The Role of E-Sourcing Information in New Product Development: A Research Design of a Case Study.

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Introduction

The objective of our research is to establish how e-sourcing information - as represented by suppliers' websites - can contribute to the creation of new knowledge and knowledge sharing in new product development (NPD) projects.
In the paper we describe the considerations that led to the adoption of case study as an appropriate research strategy.
The paper is divided as follows. First, an outline of the research problem and the theoretical framework is given. This is followed by a description of the research construct and the proposed case study design. A special section is devoted to the Sense Making Methodology, as it will be our chief approach to data collection and analysis. The paper concludes with a note on a controlled experiment which will be the next step in our research.

Definition of the Research Problem

Web technology is transforming all business into information-based activity. It will no longer be possible operationally or strategically to ignore the information-based virtual value chain for any business (Shaw, 1999). The transitions in the information context of NPD and sourcing are a case in point.
In the NPD process we are witnessing a shift from exploitation of internal resources to active exploration of external resources. NPD is incresingly viewed as a recombination of existing knowledge resources. The ideas for new products may come from suppliers, consumers, or even from competitors. The deliberate crossing (expanding) of the firm's boundaries is given i.a., by shortening product life cycles, demand volatility, and globalization. It is predicted that in future, the starting point of defining a product value proposition will not be a Value Chain enterprise, but the customers' wishes to which solution may be sought from anywhere in the business web (Tapscott, Ticoll, and Lowy, 2000).
Sourcing, an external-oriented activity, has been affected by web technology also. Web-based procurement tools enable access to product information globally and in real time. Digital markets and business portals offer aggregated product information which is supported by 3D visualization of products and its access is facilitated by search engines. A fine example of how sourcing, scouting and networking can be combined in one is the the portal of Messe Frankfurt (www.productpilot.com). Started in February 2006, the portal provides information on 22.000 exhibitors and their products worldwide. The portal can be searched using the mobile phone or PDA (Personal Digital Assistant, a handheld computer). Registration is free and portal visitors are invited to join communities of practice such as "B2B Matching" and "Experts Network".
Increasingly, the criteria for suppliers' selection also include the quality of suppliers' websites. For example, in the research by Bottani and Rizzi (2005) which studied suppliers' selection in an e-procurement environment, the navigation structure and currency of suppliers' websites emerged as very important criteria in deciding which suppliers to choose.

Sourcing practices do not only involve optimizing the supplier base, but can also involve an early suppliers' participation in product design. Although supplier involvement has been empirically found to be one of the approaches with which to accelerate the NPD process (Bonaccorsi and Lipparini, 1994; Langerak and Hultink, 2005), its timing remains a matter of contention (Appleyard, 2003; Monczka et al. 2000; Petersen et al., 2005).

In the case study, we hope to find evidence supporting our notion that employing sourcing information in the idea generation phase of NPD could produce similar benefits as strategic sourcing. For, it is generally accepted that strategic sourcing is a way to acquire manufacturing capabilities without incurring investments (Narasimhan and Das, 2000). In the similar vein, acquiring sourcing information and adopting it early in the design process would help the NPD team learn about the products and the engineering capabilities of the suppliers without necessarily committing the firm to partnership. Thus acquired knowledge would also prevent delays and misunderstandings in the product specification stage of NPD (Karlsson, Nellore, and Söderquist,1998).

Theoretical Framework

Choosing the case study as an appropriate research strategy is motivated by the fact that the topic of our research concerns a contemporary phenomenon, the boundaries between the phenomen (i.e., e-sourcing information) and its context (i.e., NPD projects) are not clearly evident, and cannot be controlled by the researcher (Yin, 2003).

The theoretical roots of our research originate from the study by Hansen (1999) and his observation that in the NPD research (Allen, 1984), finding relevant information is seen as an activity of information transfer, whereas in the social network research (Granovetter, 1973), finding relevant information is seen as an activity of search involving crossing the boundaries of one's network and employing weak ties. To these two research perspectives, our case study will add a third one, namely: the information richness theory (Daft and Lengel, 1984).

