

Capabilities for Global New Product Development  
The Role of Networks and Social Capital

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## CAPABILITIES FOR GLOBAL NEW PRODUCT DEVELOPMENT: THE ROLE OF NETWORKS AND SOCIAL CAPITAL

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### ABSTRACT

Our results show that an important capability for effective knowledge transfer in global new product development is the ability to construct a network of relationships that are built over time, that lead to the creation of social capital, and that are strong and extensive enough to inhibit duplication by others.

### INTRODUCTION

Effectively managing global new product development (NPD) is critically important to an organization's ability to grow and remain profitable. Unfortunately, as knowledge becomes increasingly dispersed among individuals scattered across the globe, companies are finding it more and more difficult to tap into that knowledge and effectively employ it in the development of their global new products. Unless companies learn how to manage global NPD effectively, they are almost certain to find themselves at a competitive disadvantage.

Managing NPD globally involves the creation and transfer of knowledge between individuals and organizations that are geographically dispersed and culturally diverse. Much of the research on global NPD has focused on global teams and their use of information technologies to enable communication among team members (Ciborra 1993; Hankanson & Zander 1988; Schnaidt 1992). These studies found that information technologies such as postal mail, teleconferencing, and individual phone calls were useful in facilitating communication across groups and between employees located at dispersed geographical locations (Ciborra 1993; Hankanson & Zander 1988; Schnaidt 1992).

McDonough and Kahn (1996) investigated the use of both information technologies and "soft technologies" and their impact on global team performance. Soft technologies reflect managerial behaviors that are necessary to deal with the social and behavioral aspects of global new product development. These soft technologies include actions taken by managers to promote such behaviors as communication, commitment, and trust among members of global teams. Based on interviews with the new product manager in eight companies, they found that effective global new product development is a function of the application of both hard and soft technologies. Specifically, they found that the frequency with which hard technologies were used was greater in higher performing global teams than it was for lower performers and that the set of hard technologies perceived to be important was different for higher versus lower performing global teams. They also found that higher performing global teams did a better job of employing soft technologies and that soft technologies were seen as more important than hard technologies.

Other research has found that a key problem in global teams is managing a global team's need for rich information, large volumes of information, and quick transmission of information (McDonough, Kahn & Griffin 1999). While there are a variety of mechanisms that can be used to manage these needs, e.g., teleconferencing, videoconferencing, email, phones, and faxes, it was found that some are more effective than others. Specifically, it was found that higher performing global teams used an "affiliated set" of communication mechanisms (rather than any one mechanism) to a significantly greater extent than did lower performing teams.

While important, this research leaves unanswered the larger question of how companies manage the process of developing global new products. Inherent in this process is the development of capabilities (Leonard-Barton 1992; Christensen & Overdorf 2000) that allow for the effective management of information and knowledge to enable the development of successful global new products. While the successful creation and transfer of knowledge in the new product development process is not well understood, prior research suggests that it will play a key role in the global NPD process (Cohen and Levinthal 1990; Nonaka and Takeuchi 1995; Subramaniam and Venkatraman). The purpose of this research is to begin to identify the capabilities that are needed for effective knowledge transfer in global NPD and to determine how those capabilities are developed within organizations.

## METHODOLOGY

We used a grounded theory methodology, via intensive case studies of two corporations, to develop insights into our research objective, to take initial steps to build theory in this area, and to develop propositions for future testing. With one exception, data were gathered via face-to-face, semi-structured in-depth interviews with a number of individuals in each corporation. These interviews were conducted on site at the headquarters of the two companies (both based in the U.S.), their subsidiaries (both are in Europe, albeit in different countries), and in one company, at a complementor<sup>1</sup> (based in England) and a customer (based in U.S.). Thus, data collection involved traveling to overseas locations as well as multiple locations in the U.S. These interviews lasted an average of 1- 1.5 hours. Some respondents were interviewed multiple times due to their critical role in the company and/or the project. A total of 56 interviews (48 individuals) were conducted in the two companies.

