# Challenges in transferring user experience related knowledge to support commercialization of innovation

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**Abstract**
Little attention has been paid to the problem of communicating and sharing user experience (UX) knowledge inside organizations. In this paper we argue that UX-related knowledge transfer includes numerous challenges that should be acknowledged in the commercialization process of user based innovation. This is particularly essential when considering how products designed with improved UX should be launched across an organization. In this study we firstly identify and categorize those intra-organizational knowledge transfer challenges that have emerged in previous research, and secondly examine how these challenges appear in transferring UX related knowledge inside an organization aiming at diffusing UX-based product innovation. The results highlight the need for continuous and two-way communication and collaboration between relevant actors during the entire innovation process, which is essential in increasing people's willingness to share knowledge. The tacit nature of UX requires new knowledge transfer mechanisms to capture the experience dimension of UX-based product innovation.

*Keywords: Knowledge transfer, User experience, Commercialization of innovation*

## 1    Introduction
The only way for companies to succeed in any market is through developing compelling offerings that bring value to customers (e.g. [1]). However, the recent innovation management research has underscored the importance of learning from external sources including users (e.g. [2]). Traditionally the users, in business-to-business (b-to-b) context, have hardly been considered the center of attention in an innovation process – the center has been on the paying customer [3], but the landscape is changing. User experience (UX) is understood in the b-to-b context as *the way a person feels about using a product, service or system in a work context, and how this shapes the image of oneself as a professional* [3]. UX has been considered to be

the competitive edge of manufacturing companies, but the problem of communicating and sharing UX knowledge inside organizations has received only little attention.

The knowledge transfer of UX is important in the whole innovation process, but it is most essential in the commercialization phase of an innovation. Commercialization is defined as the production, manufacturing, packaging, marketing and distribution of a product that embodies an innovation [3]. Traditionally, commercialization has been seen as the last part of an innovation process [5], but it has been suggested that the commercialization of an innovation should be seen as a concurrent commercialization process in parallel with the innovation process [6]. This is why managers in innovative firms should acknowledge the links between R&D and commercialization, and should purposefully create relations with diverse actors within the commercialization activities [7]. Sales people are a critical actor group, as it is essential that they commit to the selling of new products to their customers, but often the sales support functions lack the know-how about what types of material and training would be the most beneficial for sales people [6].

In this paper we argue that UX-related knowledge transfer includes numerous challenges that should be acknowledged in the commercialization process of UX innovation. This is particularly essential when considering how products designed with improved UX should be launched across an organization and how the sales departments should be supported and motivated to sell the products. In this study we aim firstly to identify and categorize those intra-organizational knowledge transfer challenges that have appeared in previous research, and secondly examine how these challenges appear in transferring UX related knowledge inside an organization aiming at diffusing UX-based product innovation.

## 2   Theoretical background

### 2.1   Knowledge management as part of innovation process

Knowledge management has been conceptualized and defined by many authors, for example, du Plessis [8]: *knowledge management is a planned, structured approach to manage the creation, sharing, harvesting and leveraging of knowledge as an organizational asset, to enhance a company's ability, speed and effectiveness in delivering products or services for the benefit of clients, in line with its business strategy.* Knowledge management has a major role in innovation especially by enabling the sharing and codification of tacit knowledge, like UX-related knowledge, which is often enough sticky because it is deeply rooted in the personal experience of individuals and can hardly be encoded in explicit terms (tacit knowledge) [9]. Sharing tacit knowledge is critical for organizations' innovation capability [10], and thus is an essential element in a successful commercialization phase of an innovation.

Since the innovation activities are exploratory in nature, also in the commercialization phase, there is usually a high degree of ambiguity and uncertainty about the knowledge to be transferred [11] Knowledge transfer is a part of the knowledge management paradigm and in organizations it is defined as *"the process through which one unit (e.g. group, department, or division) is affected by the experience of another"* [12]. It is seen important for organizations to build resources and capabilities that will allow them to capture and codify knowledge to ensure that knowledge transfer can take place adequately [13, 14]. There are several challenges in intra-organizational knowledge transfer which are discussed in the next chapter.

## 2.2 Knowledge transfer challenges in intra-organizational communication

In order to examine the challenges in transferring UX-related knowledge inside an organization an extensive literature review was conducted to identify possible problems in intra-organizational knowledge transfer. In the literature on knowledge transfer, several challenges or boundaries have been recognized within organizational communication in different contexts (e.g. [15], [16], [17]). On the other hand, the success factors and antecedents of knowledge transfer in intra- and inter-organizational settings have also been widely studied (e.g. [18], [19]).