Research Construct

A tentative specification of our research constructs, developed to better understand the research context (Eisenhardt, 1989) is shown in Figure 1. It is a model by abstraction (Lazer, 1962), i.e., it represents our suppositions about the transfer of and search for e-sourcing information in the upstream part of the firm's Value Chain. The e-marketspace from which the firm draws its e-sourcing information will in our case study be proxied by suppliers' websites.

The model is largely based on the network view of the firm (Håkansson and Snehota, 1995) and represents a resource constellation of the firm's NPD vis-à-vis e-marketspace The network's actors are positioned both outside and inside the firm. The three actor groups are: procurement staff, NPD team members, and preferred suppliers. The network's resources consist of knowledge and information necessary to maintain the firm's competitive advantage through new product development.

The search for and transfer of sourcing information is presented at the meta level as a combination of two search modes: an analytic mode which is planned, formal, and task driven, and a browse mode which is opportunistic, informal, and data driven (Marchionini, 1995). Specifically, the browse mode reflects the information seeking behaviour of NPD team members and preferred suppliers. Their searches have an ad hoc character and are often driven by satisficing and serendipity (March and Simon, 1958). By contrast, the analytical mode illustrates well the task-oriented search of

procurement professionals, its regularity and accumulated expertise. At the micro level, the information search and transfer are determined by the relationships arising from the properties of strong ties, weak ties, and trusted weak ties (Granovetter, 1973; Hansen, 1999; Levin and Cross, 2004; and Rindfleisch and Moorman, 2001).
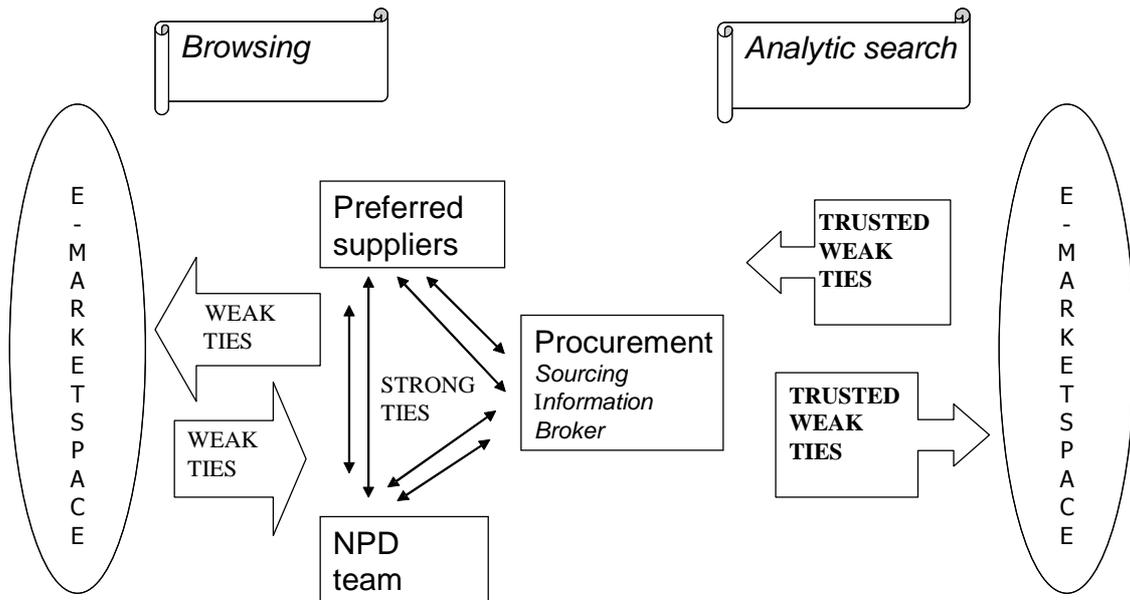
Fig. 1: The Firm's Search and Transfer of E-Sourcing Information.

