Supplier's Sales Engineer as a Knowledge Worker

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Summary
The paper forms part of a multiple case study in progress that focuses on information relationships, i.e., the exchange of information and knowledge at the micro-social level between supplier and buyer firms in the fuzzy front end of product development. The micro-social level is made up of dyadic information relationships between the Design Engineer of buyer firms and the Sales Engineer of supplier firms. The case study explores the information relationship through the lens of three theoretical perspectives, namely: early supplier involvement in product development, knowledge management, and the concepts of social embeddedness and tie strengths belonging to economic sociology. The paper describes the concept of supplier's Sales Engineer as a knowledge worker, and explains how the concept represents a specific type of supplier involvement in early product development. By using the preliminary findings of four case studies, the paper shows how the concept of the Sales Engineer as a knowledge worker has been understood and applied in practice The paper concludes with managerial implications regarding the conditions that need to be in place in order to make the knowledge transfer through the Sales Engineer robust and dependable.

Keywords: Supplier's sales engineer, design engineer, product development, knowledge transfer, social ties.

1. Introduction

The origins of the concept of Sales Engineer as a knowledge worker dates back back to the ethnographic research of Asaf Darr (2002, 2003, 2006). Darr considers the transition from a Sales Engineer to a knowledge worker in the context of the shift from mass production to mass customization. The result of this shift is 'technicization of sales force' (Darr, 2002) and the subsequent blurring of boundaries among design, manufacturing, and sales. The transition has also brought about the growing interdependence between social and technical skills in the work of Sales Engineers (Darr, 2006, p. 5-7).

In mass markets, both buyers and suppliers (manufacturers) knew what the intended application of a product would be. The codified information of the product catalogue was sufficient for the buyer to learn about the product's price and quality. Thus, the distribution of product information was symmetric. The job of the Sales Engineer was just to take care of delivering the right products in the right time and quantity. No technical knowledge and skills were necessary.

With the arrival of mass customization, the application of products has become subject to the evolving needs and wishes of buyers. In other words, the buyer determines and influences the design and manufacturing process. Therefore, the buyer and the supplier/manufacturer

develop the application of products in partnership. The distribution of product information is asymmetric because the buyer may know more about the potential product application than the manufacturer. In order to reverse the asymmetry, and to facilitate the transfer of supplier knowledge to Design Engineers of the buyer firm, the supplier's Sales Engineer, in his function as a knowledge worker, needs to 'extract contextual knowledge from the buyer's Design Engineers through face-to-face interaction' (Darr and Talmud, 2003, p. 448).

In order to be able to transfer the contextual knowledge (i.e., the intended use and function of the product as envisaged by the customer firm) to his firm's manufacturing, the supplier's Sales Engineer must have an in-depth understanding of customer needs, as well as of his firm's capabilities. Research has shown that contextual knowledge is often 'sticky', i.e., difficult to transfer (Von Hippel, 1994), but that 'sticky' knowledge can be transferred through social ties, i.e., social relations (Hansen, 1999; Szulanski, 2002), shared practice (Brown and Duguid, 2001), and cooperation (Emden et al., 2006; Von Hippel, 2006). According to Szulanski (2002), one can partially predict stickiness by analysing the quality of social ties (Granovetter, 1973, 1998; Levin and Cross, 2004; Levin et al., 2006) between the information provider and the information recipient, because social ties act as conduits for knowledge.

Drawing on the preliminary findings from a case study of four high technology manufacturing firms, the present paper explores the role of social relations in the process of information and knowledge exchange at the micro-social level between supplier's Sales Engineers and the buyer's Design Engineers.

The paper opens with a brief literature background of the three theoretical perspectives underlying the multiple case study. Next, it presents the research design, research questions, and data collection. This is followed by a presentation and discussion of the preliminary findings on how the concept of the Sales Engineer as a knowledge worker has been understood and applied in practice. The paper concludes with managerial implications.