As a result of the literature review, eighteen focal knowledge transfer challenges were identified and grouped into four categories: personal, informational, organizational and network factors (see Table 1). Due to the inductive nature of our research, the focus in this paper is on the informational and organizational challenges in transferring UX-related knowledge which is why only these categories are represented here in more detail. Considering the informational factors, the nature of knowledge includes the degree of tacitness, ambiguity and complexity of the knowledge being transferred [16], which affects the ability to transfer that knowledge, the rate at which it will be assimilated and how much is retained [20]. Knowledge that is extremely tacit, ambiguous and tacit, may therefore be hard to transfer. Related to informational factors, also the implementation of difficult and inefficient information technology in an organization can influence knowledge sharing activities negatively [19].

Considering the organizational factors, several challenges were identified, including the lack of incentives, organizational culture, organizational characteristics and organizational structure. It is stated that incentive systems motivate organizational members to share information with others in different groups or departments [20, 21] and they can also increase the quality of shared information [22]. The lack of incentives, therefore, can have a negative impact on knowledge sharing. Considering the organizational culture, the attitudes and collective actions regarding information sharing are influenced by organizational values [23]. If information sharing is not valued in the organization's culture, then efforts in sharing information with others will be decreased. The organizational characteristics such as the size and age of organizations and units can also affect knowledge transfer. Aging organizations have been argued to become inert and to possess a limited ability to learn and adapt to changing circumstances [24].

The organizational structure can relate to the formal hierarchical structure of bureaucracy [25] formal rules, guidelines and procedures [21], or the centralization of decision making [25]. It is argued that horizontal structures of bureaucracy such as departmentalization inevitably bring obstacles to information sharing between different departments of an organization because of different functional mandates, processes, and expectations [19, 20] According to Willem and Buelens [20] formal systems are less effective than informal systems in facilitating the sharing of information and knowledge, whereas informal coordination such as teamwork and personal networks can result in more effective information sharing [20, 25]. In addition, the centralization of information can reduce the employees interest in sharing of knowledge due to limited action autonomy and need of approval from supervising levels in decision-making [21].

Table 1 Knowledge transfer challenges identified in the literature.

| Categories | Knowledge transfer attributes | Perceived knowledge transfer challenges | References |
|---|---|---|---|
| Personal factors | Absorptive capacity | Low absorptive capacity reduces the ability to recognize the value of new knowledge and assimilate and use that knowledge. | [16, 18, 19, 28, 29, 30, 31, 32] |
| | Cost-benefit analysis | The costs of sharing knowledge can be perceived greater than the benefits received for providing information. | [19, 33, 34] |
| | Motivation to teach/learn | The lack of motivation for the donor to teach and for the recipient to learn can hinder information sharing. | [16, 35, 36] |
| | Self-interest | Information sharing can present a social dilemma in which personal interests are inconsistent with collective interests. | [19, 33, 37] |
| | Social identification | Low social identification has a negative impact on the sharing of activities. | [19, 21, 38] |
| Informational factors | Nature of knowledge: tacitness, ambiguity, complexity | The properties of knowledge, including the tacitness, ambiguity and complexity affect the ability to transfer that knowledge, the rate at which it will be assimilated, and how much is retained. | [16, 18, 19, 20, 33,] |
| | Information technology | If the implemented information technology is not easy and efficient to use, organizational member's IT usage will be lower, and knowledge sharing activities could be negatively influenced. | [19 ,22] |
| | Lack of incentives | With performance-based reward systems, organizational members are more likely to share information and knowledge. A lack of incentives can reduce the willingness to share with others. | [19, 21, 22, 23] |
| | Organizational culture | Organizational culture itself can prevent people from sharing and disseminating their knowledge in an effort to hold onto their individual powerbase and viability. | [19, 24, 32] |
| | Organizational characteristics: size/ age of organizations and units | Aging organizations have been argued to become inert and to possess a limited ability to learn and adapt to changing circumstances. | [18, 25] |
| Organizational factors | Organizational structure: bureaucracy | The formal hierarchical structure of bureaucracy can create barriers that impede information sharing activities of an organization. | [19, 21, 26, 27, 40] |
| | Organizational structure: roles | There is need for a knowledge activist who catalyzes and coordinates knowledge creation, ensures that teams are all informed about the results of knowledge creation and communicates future prospects throughout the organization. | [41, 42, 43] |
| | Organizational structure: centralization | Centralization has a significant negative impact on knowledge sharing in a multiunit organization. Interest in sharing knowledge can be reduced because an organizational member or group has limited action autonomy and needs approval from supervising levels regarding most decisions. | [19, 22, 25, 44] |
| | Organizational structure: formalization / formal systems | Formal systems are less effective than informal systems in facilitating the sharing of information and knowledge. | [19, 21, 26] |
| Network factors | Number of relations | A small number of relations to other firms and units decrease the likelihood that relevant knowledge can be accessed. | [18] |
| | Power relations | Sharing of information can be viewed as a loss of individual power and social influence inside an organization. | [16, 17, 21, 23, 38] |
| | Centralized position | An actor that occupies a central position creates a brokerage position, enabling it to locate relevant information or knowledge and exchange it within the social network. | [18, 31, 44] |
| | Social networks | Social networks are important for the promotion of sharing of information and knowledge between members of an organization. | [16, 18, 19, 45] |
| | Trust | The lack of trust among organizational members can create barriers to information sharing in an organization. | [16, 18, 19, 21, 23 ,24] |

