Factors Involving Knowledge Flow in Innovation Process

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Abstract

Many of business knowledge such as management strategies, financial figure, market trend, and customer satisfaction are needed in the product development process. However, the articulation of such knowledge to Research & Development team may be difficult due to asymmetric information between two parties (Crawford and Sobel, 1982). The study of effective communication between the business functions and the technical team, thus, is challenging. This paper tends to introduce the factors that should be considered to enhance the effectiveness in the communication between the two sides. Four factors are recommended - the space where the articulation is taking place, the communication process, the communication trick, and the communication tool. Eventually, the improvement in these factors can augment the effectiveness in an innovation process.

Introduction

Darwin points out in his evolution theory regarding the relationship between two absolute lives through their common ancestor, or the development of any creature from one generation to the subsequent generation (Darwin, 1859). Likewise to Darwin's theory, non-life objects can also evolve from one generation to the next. This development can emerge by mediation of innovation. Innovation transforms huge mainframe system to be the slim light-weight laptop with gigabytes capacity, and makes it recognized in the market. Thus, innovation is not just invention, but also extends to the commercialization (Smith, 2006).

Innovation can be the incremental form whereby an existing product is adjusted to be more convenient to exploit, or the radical form in which the new product is launched. Henderson and Clark (1990) introduced four types of innovation: Incremental, Modular, Architectural, and Radical innovations. Typically, these types are the combination of two distinct technical knowledge which are component and system knowledge. Rather than these types of knowledge, the firms have to involve business knowledge as the critical factor in the commercialization process. Business knowledge is varies. It includes management strategies, financial figure, market trend, customer satisfaction, production cost, manpower, etc.

Generally, different kinds of knowledge are owned by different groups of people. Knowledge sharing is a crucial activity conducing organizational knowledge exchange between a sender and a receiver (Szulanski, 1996) to ensure that the business knowledge is transformed to

become relevant technical knowledge. However, one of the difficulties in knowledge sharing is the asymmetric information between a sender and a receiver (Crawford and Sobel, 1982). Therefore, organizations have to consider how the innovation strategy will be deployed corresponding to business strategy. An answer to this question needs the connection between business context, technology, and personal soft skills.

Knowledge Flow in Innovation Scheme

Henderson and Clark (1990) identified, through the combination of component and system knowledge, four types of innovation. *Incremental Innovation* involves an improvement in product's components in an existing design while *Radical Innovation* changes significantly both product's components and design. Moreover, the other two types are typically laid between these two extremes. *Modular Innovation* adopts new components in an existing design. On the other hands, if existing components are arranged in new configuration, that pattern is called *Architectural Innovation*. The model of this combination is shown in Figure 1.

		Components/core concepts	
		Reinforced	Overturned
System/ linkages	Unchanged	Incremental innovation	Modular innovation
	Changed	Architectural innovation	Radical innovation

Source: Henderson, R. M. and K. B. Clark (1990) Architectural Innovation: The Reconfiguration of Existing Product Technologies and the Failure of Established Firms, *Administrative Science Quarterly*, **35**, pp. 9-30.

Figure 1: Henderson and Clark Innovation Model

In general, innovation emerges from the commercialization of an invented object in a marketplace (Smith, 2006). The invented object is fallen in one of the four innovation types i.e. be a novel or an enhanced existing product. To determine the form to be pursued, business knowledge is the mandatory factor. Customer feedback and revenue figure can represent the market response on such innovative product. Information about political situation and economic crisis can impact product launch and buying decision of customers. Moreover, internal organizational factors such as marketing strategy, production cost, and manpower availability have to be wholly concerned. These data should be analyzed and, in turn, circulated its feedback to product development team. Figure 2 illustrates the business knowledge flow from commercialization process to the production team who are working in an invention process.

The challenge in the transferring of business knowledge to technical team is on how the information can be effectively communicated. To achieve that goal, we suggest considering four factors.

1. The space where the articulation is taking place
2. The communication process
3. The communication trick
4. The communication tool