2. Literature background

The case study explores the information relationship through the lens of three theoretical perspectives, namely: early supplier involvement in product development (PD), knowledge management, and the concepts of social embeddedness and tie strengths belonging to economic sociology.

2.1 Early supplier involvement in product development (PD)

Research into the potential benefits of supplier involvement in PD spans almost three decades (Johnsen, 2009). The research on supplier integration in PD evolved from studying the quantifiable, tangible, benefits of supplier integration in PD such as improved product quality, reduced costs, speed to market (Monczka et al. 2000; Petersen et al. 2005; Van der Valk and Wynstra, 2005; Parker, Zsidisin, and Ragatz, 2008, Van Echtelt et al. 2008) to studying the intangible benefits such as buyer's access to new manufacturing knowledge, the supplier propensity to innovate, and the need to develop relational competences by both buyers and suppliers (Croom and Batchelor, 1997; Dowlatshahi, 1997, 2000; Koskinen, 2000; Wagner and Johnson, 2004; Schiele, 2006; Song and Thieme, 2009; Liker and Choi, 2004; Wynstra, Von Corswant, and Wetzels, 2010).

The suppliers involved in PD are mostly referred to as preferred, or strategic, suppliers. The supplier classification schemes found in the literature (Ellram 1995; Halley and Nollet, 2002) describe a preferred supplier as a manufacturing firm with which the buying firm has a long-term relationship that is characterized by sharing of information, risks and rewards. The status of preferred supplier is accorded after a selection process which is mostly led by Purchasing through the firm's commodity teams or sourcing committees in which, ideally, the Engineering, Quality Control, and R&D personnel participate. According to Monczka et al.(2000, p. 112) 'commodity team consensus, particularly between engineering and purchasing is a critical part in this process'. Similarly, Fliess and Becker (2006) point out that the interfaces between the buying and supplier firm are typically located in the Engineering department for the technical aspects, and in the Purchasing department for the commercial aspects of the collaboration.

Given the central role that Purchasing plays in the contacts between suppliers and the buyer firm, the literature soon came to regard Purchasing as a function that should assume more strategic responsibilities, and take active part in the firm's overall strategy (Johnson, Leenders, and Fearon, 1998; Pearson, Ellram and Carter, 1996). Castaldi et al. (2012) assign strategic Purchasing the role of a boundary spanner, which links the firm's competitive strategies outside and inside the firm. In the outside competitive strategies, Purchasing centres on supply chain management, finding and screening innovative suppliers (Ellram and Carr, 1994; Kraljic, 1983; Lamming, 1993; Schiele. 2006, 2010; Van Weele, 2010; Wagner and Johnson, 2004), whereas inside the firm, strategic Purchasing participates in PD (Burt and Soukup, 1985, Di Benedetto et al., 2003; Primo and Admundson, 2002; Wynstra et al. 1999, 2000, 2003).

The present study focuses on the contribution of supplier's Sales Engineer to supplier involvement in product development of the buyer firm.

2.2 *Knowledge management*

The Knowledge-based view (KBV) of the firm postulates that knowledge and its development over time are the most strategically important resources of the firm (Leonard-Barton, 1995; Nonaka and Takeuchi, 1995; Grant, 1996). The KBV of the firm emphasizes the role of individual as the primary actor in knowledge creation and the primary depository of knowledge. Davenport and Prusak (1998, p. 5-6) point out that knowledge derives from minds at work. People transform information to knowledge by giving information a meaning. The transformation happens through 'C' words: comparison, consequences, connection, and conversation. Similarly, Bhatt (2001) argues that the conversion between knowledge and information is best accomplished through social actors. Von Krogh and Grand (2002: 173) link knowledge creation to information relationships when they say: "in order to fully understand knowledge creating in the firms, we need to unmask the processes of establishing knowledge-creating relationships as well."

