

How to Create New Business Knowledge Through Multi-Disciplinary Discussion

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Abstract: Generating innovative high-tech business in the DX (digital transformation) era requires the formation of multi-disciplinary teams, which include engineers and business experts or large companies and technology ventures. However, each team member tends to focus on certain objectives: Engineers aim to develop highly advanced technology, believing it will be in high demand, whereas business experts want engineers to follow their marketing strategies. The knowledge that is deemed necessary for generating innovative products or services differs between these groups. Thus, generating new business knowledge requires that members of multi-disciplinary teams disrupt their conventional ways of thinking, understand each other, exchange knowledge, and ultimately generate new knowledge. Previous literature on knowledge creation mainly discusses the generation of new knowledge within or between organizations that have relatively the same goals and organizational values, such as how to build trusting relationships for knowledge creation and exchange. However, as modern society comprises various fields of experts and numerous values, the discussion of knowledge exchange and creation needs to include knowledge creation among experts who have previously focused on different goals and values. Furthermore, generating innovative business requires individuals to disrupt their conventional ways of thinking, but previous studies on knowledge creation rarely mention how to do so in order to create innovative knowledge. Thus, this study aims to explore the impediments to new knowledge creation and proposes a new model that overcomes these impediments through multi-disciplinary discussions.

Keywords: Knowledge and Digital Transformation, Multi-Disciplinary Discussion, creation of Innovative Knowledge

1. Introduction

Generating innovative business in the Digital Transformation (DX) era requires the formation of multi-disciplinary teams that include both engineers and business experts, as DX is a business transformation strategy that enhances and engages relationships with customers and other stakeholders using advanced digital technologies. It is crucial for companies to transform and deepen their relationships with their stakeholders – such as customers, suppliers, and employees – by leveraging advanced digital technologies, including artificial intelligence and robotics, for their competitive advantage (Wade et al., 2019). To conduct innovative digital business, it is necessary to transform employees' mindsets from a conventional approach, disrupting their conventional ways of thinking and creating new business (Rogers, 2016; Wade, 2019). Yet according to business surveys, over 70% of DX projects fail (Bonnet, 2022; Saldanha, 2019). One of the reasons for such failure is that large firms struggle with bureaucratic structures that sap initiative and they also have a tendency to maintain conventional ways of thinking. These factors make it challenging for firms to generate innovative business knowledge (Hamel & Zanini, 2018). Thus, managers and employees need to disrupt their conventional business knowledge and practices, gain more insight into external knowledge and ultimately create innovative business with other experts.

Christensen (1997) points out that long-term successful companies find it difficult to disrupt their conventional business models because they tend to stick to their past successful experiences. This study points out three impediments for generating innovative business. In the first stage, managers and staff have difficulty disrupting their conventional business knowledge and ways of thinking because their conventional knowledge has been constructed through their experiences (Bolisani & Bratianu, 2018). The second impediment is difficulty understanding other experts' knowledge because they lack the ability to understand such knowledge (Cohen & Levinthal, 1990; Zara & George, 2002). After disrupting their conventional knowledge and practices, managers and staff need to exchange specialized knowledge, understand each other's knowledge, and generate innovative business knowledge with other specialists. Past literature discusses the difficulty of understanding other specialized knowledge without any preparation. The third impediment is the difficulty of sharing innovative knowledge at the organizational level, because if only a limited number of people can grasp an innovative idea, such knowledge tends to be regarded as merely subjective knowledge (Brunsson, 1982).

For two decades, numerous practitioners and academics have stressed that knowledge regarding the managerial process and technology knowledge serve as major competitive assets for organizations (Nonaka, 1994; Grant, 2006; De Long & Fahey, 2000; Nonaka & Takeuchi, 1997; Suzulanski, 1996; Crossan, et al., 1999; Zahra & George, 2002; van Winkelen & McKenzie, 2007). With increasing globalization, firms are being required to manage an

increasing number of relationships between organizations and even across borders, such as joint ventures and strategic alliances (Inkpen & Dinur., 1998; Larsson et al., 1998). Owing to the severe international competition brought about by globalization, firms are now required to effectively learn specific knowledge from external sources through various types of relationships that they previously lacked (McKenzie & van Winkelen, 2004).

Past literature discusses that modern society is comprised of specialized knowledge (Beck, 1992; Schon, 1983) and points out the limitations of rigorous professional knowledge when it comes to solving uncertain and unique practical problems (Schein, 1972; Schon, 1983). Schein (1972) points out the gap between convergent basic and applied science and divergent practice. He claims that dealing with professional practice requires taking a convergent knowledge base and tailoring it to the unique requirement of practice based on “divergent thinking skills”. Thus, in order to generate innovative business knowledge, “divergent thinking” must be adopted, which includes both technological and business ways of thinking, based on practical business strategy. Innovative business requires the disruption of conventional values and practices, understanding the value of other participants’ knowledge, and finally collectively generating new transformative knowledge (Christensen, 1997).