Weak ties are defined as distant infrequent dyadic relationships that lead to novel and diverse information, have low knowledge redundancy, show low connectivity, and are temporal and non-reciprocal. In our model, search for e-sourcing information represents a weak tie relationship.

Strong ties are defined as reltionships with a small group of actors. The group prefers to engage in transfer of information which is well tried (high knowledge redundancy). A strong tie relationship is based on trust and reciprocity and is conducive to learning and information utilization. In our model, the strong tie relationship is found in the triangle formed by NPD team, preferred suppliers, and procurement staff.

The model underscores the focal role of procurement staff as that of a broker of e-sourcing information. In addition to a strong tie relationship vis-a-vis NPD team and preferred suppliers, the procurement staff has a trusted weak tie relationship vis-a-vis e-marketspace.

The concept of trusted weak tie, developed by Levin and Cross (2004), applies to situations when codified information is transferred within a weak tie relationship, and where the transfer presupposes a benevolence-and-competence based trust relationship (hence "trusted weak tie"). Trusted weak ties were found, under certain conditions, to bring about learning effects, hitherto associated only with information transfer among strong ties (Levin and Cross, 2004; Rindfleisch and Moorman, 2001). In our model, the concept of trusted weak tie has been incorporated, so as to underline the competency

and trust aspects of the procurement staff search. The presumed learning effect of trusted weak tie was another reason for adopting the concept.

Provided that e-sourcing information, as mediated by the firm's procurement staff, is found to represent a trusted weak tie relationship, then e-sourcing information could make a valuable contribution to the firm's NPD knowledge creation.

Case Study Design

Research Questions

The tentative formulation of our three research questions reads as follows:

1. What contribution does e-sourcing information, as provided by suppliers' websites, make to the creation of new knowledge in NPD?
2. What is the inspirational value of suppliers' websites to the designer in his/her search for new product ideas?
3. How does the real time availability of e-sourcing information affect the process of knowledge sharing in NPD team?

We propose to operationalize the research questions through the concept of information richness. In measuring the information richness of e-sourcing information we seek to establish: "How much design relevant insight can e-sourcing information generate to change the receiver's understanding of a design problem?"

Unit of Analysis

The unit of analysis is e-sourcing information provided by suppliers' websites. By sourcing information is understood both the information about suppliers themselves and the information about suppliers' products. Conform the guidelines on case study design (Yin, 2003), we propose to employ a multi-case embedded design with two levels of analysis: 1/ e-sourcing information at the level of procurement staff; 2/ e-sourcing information at the level of the designer (a member of NPD team). Ideally, the number of cases should be four, two for each level of analysis. This would enable us to interview individually about 20 case study participants (Yin, 2003; Griffin and Hauser, 1983).

Case study boundaries

The participating firms work in an e-procurement environment and have in place the operational relationships among NPD team, preferred suppliers, and procurement staff (our triangle of strong tie relationships). Data collection will focus on the real/perceived usefulness of e-sourcing information in the idea generation phase of product development projects, as experienced by the firm's procurement staff and the designer (a member of NPD team). The studied projects should involve a product category whose supply chain is easily decomposable and whose members have active websites.

Quality tests

The case study will have exploratory nature and therefore must conform to the criteria of construct validity, external validity, and reliability (Yin, 2003).

To satisfy the criterion of construct validity, we shall use multiple sources of information, such as procurement records, design project documentation, and interviews in order to triangulate and chain the evidence.

There will be two kinds of interviews: 1/ an in-depth interview of members of procurement staff and NPD team in order to establish understanding of their respective fields of activity. The informants will be requested to review the draft reports of

interviews; 2/ The actual data collection will be done through the Micro-Moment Time-Line Interview belonging to the instrumentarium of the Sense-Making Methodology (Dervin, 1983, Dervin, Foreman-Wernet, and Lauterbach, 2003). Again, interview records will be sent to participants for validation. We shall return to the Sense Making Methodology (SMM) in a separate section. Here we should like to mention the contribution that SMM makes to the external validity of the case study. The SMM views information use as process condition, a process of gap bridging. Each Micro-Moment represents a triangular circling of experience: how the respondent saw the situation, the gap, and the help wanted. The SMM research philosophy holds that focusing on the gap idea moves research toward a new kind of generalizability, applicable across situations but relevant to specific moments in time and space.