Central to any discussion about knowledge management is the interaction between tacit knowledge (Polanyi, 1966) and explicit knowledge. Research by Bucciarelli (1984, 1994) shows a similar interaction in the work of the design practitioner. The design engineer moves in two worlds: the explicit knowledge of an "object world" (performance specifications, milestone charts, quantitative estimates, etc.) and the tacit knowledge of a "process

world"(narratives, social exchange, etc.). Madhavan and Grover (1998) posit that knowledge management is the central theme in the process of product development, whereby PD team combine disparate tacit knowledge of team members. Von Hippel (2006, p. 104) reminds us that: "physical products are information products during the design stage. Several authors (Nonaka and Takeuchi, 1995; Boisot, 1999; Skyrme, 2001) developed frameworks explaining the process of converting tacit, experience-based knowledge into explicit, codified, knowledge and vice versa. Jasimuddin, Klein, and Connell (2005) argue that the currently prevailing perspective of knowledge categorizing into tacit and explicit should make place for a perspective that regards knowledge type as a graded continuum; they advocate the use of both types in complimentary ways.

Working within this graded continuum of knowledge is the supplier's Sales Engineer. The exchange of information between the Sales Engineer and Purchasing of the buyer firm often involves codified information much of which can be deferred to IT systems. By contrast, the information and knowledge exchange between the supplier's Sales Engineer and Design Engineers of the buyer firm is often tacit, and requires face-to-face communication. Case studies (McEvily and Marcus, 2005) demonstrate that the value-adding properties of supplier information and knowledge are: level of detail, situation specificity, and the availability of hands-on technical assistance in integrating new techniques.

The present study seeks to find evidence for the hands-on technical assistance that the supplier's Sales Engineer.

2.3 Social embeddedness and tie strength

The concept of embeddedness (Granovetter, 1985, Uzzi 1996, 1997) holds that an economic action (i.e., exchange and/or combination of resources) does not take place in isolation but is embedded in the context of on-going interpersonal relations operating through social ties. Relational embeddedness (Granovetter, 1985) is a quality dimension of social ties, and can vary in strength and content. The frequency and intensity of contact (tie strength) between the social actors determine the outcome information search, exchange, or utilization. Granovetter (1973, 1998) specified two types of interpersonal relationships: weak ties and strong ties. Research of Levin and Cross (2004) have identified a third type: the trusted weak tie relationship.

Croom (2001) describes relational capability of the firm as 'formal and informal ties within and between individuals, groups and functions', and argues that while operational capability of the firm is unsustainable (i.e., it can be replicated by the competitors), the relational capability can become a unique source of competitive advantage. Research of Borgatti and Cross (2003) found that information seeking of individuals mirrored the characteristics of the extant relationship between the information seeker and information provider.

The present study seeks to identify the characteristics of information relationship between the supplier's Sales Engineer and the Design Engineers of the buyer firm.

3. Research design

The paper forms part of a multiple case study in progress involving four firms from the

following manufacturing industries: aerospace, automotive, industrial automation, and aeronautical equipment.

The unit of analysis is information relationship at the micro-social level between customer firms and supplier firms at the fuzzy front end of product development, i.e., the initial idea generation stages of product development projects (Smith and Reinertsen, 1992). The micro-social level is made up of members of the firms' three functional areas, namely: Engineering, Purchasing, and Suppliers. Thus, the information relationships take place within the dyads of Suppliers/Engineering, Purchasing/Engineering, and Purchasing/Suppliers. The information relationship pertains to searching, exchanging and utilizing supplier information and knowledge. The present paper only addresses the information relationship within the Suppliers/Engineering dyad, i.e., Sales Engineers and Design Engineers. The focus of the paper lies not so much on the outcome of the information and knowledge exchange as on the conditions for and quality of underlying relationships (after Uzzi, 1997) that make the transfer of supplier information and knowledge dependable and robust.

3.1 Research questions

The literature research resulted in the formulation of two research questions:
RQ1: What constitutes a supplier's Sales Engineer 'a knowledge worker'?
RQ2: What are the conditions under which the Supplier's Sales Engineer as a knowledge worker can be instrumental in integrating his firm's knowledge in the customer's product development?