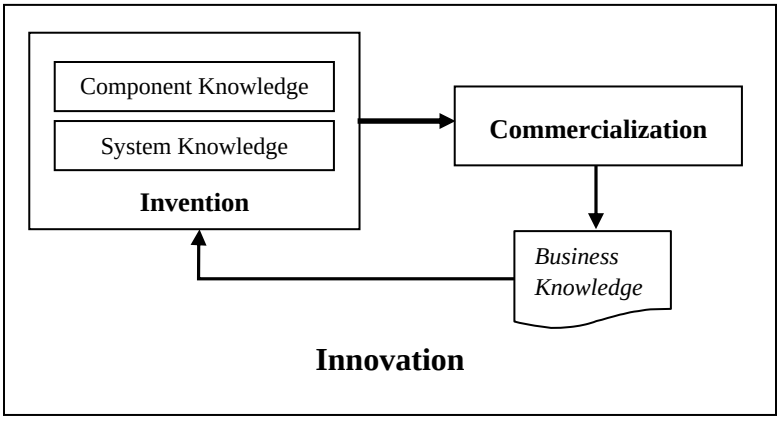

Figure 2: Business Knowledge Flow in an Innovation Process

To have know-how shared with the right persons, and in the right time, the appropriate space should be provided. The space where knowledge is shared can be physical or virtual area in which participants can share everything including their subjective ideas and emotions (Nonaka and Konno, 1998). The organization should firstly determine the type of space that can be utilized to create the suitable atmosphere is for the communication. Due to the different dialect between business knowledge owners and technical professionals, the non-verbal communication e.g. email may be reduced as much as possible. The knowledge transfer facilitator should consider physical face-to-face meeting and teleconference in which interactive communication can be performed.

The communication process involves activities occurring before, between and after the communication i.e. the meeting. Unproductive meetings with a poor plan and poor meeting run, waste time, and participants gain nothing from the meetings (Davis, 2001). In general, the purpose of meetings is to review and discuss past events, decide on future actions and agree among the participants on the course of action (Leigh, 2002). The planning ahead on what and how to communicate is important. During the meeting, participants should ensure that they are on the same understanding in the being discussed topic. Some communication trick can be used in the meeting in order to elucidate the understanding. After the meeting, follow up actions are required. The actions should include frequently status update. The technical team should update the progress in the frequent manner in order that the management and relevant parties can ensure that the product development and/or enhancement are still on track. An update can be in the form of online reporting or an interactive session i.e. face-to-face meeting. However, face-to-face meetings should be intermittently conducted in order that possible issues can be explained and discussed. Sometimes, any potential or unaware issues may not be observed by the technical professional, but may be raised up by others.

The communication trick covers the method in which the business knowledge can be properly disseminated to technical people. It is the joint between two distinct worlds to ensure that the message from the source is correctly interpreted and understandable by the receiver. Use of translators is one example of the trick in effective data articulation. Brown and Dugrid (1998) defined a translator as a person who can frame interest of one community in the view of the other community. The translator must be influent in vocabularies of both sides and characterized with the effective communication skill. Organizations can develop the translators by rotating technical people to the business function so that they can learn the business circumstance from their new assignment and blend it with their traditional knowledge. Moreover, the communication

competence is also the critical success factor in the feedback sharing. The competence incorporates communicator's skill, knowledge, and motivation (Spano and Zimmermann, 1995). In the knowledge sharing process, participants have to avoid as much as possible the specific terms and languages in order to confuse the other parties. One of possible method to describe specific context is using metaphor to draw hard-to-understand business requirement into the understandable view for technical persons. For instance, the information traffic can be compared to vehicle traffic.

In terms of communication tool, current technologies have expanded capacities of communication channels and reduced communication time and cost. Many of the hi-tech tools can be adopted to help the sharing of information, ideas, and feedbacks. The teleconference is worth when participants locate in different areas. Moreover, electronic whiteboard or groupware can collaborate in the group discussion. In addition, the participants can learn unfamiliar vocabularies or contents from Internet, Wiki, or companies' intranet. Indeed, these technologies budge resources, knowledge, and convenience to practitioners and decision makers. The remaining task is to select the right tool to the right job.

Conclusion

In an innovation process, not only technical knowledge is flowed around, but also business knowledge is disseminated. This business knowledge can be internal knowledge such as firm's financial figure, marketing goals, and management strategies. Moreover, it can be external knowledge such as the economic crisis or customer demands. To have this business knowledge conveyed effectively to the technical professionals who involve in an invention process, four considerations are recommended.

The appropriate space for the sharing is the first consideration. Face-to-face meeting is the effective way that people can share their different knowledge. Organizations should encourage this type of communication so that the interactive dialogue can be made. The communication process is the next factor to be verified. The process involves activities before, during and after the communication. An organization should ensure that the communication planning is prepared ahead. Moreover, the participants understand the same content during the meeting. The after-meeting activities are also important. The frequently follow up action has to be conducted. The next consideration is the communication trick. The trick is a conceptual tool that eases people from different areas in understanding the others' context. Two tricks are recommended in this paper – translators and metaphors. Last, but not least, is the communication tools. The tools include technologies that support the communication among the team. The examples of the tools are the teleconference and Internet.

With these four factors considered, the business information i.e. strategy, ideas, and feedback can be effectively reflected in inventive process. Consequently, the innovation process will be enhanced.

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