With regard to the case study reliability, at this stage, we can only declare our intention to draft and be guided by a case study protocol and to maintain a database of case study notes.

Sense Making Methodology

Sense –Making Methodology (SMM) has been developed by Brenda Dervin and her colleagues since 1972. A website is devoted to it, listing articles written be Dervin, and some 600 articles citing the apporach in some way.
http://communication.sbs.ohio-state.edu/sense-making/
The brief outline, which follows, comes largely from the Sense-Making Methodology Reader (Dervin, Foreman-Wernet, and Lautenbach, 2003).
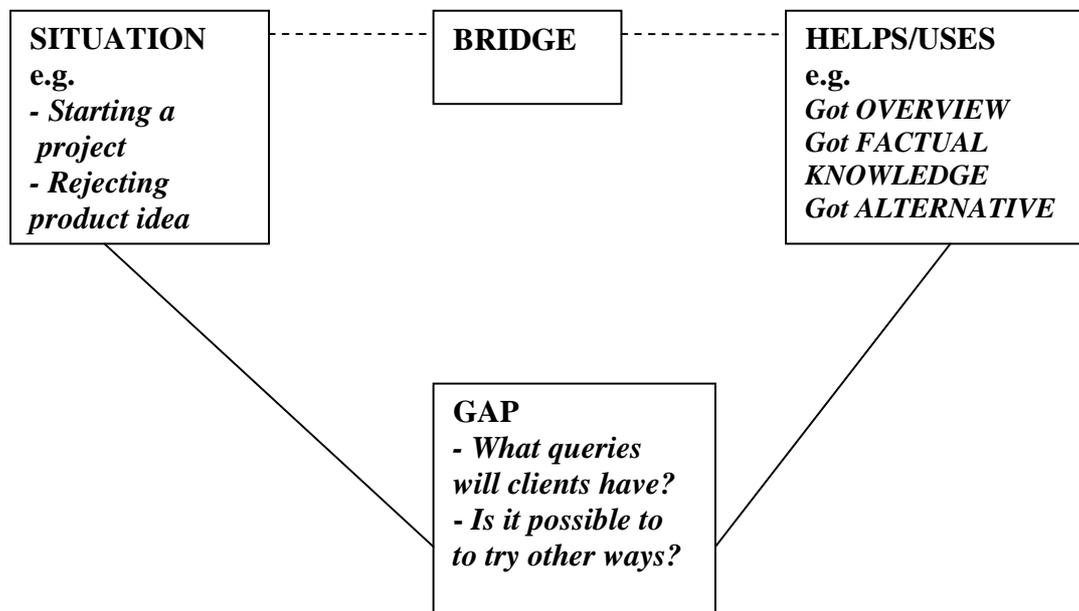The three core elements of the sense making model (Figure 2) are situations-gaps-uses.

Figure 2: The Sense Making Triangle (after Cheuk and Dervin, 1999)