3.2 Data collection

The study data come from coded and categorized verbatim transcripts of 35 interviews varying in length from 11 to 24 pages, 8 transcripts of field notes, and from company documentation. The coding and categorizing proceeded in three steps (Strauss and Corbin, 1998): open coding resulting in 173 codes, axial coding in which the codes were broken down to 40 categories and sub-categories, and finally, selective coding in which the categories were integrated into three central themes: 'information environment', 'supplier potential', and 'belief'. According to Strauss and Corbin (1998, p. 146), a good test for the validity of central categories is whether and how they explain what the research is about. Strauss and Corbin suggest that by using the central categories it should be possible to capture the essence of research in just one sentence. Thus, at the end of the coding phase of the data analysis, the one sentence (coached in the terms of the central categories), that captures the essence of this case study research might run like this:

> "Beliefs about the potential of suppliers are an underlying factor in the information environment in which supplier and customer firms meet and work together in a product development project"

4. Discussion

Since the within-case analyses and cross-case analysis are still in progress, the findings regarding the two research questions below can only be regarded as preliminary.

4.1 Research question 1

RQ1: What constitutes a supplier's Sales Engineer 'a knowledge worker'?

As the job title indicates, the Sales Engineer represents the supplier's interests on two fronts: Sales and Engineering. Which part of the job gets an upper hand depends on the kind of relationship orientation that the supplier firm adopts towards its customers. Basically, the firm can adopt two orientations towards customers. It may have a sales (arm's length) orientation, which means that the supplier firm has as its chief objective to achieve high sales quota. Alternatively, the firm may adopt a relational orientation, which means that the supplier firm provides support to customers in solving product design and manufacturing problems.

The interviews with eleven supplier's Sales Engineers and their Managers have revealed that Sales Engineers of supplier firms with a relational orientation enjoy a considerable autonomy of action. 'Pioneering'- is the way one Sales Engineer describes his work style: establishing and developing contacts with the Engineers of the customer's firms. The performance evaluation of Sales Engineers from supplier firms with a sales orientation focuses on the number of visits to the customer per year, and on the attainment of annual sales quota. By contrast, what counts in the evaluation of Sales Engineers working for a supplier firm with a relational orientation is the degree to which the Sales Engineer has personally participated in co-designing, or customising the customer's products. When supplier's Sales Engineer is involved in co-designing or customising of customer's products, he adopts the work style of a knowledge worker; he acts as an intermediary between his firm and the Engineers of the customer firm. Since the Sales Engineer is familiar with the engineering practices of both firms, he is in a position to access the knowledge of R&D labs of his firm, and transfer and relate this knowledge to the customer's needs. In other words, he can make 'sticky knowledge'(Von Hippel, 1994) unstuck. Interestingly, none of the Sales Engineers interviewed used the term 'knowledge worker'. Instead, they talked about a 'new style' of Sales Engineer: someone who represents his firm in the broadest possible sense, not just through products, but also through expertise by "talking the same language" as the Engineers. What has transpired from the interviews with Sales Engineers and their Managers is that in their view, trust is as a precondition to any information relationship. Or, as one Sales Engineer put it: "How can I help the Engineers if they are not prepared to disclose what the problem is?"

In the terminology of Darr (2006), the Sales Engineers become "frontline workers" when they co-develop products with the customers. The co-development may take the form of prototype testing, or helping revise drawings. Darr (2006, p. 8) contends that in such situations, the Sales Engineers represents a form of 'a quasi-vertical integration by building and maintaining ephermal, yet intensive cross-firm expert ties.'

4.2 Research question 2

RQ2: What are the conditions under which the Supplier's Sales Engineer as a knowledge worker can be instrumental in integrating his firm's knowledge in the customer's product development?