Semi-structured interviews were used because they allow for flexible questioning, the explanation of questions that are unclear, and probing to help respondents provide complete information. Interviews were conducted over an 18-month time frame by four faculty researchers. Based on accepted grounded theory methodology (Stake 1995), each interview was conducted using a protocol that specified a common set of open-ended questions. These questions stemmed from our review of the literature, interviews with three experts in the field, and interviews with senior executives in other firms engaged in global NPD. Interview questions asked about the background of each company, roles of individuals, relationships, capabilities, methods of communicating and sharing information, and the organization culture. As the

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<sup>1</sup> We use the term complementor here because this company was not just a supplier of technology to the company being studied (HGO), but also worked very closely with HGO to develop and integrate the complementor's technology into the new product.

interviews proceeded, follow-on questions were asked to pursue other relevant issues that arose during the course of each interview.

During the data collection process each interview was recorded and subsequently transcribed. A multi-step procedure was then employed to analyze the interview data that were collected. These transcripts were content analyzed to identify general patterns in the data using an iterative process consisting of multiple readings of the interviews by several of the co-authors. Co-authors would assemble frequently to share their impressions and perspectives. The goal of this process was to achieve convergence around a set of themes that emerged from the data. Not all aspects of the interview and the data that resulted from the interviews were given equal emphasis in this process, nor were they of equal importance (Stake 1995). From this analysis, we were able to refine our thinking about the key themes that impact on global new product development success.

In addition to the interviews, we also reviewed secondary data sources and company and public documents for each organization. Following preliminary analysis, we provided feedback to individuals at multiple levels within each organization through dialogue sessions that involved many of the individuals interviewed at that location, as well as other company personnel. These on-site feedback sessions were interactive and allowed us to reach a deeper understanding of the issues involved.

### Company Backgrounds

MM is an 84 year old, \$1 billion corporation in a technology intensive industry. In spite of the competitive nature of the industry in which it operates, MM is a conservative, risk-averse company that moves cautiously and incrementally. Yet, it has had a record of 15-20% growth throughout its history and was not profitable only once, in 1932. Recently, however, MM had found that maintaining this level of growth was becoming increasingly difficult. At the same time, many of their customers began to go global. As a result the company felt pressured to also go global in order to continue to satisfy their customers' demands. While the initial steps taken by MM satisfied their customers and sustained growth, it wasn't until they acquired a European company (in 1993) that they were able to penetrate the European market to a significant degree with the development of global new products.

Over a period of five months, from September 2000 until January 2001, we made several visits to MM's headquarters and interviewed senior managers including the CEO, VP of Technology, general managers and division heads, functional managers (i.e. Purchasing, Manufacturing), project leaders, and NPD project team members. As well, we visited their European operation and interviewed the head of that organization as well as several division heads. In all, we conducted 30 interviews with individuals from MM.

In many respects, the situation at HGO was similar to a start-up situation. In 1993, several senior managers in the U.S. were looking for a way to get high performance computing started within ASC, a multi-billion company in the computer industry. By doing so, they could help to create a target market for one of their key technologies. At this same time, however, the company started to come under severe budget pressure as a result of the downsizing and consolidation that was

occurring in the company. Any obvious attempt to create a new organization, build capabilities, and develop and deliver new products, would almost certainly fall victim to severe budgetary constraints. These managers chose instead to hide the high performance computing effort where it would go virtually unnoticed - in Europe.

Despite being anointed as the company's high performance computing group, HGO had no corporate mandate, budget or specific expertise to enter the high performance computing arena. Their work had to be funded by culling resources from approved projects and their costs had to be kept sufficiently low to avoid corporate attention. Despite these meager resources, however, HGO was able to hire personnel, and in the space of six months, had put together a core team of 15 people who were "pretty competent with some relative experience."

Over a period of eighteen months, from December 2000 until April 2002, we interviewed the head of HGO, project team leaders, project team members, senior managers, the general manager and team members of the complementor organization, and a customer. These interviews took place in multiple locations in the U.S. and abroad. In all, we conducted 26 interviews with individuals from HGO.