Previous studies on knowledge creation mainly address how tacit and explicit knowledge can be exchanged and extended from an individual to organizational level (Crossan et al., 1999). However, little research has investigated the detailed process of innovative knowledge creation in the DX era: how people disrupt their conventional ways of thinking and practices, understand other experts’ knowledge, and create innovative knowledge with other experts at the organizational level. Moreover, a gap exists in previous research as to how members of different organizations understand innovative knowledge.

2. Difficulty in Disrupting Conventional Ways of Doing Business

Sveiby (2001) divides knowledge into two categories: “a justified true belief” and “capacity-to-act”. Sveiby (2001) claims that a justified true belief acts as a filter when a person is trying to make sense of a new situation as such a belief can be used by the individual to create meaning. People often develop ways of justifying that their beliefs are true based on their norms and values, rather than questioning whether those beliefs hold true for changing circumstances. A capacity-to-act, however, is an individual competence that is reflected in action and developed through experience (Calhoun & Starbuck, 2005; Sveiby, 2001). People’s capacity to act may be limited by the norms and values that they have absorbed and rely on. Thus, even if they learn something new from a cognitive perspective, meaning that they understand it, they may still find it difficult to put such knowledge into practice and therefore fail to change their behaviour. Thus, it can be difficult for individuals to doubt their conventional, justified true beliefs and accept the different beliefs upon which others within an organization rely. Berger and Luckmann (1967) argue that academic experts and practitioners can come into conflict because their understandings of reality differ in their work.

Schumpeter (1942) defines innovation as creative disruption; society is always looking for new processes. Innovation can be defined as generating new knowledge which has been rarely recognized by disrupting conventional, widely shared perceptions of beliefs. However, people have difficulty disrupting their conventional “justified true beliefs”, as these have served as the correct knowledge for a long time. As Schumpeter (1934) claims, innovation needs to be diffused. Thus, innovative ideas need to be shared by group members. A perception of belief held by only one person may be regarded as subjective (Calhoun & Starbuck, 2003). Thus, it can be said that in high-tech innovative discussions, every participant may hold their own “subjective belief” and try to disrupt their own differing conventional belief. As Christensen (1997) points out, a company that has achieved success through their conventional business activities may have difficulty in disrupting their way of business. It is hard to disrupt their conventional values and practice because people accumulate knowledge by reflecting on their social experiences (Berger and Luckmann, 1967; Cohen & Levinthal, 1989).

2.1 Difficulty in Understanding Other Experts’ Knowledge in Multi-Disciplinary Discussions

The importance of considering the tacit dimension of knowledge is highlighted in previous literature. Here, knowledge is categorized into two types: rationalism, and empiricism (Bolisani & Bratianu, 2018). Knowledge in rationalism is comprised of a reasoning process and does not include human perception (Bolisani & Bratianu, 2018; Russel, 1972). On the other hand, empiricism claims that knowledge is created through human sensory experience of the real world. According to Polanyi (1969), knowledge in empiricism, which includes tacit knowledge, should be distinguished from explicit knowledge. He explains that while explicit knowledge can be transferred through writing and verbal expression between people, tacit knowledge cannot, as this knowledge

is produced based on human experiences associated with their contexts. Nonaka (1994) claims that tacit knowledge is created by interaction between various individual experiences and rational external knowledge.

Thus, based on the past literature, participants in multidisciplinary discussions need to consider other participants' tacit dimensions of knowledge, which are generated by social integration within their organizations. Past discussions suggest that expert knowledge differs depending on careers and social rules. Berger and Luckmann (1967) point out the difficulty of accepting of knowledge of a different field of experts; individuals often avoid accepting knowledge which is inconvenient and only apply knowledge within their familiar community (Berger & Luckmann, 1967).

Cohen and Levinthal (1990) point out that people's understanding of external knowledge depends on their accumulated prior knowledge within an organizational context, which means how they accumulate organizational-related experience and cognitively understand external knowledge. Thus, in order to understand other experts' knowledge, one must avoid mere surface learning (Marton & Salig, 1984). Moreover, understanding external knowledge requires that individuals obtain the capacity to understand the knowledge (Cohen & Levinthal, 1990; Zara & George, 2002; Todorova & Durisin, 2007). Cohen and Levinthal (1989, 1990, 1994) use the phrase "absorptive capacity" to describe the capacity to understand. They claim this capacity is path-dependent because it is developed based on already-accumulated knowledge within an organizational context.

2.2 Difficulty in Exchanging Different Experts' Knowledge in Multi-Disciplinary Discussion

Past literature on knowledge creation mainly discusses new knowledge generation within or between organizations that have relatively the same goals and values, such as how to build trusting relationships for knowledge exchange and creation (Nonaka, 1994). Lane & Lubatcan (1998) point out the importance of selecting companies which have the same salary system and organizational structure to successfully understand the knowledge generated from external companies. However, as modern society is made up of various fields of experts, the discussion of knowledge exchange and creation needs to consider various experts who have been focused on different goals and values.