A Supply Sales Manager offers his perspective on the 'new style 'Sales Engineers, when he warns against the policy to appraise customers solely according to the firm size. By

neglecting customers who are currently small in terms of turnover, but who in time may grow big, the supplier firm may be passing up an important customer. The Supply Manager divides the customers according to their needs, not according to the industrial segment they come from. In his view, a mass manufacturer has different needs than a series manufacturer. The requirements of the mass manufacturer revolve round spare parts, whereas the requirements of the series manufacturer (of customized products) revolve round specific problems for which the supplier may be able to provide a solution. Thus, in order to serve the different needs of these two customer groups (both of which cut right across the traditional industrial segments), the Supply Manager assigns a different type of Sales Engineers to each group. The selection criterion for assigning a particular Sales Engineer to a customer group is whether the social skills and technical competencies of the Sales Engineer match the needs of the customer. New Sales Engineers get the following counsel: "The first two years you call the customer, after two years they should be calling you."

A Director of the buyer firm, who is a product designer himself and who owns several patents on his name, describes his relationship with the supplier's Sales Engineer as follows: "He is a bridge for us. We can talk with him about our problems, and he knows which products of his firm are suitable for us. He helps us combine the products in order to find a solution. If the products are not there, then we have to do our own designs." To which the Sales Engineer responds: "My task is to advise on technical and engineering matters. There are always similarities among machines, or past solutions that one can use."

A Sales Engineer from another firm underlines the importance of knowing the 'right' people within his company: "That I know where to go for certain knowledge. And that they know that when I contact them that it is important and urgent. (They know) that I don't come back twice with the same question, that I try to increase my knowledge."

The degree to which the concept of Sales Engineer as a knowledge worker has been accepted varies not only among the four firms, but within each firm as well. The conflict between the sales perspective and knowledge perspective of the Sales Engineer's work comes to the forefront, for example, when a firm tries to innovate through new applications for standard product components. The delivery of standard component parts is a routine matter, and therefore the Engineers associate the role of Sales Engineers with sales. However, the situation changes when the Engineers look for a new application of the well-tried component parts. Can they trust the Sales Engineer (and his firm)? Does the Sales Engineer have the necessary knowledge and contacts? Will not the supplier involvement in product development put the authority of the Engineers in jeopardy?

The present study has found that when the Sales Engineer acts as a knowledge worker (i.e., his firm has adopted a relational orientation towards customers), the question of sales takes a temporary second place to assisting customers in problem solving. One Sales Engineer describes the quandary of Sales Engineers as follows: "Of course, at the end we want to sell our products. But at the same time our technology team tries to orient the mind of each team member to the needs of the market, to find technical solutions ".

Another finding of the study is that, over time, personal ties become just as important as straight product data, as the following comment illustrates. After a technical meeting with a Sales Engineer and his team, a Design Engineer remarked: "Sometime you want to share a

lunch with the Sales Engineer so as to get a feeling that the cooperation with the supplier firm is going to work out well. Having data is not everything."

5. Managerial implications

A recurring theme which runs through the data of the present case study is the interplay between trust and competence that supplier and buyer firms attribute to each other. In this respect, the information relationships play a critical role as a playing field in which the two parties can put their beliefs about each other to the test. The contacts between supplier's Sales Engineers and the customer's firm may begin as informal but can progress quickly to become a chief channel for knowledge exchange. This is especially the case when the supplier's Sales Engineer adopts the role of a knowledge worker whereby he develops a close working relationship with the Engineers of the customer firm who accept (trust) him as a sparring partner in knowledge transfer. The preliminary findings suggest that when it comes to spanning the boundaries of (tacit) knowledge between supplier and buyer firms, then, the supplier's Sales Engineer, in his role as a knowledge worker (Darr 2002; 2003; 2006), is more of a boundary spanner than Purchasing staff (Castaldi et al., 2012; Schiele, 2006, 2010).