The central metaphor of Sense-Making is a person moving across time and space, facing gaps in his/her situations, building a bridge across the gap and then evaluating the use of the bridge in terms of outcomes that provide guidance for his/her further behaviour. The metapor's underlying assumptions are: 1/ The discontinuity premise: it is assumed that there are discontinuities (gaps) in between entities, between times, and between spaces; 2/ Gappiness is assumed to occur because of the differences across time (e.g., self today vs self yesterday, or design problem of today vs design problem of yesterday), and differences across space (e.g., experiences of a particular condition, such as different design projects). The gap idea is the guiding frame for SMM methods which underpin questions, interviews, and analysis; 3/ Sense-Making focuses on behaviour in a particular situation in time and space. The SMM studies have shown that the situational measures are more powerful predictors of information seeking than individual traits of the seeker (Dervin, 1998). Information is not seen as state condition but as process condition expressed through human activity. (Therefore, in our study of e-sourcing information, we shall not ask about how much information the designer acquired from a suppliers'website, but rather, what situation/experience has led the designer to turn to the website in the first place); 4/ Information is studied from the perspective of the user not the observer. It is the user who identifies the gaps and decides on his/her own terms, on which steps to take. The metaphor is not intended to imply that gap facing is only linear, logical and problem oriented. Also, the way two people face the same gap will depend on where they are in time and space: where they have been, where they are, and where they are going.

A particularly attractive feature of SMM is that it does not distinguish between information and knowledge. Both information and knowledge are seen as fodder for sense-making and sense-unmaking. In our view, the constructivist perspective of information and information seeking makes SMM singularly suitable for a study of information richness.

The core method of data collecting is the Micro-Moment Time-Line Interview. The respondent is asked to reconstruct a situation, i.e., describe in time-line steps in detail using the Sense Making Triangle (Figure 2). The Time-Line Interview concludes with an in-depth analysis of one or more gaps. Sense making studies have developed prototypical categories based on time-space movement metaphor for situations, gaps (questions), and outcoms (hindrances).

The Sense Making Methodology (SMM) has been extensively used for the evaluation and assessment of information systems. It is for this reason that SMM could prove valuable for marketing practitioners who wish to improve the effectivenes of their websites. For, if we take the view that the suppliers' websites are a kind of information system, then the SMM perspective on communication could be relevant.

Currently, most information systems are still based on a transmission model of communication (Shannon and Weaver, 1949). The transmission model is a linear, one-way, sender-receiver model, in which messages are initiated by the sender. The messages are assumed to have truth-value. However, the meaning of messages to the receiver and to his/her situational context is not addressed by the model. The main focus lies on the message capacity and the transmission properties of the channel, and the fit between the sender and receiver technology. By contrast, the Sense-Making Methodology (Dervin,1983, Dervin and Nilan 1986)) offers an alternative perspective on communication. It does not regard the messages as things to be gotten but instead underlines the role of the recipients in constructing the meaning of the messages.Thus, messages are considered of value only in so far as they can be understood within the context of the recipient's (information seeking) situation. If applied to the website design,

the SMM perspective mandates a design which is open ended and which draws users into a permanent dialogue.

Further Research: Controlled Experiment

As preparation for our case study, we plan to carry out a controlled experiment – a product idea brainstorming session in which the suppliers' websites will be used as an inspiration source. A small group of students from our faculty of Industrial Design Engineering who have recently completed the course on Lighting Design will be asked to propose new product concepts. The proposed concepts must be the result of the designers' search through the sourcing information provided by the websites of leading lighting manufacturers. The designers will be free to set their own product specifications. Their search through the selected websites will be monitored. The focus of the experiment will not be the product concept as such, but the effect and contribution of e-sourcing information that had led to the concept development.
On completion, the designers will be asked to explain their search steps (situations), search progress (gaps), and findings (outcomes).
The experiment is expected to serve at least three purposes:
1. It will give us a first indication of the richness of e-sourcing information and how it is experienced by designers;
2. It will provide us with insights needed for the setting up a data collection plan, and for streamlining the case study protocol;
3. It will be a training opportunity to learn about the Sense Making Methodology.

Conform the advice Yin (2003) gives about pilot case studies, we shall write a short report about the lessons learned.

Conclusion

Our research will result in insights in the role of E-Sourcing Information in New Product Development. Besides the findings on the potential value of e-sourcing information in NPD, our case study also identifies factors contributing to the success/failure of case study research. Through the application of the established theory of information richnesss (Daft and Lengel, 1984) to the new emerging field of e-sourcing, combined with the relatively little known Sense Making Methodology, we add to the strengths and weaknesses of case study research.

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