## RESULTS

One of the keys to MM's success was the development of a core capability of building and using interpersonal networks, both internal and external, to share information and knowledge for the development of new products. For example, at the U.S. headquarters, members of the NPD group were co-located in one area of the building in adjoining cubicles. Meeting spaces were created in the middle of this work area by placing semi-circular tables at the end of every other cubicle. This arrangement made it easier for members of the group who were working on different projects to talk with each other about what they were working on and provided multiple opportunities for interacting with each other.

When a new person came into the NPD group, others in the group, some of whom had been with the company for 20 years or more could always tell them who to talk to within the organization regarding a specific issue or problem. In this way, the more tenured members of the group introduced their pre-existing networks to others that expanded the network as well as helped the new person create their own internal network.

MM also had experience and expertise in building and using external networks for information gathering and sharing. In regard to new product development, MM used a variety of sources for identifying new technological and market opportunities. For example, the R&D group at MM monitored the external environment (competition, legal, environmental, social/cultural, technological) to identify trends that might impact them in the future. They consulted with academics at universities and were partners in several consortia developing new technologies. They hired an industry consultant who came in twice a year to share his expertise on industry trends and developments with them. They also attended trade shows, made presentations at conferences and at customer sites to gather insights into future needs and requirements. The divisions relied on their networks of customers, competition and divisional employees such as salespeople and engineers to identify new product opportunities.

When MM initially acquired the European organization, they found that this core capability of building and using interpersonal networks, particularly amongst company employees, was woefully lacking. In fact, working relationships among employees was described as “toxic”. To overcome these poor working relationships, perhaps the first, and most important step taken was to create a culture that mirrored the parent corporation’s culture.

This cultural change was achieved slowly, over a period of time through a number of actions. One action was to replace some of the managers of the European organization with MM employees. As well, other employees were replaced with individuals who had functional and more importantly, interpersonal skills that MM valued. Over time, some of the MM managers were replaced with individuals from the European home country but care was taken to ensure that they believed in the values of openness that MM espoused.

Another tactic used to build interpersonal networks was to have frequent, face-to-face meetings between individuals in the U.S. and the European operation. Initially, these meetings occurred at the senior and middle manager level, and these still occur several times per year. However, as NPD personnel from both locations started to work on projects together, it became evident that project team members also needed, at times, to meet face-to-face. These face-to-face meetings were important for team members as most only knew the people in their own country and had never met the individuals from the other country.

These face-to-face meetings were important in breaking down cultural and language barriers and helped team members and managers to get to know each other personally as well as professionally. On these visits, time was always taken to socialize with the visitors and show them around the area. These meetings also made it easier and more comfortable for individuals, particularly team members, to willingly contact team members in the other country via e-mail, phone, and occasionally, video-conferencing.

As team members from each location started working together more on NPD projects, senior management initiated personnel swaps between the two organizations. The length of each swap varied but typically, employees would move to the other location for about 6 months. This tactic not only enhanced interpersonal relationships but also enabled each location to learn more about the other and how it operates.

Recently, to improve interpersonal networking in the European organization, MM created a new facility to house all non-plant personnel who had previously been in two separate locations. Employees and managers from both European locations were intimately involved in organizing the space of the new building as well as creating a culture that would imitate the friendly and open environment of MM.

All of these actions enhanced interaction between the U.S. and the European organization and allowed individuals to amass social capital in the form of trust, norms and networks. The flow of information was facilitated across individuals when they engaged in interpersonal interactions and used their networks to get the information they needed. Interactions and networking, in turn, worked effectively because of the social capital that was built up between employees. Inherent in social capital is the expectation on the part of an individual that the help they give someone today will be returned “tomorrow.” Thus, social capital was an important means of building trust

among employees of MM on both sides of the pond. The networks that developed among managers and members of the NPD group, the social capital, and the trust that built up, fostered cooperation and collaboration among the two locations.

There are several lessons to be learned from this case study. First, we found that building and using interpersonal networks, both internal and external, are critical to sharing information and knowledge particularly when developing new products. Second, this information sharing is even more critical when you have team members who are geographically dispersed and culturally diverse. Third, creating interpersonal networks takes a long time, years in fact, because leaders can only encourage networking by facilitating the process and modeling correct behaviors. Overall, our results highlight that building and using interpersonal networks for global NPD is important because of the social capital that is embedded in these relationships. Social capital can be defined as the set of assets that are accumulated in the networks of relationships individuals have with others that can be used for a specific purpose (Nahapiet and Ghoshal 1998). As social capital is accumulated, so is knowledge about technologies and customers.