Management of buyer firms should be aware that at the micro-social level there are two separate information and knowledge streams between their firm and the supplier firms: one between Purchasing and supplier's Sales Engineers, and another between Design Engineers and supplier's Sales Engineers. The next realization that Management should come to is that the interests of Design Engineers and Purchasing may not always converge. A Chief Design Engineer puts it so: "Purchasing wants large volumes, standardized product parts, more of the same. And that's understandable because of the discounts they can negotiate with suppliers. But that does not mean that such criteria always meet the needs of the Engineers. For example, having interchangeable product parts may lead to mistakes in assembly". The fact that the supplier selection decisions are taken jointly by Purchasing and Engineering give inevitably rise to debate. The Purchasing may accuse the Engineers of being blinded by the latest technology 'gadgets', and for having little regard for the costs involved. In return, the Engineers may point out that the costs of components will be more than offset by the ease of assembly during production. A Project Management Engineer sums up the debate thus: "It's always a fight between Engineering and Purchasing. How far do we want to go with the new technology? And how much do we want to pay for it?" The present study also found that technical educational background of Purchasing staff was conducive to dialogue between the two functions, and made the knowledge transfer through the Sales Engineer less of an issue.

References

Bhatt, G. D., 2001. Knowledge management in organizations: examining the interaction between technologies, techniques, and people. Journal of Knowledge Management 5 (1), 68-75.

Boisot, M. H., 1999. Knowledge Assets: Securing Competitive Advantage in the Information Economy. Oxford University Press, Oxford, UK.

Borgatti, S. P., Cross, R., 2003. A relational view of information seeking and learning in social networks. Management Science 49 (4), 432-445.

Brown, J.S., Duguid, P., 2001. Knowledge and organization: a social-practice perspective. Organization Science 12 (3), 198-213.
Bucciarelli, L. L., 1984. Reflective practice in engineering design. Design Studies 5(3), 185-190.
Bucciarelli, L. L., 1994. Designing Engineers. MIT Press, Cambridge, MA.
Burt, D. N., Soukup, W. R., 1985. Purchasing's role in new product development. Harvard Business Review 63 (September-October), 90-97.
Castaldi, C., Ten Kate, C., Den Braber, R., 2012. Strategic purchasing and innovation: a relational view. Technology Analysis & Strategic Management 23 (9), 983-1000.
Croom, S. R., 2001. The dyadic capabilities concept: examining the processes of key supplier involvement in collaborative product development. European Journal of Purchasing & Supply Management 7(1), 1-29.
Croom, S., Batchelor, J., 1997. The development of strategic capabilities – an interaction view. Integrated Manufacturing Systems 8 (5), 299-312.
Darr, A., 2002. The technicization of sales work: an ethnographic study in the US electronics industry. Work, Employment & Society 16 (1), 47-65.
Darr, A., 2003. Control and autonomy among knowledge workers in sales: an employee perspective. Employee Relations 25 (1), 31-41.
Darr, A., 2006. Selling Technology: The Changing Shapes of Sales in an Information Economy. Cornell University Press, Ithaca, NY.
Darr, A.,Talmud, I., 2003. The structure of knowledge and seller-buyer networks in markets for emergent technologies. Organization Studies 24 (3), 443-461.
Davenport, T. H., Prusak, L., 1998. Working Knowledge: How Organizations Manage What They Know. Harvard Business School, Boston, MA.
Di Benedetto, C. A., Calantone, R., Van Allen, E., Montoya-Weiss, M. M., 2003. Purchasing joins the NPD team. Research.Technology Management 46 (4), 45-51.
Dowlatshahi, S., 1997. The role of product design in designer-buyer-supplier interface. Production Planning & Control 8 (6), 522-532.
Dowlatshahi, S., 2000. Designer-buyer-supplier interface: theory versus practice. International Journal of Production Economics 63 (1), 111-130.
Emden. Z., Calantone, J., Froge, C., 2006. Collaborating for new product development: selecting the partner with maximum potential to create value. Journal of Product Innovation Management 23 (4), 3330-341.
Ellram, L. M., Carr, A., 1994. Strategic purchasing: a history and review of the literature. International Journal of Purchasing and Materials 30 (2), 10-19.
Ellram, L. M., 1995. Partnering pitfalls and success factors. Journal of Supply Chain Management 31(2), 35-44.
Fliess, S., Becker, U., 2006. Supplier integration – controlling of co-development processes. Industrial Marketing Management 15(1), 28-44.
Granovetter, M. S., 1973. The strength of weak ties. American Journal of Sociology 78(6), 1360-1380.
Granovetter, M.S., 1998. The strength of weak ties: a network theory revisited. In: Peter V. Marsden, N. Lin, (Eds.). Social Structure and Network Analysis. Sage, Beverly Hills, CA, p. 105-130.
Granovetter, M. S., 1985. Economic action and social structure. The problem of embeddedness. American Journal of Sociology 91, 481-510.
Grant, R. M., 1996. Towards a knowledge-based theory of the firm. Strategic Management Journal 17 (Special Winter Issue), 109-122.
Halley, A., Nollet, J., 2002. The supply chain: the weak link for some preferred suppliers? The Journal of Supply Chain Management 38(3), 39-47.