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# 3 Methodology

## 3.1 Case description

Our case company is a materials handling company located in Finland. During the recent years, the company has put a lot of effort in transforming its business from being product oriented towards having a more customer- and user centric focus. User experience is particularly emphasized in the company's R&D strategy. User-based innovation is seen as a key competitive factor for the company, which is why more attention is paid to the commercialization process of new products and product launches within the organization. The marketing and R&D units in Finland have started to collaborate closely to link the product development process with the marketing and sales processes. The role of successful knowledge transfer has thus been recognized as extremely crucial in developing and launching products based on better UX. Our case company is also responsible for the R&D for European markets, which means that the collaboration and knowledge sharing extends to the European marketing and sales operations as well. The sales operations also include a wide dealer network.

As a means of disseminating information about new products, the company uses a New Product Introduction (NPI) tool, which consists of documents including all necessary information about the new product, sales brochures and product launch events for sales and dealers. The product information is produced by the R&D unit, after which the marketing people in Finland compile the information and create the sales brochures. These NPI documents are intended to support the sales of new products. The product launch events are organized in collaboration with the marketing and R&D unit, and they aim to introduce new products in an interesting way so the sales people are motivated to sell the product. In this study we focus on investigating the challenges of transferring the UX related knowledge in the context of the NPI tool.

## 3.2 Data collection and analysis

In this study we have adopted a case-study based research approach (see e.g. [46], [47]). The research material was collected through semi-structured interviews lasting from 1 hour to 1,5 hours during the year 2013. In Finland we interviewed seven people from R&D, two from marketing, three from sales support and three from sales. In addition, we interviewed two people from a Finnish dealer. As supplementary material we utilized memos from several meetings with the case company's concept team members and the marketing and communications manager. In the case company's European operations, we interviewed eight people; the vice president of marketing and sales, the senior marketing manager and sales managers from different geographical areas in Europe.

With the amount of the interviews (25 in total), we achieved saturation of data [48]. The interview topics regarded the compiling and contents of NPI and its meaning in the work of the interviewees. The interviewees were also asked to give proposals for the improvement of the NPI. In addition, the current state of internal collaboration and its future prospects were discussed to gain an understanding about the state of knowledge transfer in the organization. In the analysis of data, we used traditional qualitative methodologies to sum up and categorize our central findings. The material was analyzed based on the developed theoretical framework, but the analysis also included inductive elements ([49], see also [50]).

# 4   Results

In our analysis we identified challenges in UX-related knowledge transfer through the NPI mainly in two categories discussed in the literature: the organizational and informational factors. The challenges in *the organizational factors* were highlighted when our interviewees discussed about the process of creating and compiling the NPI. The organizational structure and roles in the organization became key issues. The role of R&D in knowledge transfer was naturally seen remarkable as the UX-related knowledge originates from R&D and it is thus responsible of disseminating the information further. Knowledge transfer and sharing was seen successful between the R&D and the Finnish marketing unit. However, communication was seen to become more difficult when trying to reach the sales channels in the Finnish and European operations. The main challenge identified was the lack of collaboration with R&D, marketing and sales during the development and commercialization processes of new products. The interviewees emphasized the need for continuous and two-way collaboration between the units, since at that time the sales people felt that their voice was not heard in the NPI process and new products were only "dropped into their lap" after they were designed. The current NPI process did not engage the sales people, even though it is a tool created to support sales activities. This scenario affected their attitudes towards knowledge sharing activities greatly and the need for enhancing information flow from the sales channels to the R&D was recognized. Sales people have valuable knowledge about the markets, customers and users and disseminating and utilizing this knowledge would benefit the innovation process.