Based on our learning from MM company, we decided to explore, in more depth, how individuals build networks and social capital. For this purpose, we undertook an even more intensive case study of HGO.

In Phase 1 of HGO's life cycle, the network itself consisted of few members, relatively little social capital had been built between network members, and the knowledge that was being transferred was explicit. Explicit knowledge is information and skills that are easily communicated, documented and conveyed to others (Johannessen, Olaison, and Olson 2000).

To begin the project, HGO hired individuals with different backgrounds and broad experience yet also with strong technical skills. This provided a “common context” for team members and, along with continual face-to-face interaction, resulted in a high level of trust between team members, which in turn built up stocks of social capital among them. HGO also hired individuals who were former employees of companies that were potential customers for the products that HGO thought it might develop.

These individuals also viewed new ideas as interesting and problems as challenges and they enjoyed working on interesting problems with the other members on the team. As they interacted with each other to share information and ideas, they built up relationships and social capital with each other. Resulting from this continual interaction was a familiar and safe environment in which team members generated, shared, and listened to the ideas of others.

Steps were also taken by HGO's senior manager to develop relationships with engineers in the U.S. corporation. Exposing team members to different perspectives and to people who viewed the same problems through a different lens was an effective means of generating lots of ideas as well. Thus the network expanded as HGO team members interacted with other members of the ASC US corporation.

The network expanded further as HGO conducted benchmarking for customers. Customers in this business require “benchmarking” tests before purchase so that they can evaluate the performance of products in their particular environment and for their specific task.

Through this benchmarking activity, customers described their needs, so the organization could begin to understand them. In this way knowledge about customers' needs and problems was transferred to HGO. Because HGO was providing a valuable service at no charge, social capital was built up between the customers and HGO engineers. At the same time, this benchmarking activity helped the HGO team to learn about and narrow the technological issues that needed to be considered in the development of new products. Benchmarking was also a way of building relationships within corporate.

In sum, a series of quite deliberate steps were taken by HGO to build social capital. For example, whenever individuals who did not know each other were going to begin to work together an initial face-to-face meeting was set up. These face-to-face meetings served to establish a common context and to build trust - a fundamental prerequisite to building successful network relationships. In addition, social capital was maintained because team members kept in close touch through e-mails and telephone thereby ensuring frequent and continual communication.

In general, though, building social capital was made difficult as a consequence of HGO being separated from corporate headquarters, and the existing technology resources, by an ocean. To overcome this difficulty, relationships were developed through selected individual travel and working together on challenging tasks. "In the end, it came down to time spent with people. You just need to spend a lot of time, one-on-one in the same place, working with them." These face-to-face contacts, along with providing value to the engineering group in the US, increased HGO team members' stock of social capital.

In Phase 2 of HGO's existence, they began to experience corporate pressure to generate tangible results and to generate them quickly. There was an increasingly pressing need to develop products and to generate a revenue stream. Developing HGO's reputation with external customers as well as internal constituents in the US corporation was also becoming a necessity in order to not only attract orders, but also to continue to receive corporate support - however modest it might be!

HGO expanded the existing network even further to include links with other groups in the corporation who were needed to deliver the product to customers, with lead customers who could help define and identify a winning product, and with vendors who had the technological capabilities that HGO lacked.

The network was enhanced by the addition to HGO of 1) a technical director from elsewhere in the corporation, and 2) an executive who not only believed in HGO's value but also brought with him three decades of experience in the corporation. Both individuals brought both extensive tacit knowledge<sup>2</sup> of how to leverage important resources in the corporation, and market savvy and each had brought with them networks that had been built up over decades within the corporation. These networks were so extensive that when a lead customer approached someone else in the corporation, these individuals were contacted immediately. As well, there was sufficient social capital in their networks to allow them to gain personal access to that customer.

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<sup>2</sup> Tacit knowledge is personal knowledge in people's heads that has not been written down or documented. It is gained largely through experience and requires joint, shared activities in order to transmit it (Johannessen, et.al.)