Hansen, M.T., 1999. The search-transfer problem: the role of weak ties in sharing knowledge across organization subunits. Administrative Science Quarterly 44 (March), 82-111.
Jasimuddin, S.M., Klein, J.H., Connell, C. (2005). The paradox of using tacit and explicit knowledge: strategies to face dilemmas. Management Decision 43 (1), 102-112.
Johnsen, T. E., 2009. Supplier involvement in new product development and innovation: taking stock and looking to the future. Journal of Purchasing & Supply Management 15 (3), 187-197.
Johnson, P. F., Leenders, M. R., Fearon, H.E., 1998. Evolving roles and responsibilities of purchasing organizations. International Journal of Purchasing and Materials Management 34 (1), 2-11.
Koskinen, K. U., 2000. Tacit knowledge as a promoter of project success. European Journal of Purchasing & Supply Management 6(1), 41-47.
Kraljic, P., 1983. Purchasing must become supply management. Harvard Business Review 61 (5), 109-117.
Lamming, R., 1993. Beyond Partnerships: Strategies for Innovation and Lean Supply. Prentice Hall, London.
Leonard-Barton, D., 1995. Wellsprings of Knowledge: Building and Sustaining Sources of Innovation. Harvard Business School Press, Boston, MA.
Levin, D. Z., Cross, R., 2004.The strength of weak ties you can trust: the mediating role of trust in effective knowledge transfer. Management Science 50 (11), 1477-1490.
Levin, D.Z., Whitener. E.M., Cross, R., 2006. Perceived trustworthiness of knowledge sources: the moderating impact of relationship length. Journal of Applied Psychology 91 (5), 1163-1171.
Liker, J. K., Choi, T. Y., 2004. Building deep supplier relationships. Harvard Business Review 82(10), 102-112.
Madhavan, R., Grover, R., 1998. From embedded knowledge to embodied knowledge: new product development as knowledge management. Journal of Marketing 62 (October), 1-12.
McEvily, B., Marcus, A., 2005. Embedded ties and the acquisition of competitive capabilities. Strategic Management Journal 26 (March), 1033-1055.
Monczka, R. M., Handfield, R.B., Scannell, T. V., Ragatz, G. L., Frayer, D. J., 2000. New Product Development: Strategies for Supplier Integration. ASQ Press, Milwaukee, WI.
Nonaka, I., Takeuchi, H., 1995. The Knowledge Creating Company: How Japanese Companies Create the Dynamics of Innovation. Oxford University Press, Oxford, UK.
Parker, D. B., Zsidisin, G. A., Ragatz, G. L., 2008. Timing and extent of supplier integration in new product development: a contingency approach. Journal of Supply chain Management 44 (1), 71-83.
Pearson, J.N., Ellram, L.M., Carter, C. R., 1996. Status and recognition of the purchasing function in the electronics industry. International Journal of Purchasing and Materials Management 32 (2), 30-36.
Petersen, K. J., Handfield, R. B., Ragatz, G. L., 2005. Supplier Integration into New Product Development: Coordinating Product, Process, and Supply Chain Design. Journal of Operations Management 23 (3-4), 371-388.
Polanyi, M., 1966. Tacit Dimension. Doubleday, New York, NY.
Primo, M. A. M., Amundson, S. D., 2002. An exploratory study of the effects of supplier relationships on new product development outcomes. Journal of Operations Management 20 (1), 33-52.
Schiele, H., 2006. How to distinguish innovative suppliers? Identifying innovative suppliers as new task for purchasing. Industrial Marketing Management 35(8), 925-935.
Schiele, H., 2010. Early supplier integration: the dual role of purchasing in new product development. R&D Management 40 (2), 138-153.
Skyrme, D.J., 2001. Capitalizing on Knowledge: From E-Business to K-Business. Butterworth Heinemann, Oxford, UK.

