companies within our case studies were generally at the receiving end of their customers' intervention strategies. There were few examples of the focal companies intervening themselves. As a consequence we believe two tentative managerial implications can be drawn from the findings.

*Understanding the conditions that drive other network actors towards intervention*

The first managerial implication is that a company may be unable to control its own management of product innovation projects because powerful customers, who do not have sufficient competence trust in its ability to manage the innovation processes within its own supplier relationships, are intervening in its choice of, and communication with, its key suppliers. The findings also indicate that a company involved in the development of a critical product or part that has a modular product architecture may be more likely to be subjected to customer network intervention in uniting and communication activities. Conversely, in such situations companies may also wish to intervene themselves in, for example, sub-supplier decisions. Hence, the choices and actions, which individual network actors can take, may be limited in certain circumstances. Consequently they have to cope with the constraints imposed on them by other network actors.

*Coping with customer's network intervention*

The second managerial implication concerns how to cope with situations of excessive customer intervention. One way of doing so may be for companies to establish a more viable network position. For example, they may be able to take more control of the system they offer to become full-systems suppliers. This could involve merging with or acquiring other actors in the network to enable companies to provide a full-system offering. For some companies an

alternative may be to develop strategic relationships with other companies thus taking charge of their own destiny, but without having to make the capital investments which are difficult and risky for many companies. Finally, in extreme cases the development of new customer relationships may be the only solution to limit over-reliance on powerful intervening customers. How to pursue these strategies constitutes an area of future research.

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