As a consequence of the addition of these individuals, HGO was able to expand its network to include lead users, i.e., customers who needed products containing the very latest technological advances. HGO was able to build tight links with these lead customers through intensive face-to-face interaction with multiple individuals within each organization. They were maintained by frequent travel for face-to-face meetings with selected individuals, and by frequent telephone calls, conference calls and a flood of e-mail. The frequency and intensity of contact with the lead customers was, naturally, lower than that within the core team. But this contact led to the development of a commitment by the core team to the customer and product and to a culture of "heroic success," in which engineers worked ferociously hard to meet deadlines and specifications that had been previously developed within the core team. It is clear however, that these tight links would not have developed if HGO's engineers had not been perceived as being technically capable. Thus, the development of technological competence that occurred in Phase 1 was an important prerequisite to expanding the network in Phase 2 and technical expertise remained important in building social capital. The result of the development of these relationships was an invitation to bid on an upcoming project, and further, an offer to provide the funding to support the product development effort.

The value of an individual's pre-existing network is demonstrated in the instance where one of HGO's lead customers introduced HGO to another company with technology that was critical to the development of these radically new products. In effect, this lead customer brokered a partnership, based on its own established network of relationships, which provided competitive advantage to the organization. This relationship provided HGO with an important technology that, on its own, it would have been unable to develop.

In addition to the above actions, team members and the complementor were co-located as were team members and the customer at particular periods of time. However, these individuals were co-located only to do "real work" on the project thereby developing social capital specific to the task.

In order to maintain social capital, team members kept in very close contact with customers and complementors through emails and phone calls. In addition, relationships were kept "fresh" with the complementor through regular meetings (every 6 months or so). Thus, in Phase 2, HGO's network had expanded to become more dense, tacit knowledge was being shared, and lots of social capital was built.

In Phase Three, the goal of HGO shifted to making profit by manufacturing and selling standardized products. To accomplish this goal required that the network bifurcate with one part of the network composed of the core team, the complementor, Lighthouse accounts, and a few individuals within HGO US. This "original" network remained quite dense with lots of social capital among network members. It also retained a strong focus on innovation. The newer part of the network was composed primarily of individuals from manufacturing, sales, and service from ASC US, as well as customers. Here network members were loosely coupled with little - and little need for - social capital. It was in this part of the network that the routine work of the organization was conducted. Machines were manufactured in volume to a well-known set of specifications and were sold to customers who were not interested in the leading edge technologies as much as they were in machines that were dependable and affordable.

In summary, HGO's experience suggests that much of the work of global new product development relies on informal, interpersonal, frequently face-to-face interaction among pairs or

small groups of individuals. Through this interaction, networks of relationships are built. The process of building networks, however, is not amenable to deliberate implementation planning, and it benefits from serendipity. But building the "right" network with the right people, and creating a dynamic, informal network provided an important way for HGO to create a competitive advantage. The relationships that form the basis of a network take time to build because they are personal and require face-to-face interaction and because they are built through others. However, as we found, it is possible for a manager to speed up the development of a network and it is possible to take actions that will facilitate the development of the "right" network.

## CONCLUSIONS

Our learning from these two intensive case studies shows that a critical factor for global new product development success for both companies was their ability to build a network of relationships that provided them with competitive advantage. In both organizations,

- The network was built over time (ie.years).
- Individuals who were brought into the network had networks of their own, some of which had been developed over many years.
- Within the networks, a tremendous amount of social capital was built over time between individuals.
- The culture contributed to the creation, use, and maintenance of interpersonal networks.
- The length of time needed to build the network, the strength of the relationships in it, and its extensiveness makes it extremely unlikely that other companies can duplicate it.

From our results we propose the following research propositions:

- 1) Interpersonal networking has a positive effect on global new product success.
- 2) Building social capital that is specific to the task of the project impacts positively on global new product success.
- 3) Informal networking has a greater positive impact on global new product success than formal networking.
- 4) In the beginning of a global NPD project, networks are smaller and less dense while at the end of the process, networks are larger and more dense.
- 5) The greater the strength of the relationships in the network, the greater is global new product success.

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