The lack of collaboration influenced the quality of knowledge transfer, which was often seen to be inadequate or delayed due to differing expectations. The unclear roles in the creation of the NPI were also seen as a significant challenge. Many units and people were involved in the process; however, these roles appeared as fuzzy for the different actors in the organization. Having a person responsible for the coordination and communication in the process was seen as essential, and was highlighted by the interviewees from the European operations as the chain of communication is longer. The creation process of the NPI as a whole was described as very formal and it did not encourage exchanging the knowledge informally. Despite the formality, no incentives were utilized to increase knowledge sharing. Furthermore, the boundaries between organizational teams and communities are not spanned in the process, even though it might have improved the knowledge transfer. All the above mentioned organizational challenges in knowledge transfer reflect the current organizational culture and mindset in the organization, which is not enough emphasizing the value and importance of knowledge sharing.

The challenges in UX related knowledge transfer through NPI also appeared in *the informational factors*, which were highlighted by the interviewees when discussing about the contents of the NPI and its utilization in sales activities. The NPI was seen to provide all relevant technical information about new products, however, the experience based knowledge was considered very difficult to communicate to the sales channels. The desired UX message of new products has not reached the sales channels, which has created frustration in the R&D. The NPI in itself was seen inefficient in boosting the UX features of new products and making the sales people see UX as a key selling point. The information included in the NPI that is not considered useful by the sales people is not utilized in the sales situations, and the sales people did not absorb the information they regarded as unnecessary. Some of the sales people reported that they don't even open the NPI documents, because their benefit is not seen. Furthermore, it was discovered that the NPI documents produced in Finland are actually not utilized in the European operations and the marketing and sales people have been generating documents of their own to support the sales activities. The UX message of new

products is thus considered to disappear to some extent. The tacit nature of UX-related knowledge makes it difficult to communicate via traditional tools. Regarding this, the sales people highlighted that NPI is not the tool to communicate UX features of products to customers. Being able to see and try out the products in practice makes the experience dimension easier to communicate. The results are summarized in table 2.

Table 2 Summary of the challenges in transferring UX related knowledge inside the case company in order to diffuse UX-based product innovation.

| Categories | Knowledge transfer attributes | Perceived knowledge transfer challenges |
|---|---|---|
| Informational factors | Nature of knowledge: Partially tacit nature of UX-knowledge | Experience based knowledge is tacit in nature and thus difficult to communicate to the sales channels. |
| | Consensus on what information needs to be transferred | R&D and sales have different views of what information is needed in the sales situation |
| | Finding the right methods for UX-related knowledge transfer | Traditional tools are not enough to communicate UX-related knowledge. A possibility to see and try the products is needed. |
| Organizational factors | Lack of incentives | There are no incentives utilized to boost knowledge sharing activities. |
| | Organizational structure: unclear roles and responsibilities | People's roles and responsibilities of knowledge transfer appeared as fuzzy for others |
| | Organizational structure: formality of the process | The formal knowledge transfer process does not encourage people to share knowledge informally. |
| | Organizational structure: collaboration between functions and teams | The lack of continuous and two-way collaboration especially between R&D and sales. |
| | Organizational culture | Organizational culture does not currently emphasize the value and importance of knowledge transfer as well as it could. |

## 5   Conclusions

Based on our findings, recognizing the challenges in UX-related knowledge transfer is essential when aiming to commercialize innovations. The most apparent challenges related to the lack of collaboration between relevant actors during the innovation process. We argue that engaging different units, including the sales channels, during the entire innovation process enhances the commitment to new products and their sales. A continuous and two-way communication is essential in increasing people's willingness to share knowledge and will ultimately influence the organizational values and culture towards effective and open knowledge sharing. Furthermore, our results highlight the need for co-creation of tools meant for UX-based knowledge sharing, such as the NPI, to further engage relevant actor groups in the innovation process.

The tacit nature of UX related knowledge was also essential in our results, as it brings extra challenge to the knowledge sharing. We argue that due to the tacit and ambiguous nature of UX, traditional knowledge transfer mechanisms are not sufficient enough. Since the experience dimension is central in UX-based product innovation, we argue it should also reflect to the means of knowledge transfer within the organization, meaning that experimental and interactive methods are required to capture the essence of UX-based products, such as test drives and experimental events where people can see and try the products themselves.

This study has contributed to the scarce innovation commercialization literature by examining it from the perspective of knowledge transfer and by supporting the view that more collaboration between R&D and other units in organizations is needed for successful a commercialization process. Especially sales personnel should be engaged in the innovation process to make the knowledge transfer more efficient. Moreover our findings support the need to consider commercialization of innovation already in the early phases of the innovation process instead of considering it just the final step.

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