Smith, P. G., Reinertsen, D. G.,1992. Shortening the product development cycle. Research.Technology Management 35 (3), 44-49.
Song, M., Thieme, J., 2009. The role of suppliers in market intelligence gathering for radical and incremental innovation. Journal of Product Innovation Management 26 (1), 43-57.
Strauss, A., Corbin, J. 1998. Basics of Qualitative Research: Techniques for Developing Grounded Theory. Second edition. Sage, Thousand Oaks, CA.
Szulanski, G., 2002. Sticky Knowledge: Barriers to Knowing in the Firm. Sage, Thousand Oaks, CA.
Uzzi, B., 1996. The sources and consequences of embeddedness for the economic performance of organizations: the network effect. American Sociological Review, 61 (4), 674-698.
Uzzi, B., 1997. Social structure and competition in interfirm networks: the paradox of embeddedness. Administrative Science Quarterly 42 (1), 35-67.
Van der Valk, W., Wynstra, F., 2005. Supplier involvement in new product development in the food industry. Industrial Marketing Management 34 (7), 681-694.
Van Echtelt, F. E.A., Wynstra, F., Van Weele, A., Duysters, G., 2008. Managing supplier involvement in new product development: a multiple case study. Journal of Product Innovation Management 25 (2), 180-201.
Van Weele, A., 2010. Purchasing and Supply Chain Management, Fifth Edition. Cengage Learning (formerly Thompson Learning), London.
Von Krogh, G., Grand, S., 2002. From economic theory toward a knowledge-based theory of the firm: conceptual building blocks. In: C.W. Choo, N. Bentis (Eds.). The Strategic Management of Intellectual Capital and Organizational Knowledge. Oxford University Press, Oxford, UK. p. 163-184.
Von Hippel, E., 1994. 'Sticky information' and the locus of problem solving: implications for innovation. Management Science 40 (4), 429-439.
Von Hippel, E., 2006. Democratizing Innovation. MIT Press, Cambridge, MA.
Wagner, S. M., Johnson, J. L., 2004. Configuring and managing strategic supplier portfolios. Industrial Marketing Management 33(8) 717-730.
Wynstra, F., Van Weele, A., Axelsson, B., 1999. Purchasing involvement in product development: a framework. European Journal of Purchasing & Supply Management 5(3-4), 129-141.
Wynstra, F., Axelsson, B., Van Weele, A., 2000. Driving and enabling factors for purchasing involvement in product development. European Journal of Purchasing & Supply Management 6(2), 129-141.
Wynstra, F., Weggeman, M., Van Weele, A., 2003. Exploring purchasing integration in product development. Industrial Marketing Management 32 (1), 69-83.
Wynstra, F., von Corswant, F., Wetzels, M., 2010. In chains? An empirical study of antecedents of supplier product development activity in the automotive industry. Journal of Product Innovation Management 27 (5), 625-639.