At this stage, the pattern of interaction affects the partner's feeling of psychological attachment to their relationship (Kumar & Nti, 1998). For example, the difference in each individual way of understanding can be an impeding factor to exchanging different specialized knowledge. Regarding the flow of knowledge among humans, Walsham (2002) cited Polanni's (1967) paper and found that when A, who went on a trip, explained the details of his trip to B, who had never been to the area, Polanni (1967) explained sense-reading and sense-giving using an example in which the information is not necessarily transmitted to B. Thus, within a group, the ways in which new knowledge is understood differ from person to person, and it is important to be aware of the different interpretations each person may have.

Tacit knowledge is made up of people's values, beliefs, and assumptions, and because these cannot always be clearly expressed it can be difficult for people to obtain others' tacit knowledge (Baumard, 1999; Polanyi, 1967). Collective behaviour is generated when the collective tacitly accepts tacit knowledge as holding true for them and relies on it to guide collective behaviour (Calhoun & Starbuck, 2005). People tend to rely on their organizational, collectively accumulated knowledge rather than external knowledge, which is unfamiliar to them. Thus, if each individual way of understanding differs, knowledge cannot be widely shared because a belief held by only one person would be subjective and result in only that person's action (Brunsson, 1982). On the other hand, a widely shared perception or belief acquires the status of being objective (Brunsson, 1982). It can be difficult to collectively generate new knowledge by integrating various kinds of "subjective beliefs" by disrupting conventional objective knowledge.

Another impeding factor can be the differences in routine processes and local language among team members. For example, discrepancies in their business processes, including "speedy decision making," impede trust relationships among team members. This is particularly true when the work objectives or technical terms they can share differ (Lei et al., 1997).

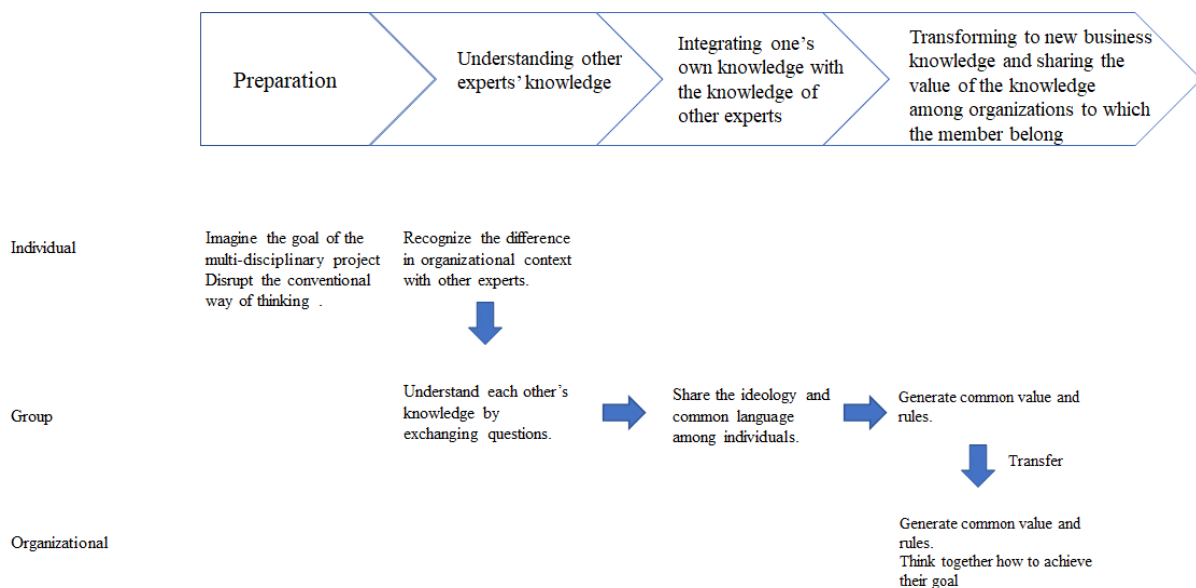
3. Creation of Innovative Knowledge in Multi-Disciplinary Discussion

This paper aims to propose a process for creating innovative knowledge in a multi-disciplinary discussion (Figure 1). Based on past discussions on knowledge creation, the model can be divided into three levels: the individual, group and organizational level. Previous literature on knowledge creation mainly discusses how individual levels

of knowledge can be extended to group and organizational collective knowledge by connecting it to existing organizational knowledge (Crossan et al., 1999; Nonaka & von Krogh, 2009). To generate knowledge at the organizational level it is important to obtain individual understanding at the initial phase (Nonaka, 1994; Taylor & Osland, 2003). In particular, multi-disciplinary knowledge creation should consider that individuals tend to follow conventional ideas that have been socially constructed in the initial stage because their social reality is constructed in individual everyday life (Berger & Luchman, 1967).

Based on these discussions, Figure 1 assumes that one specialized field of knowledge can be created by the individual experience which occurs in each organization. It suggests that the longer individuals belong to their organizations, the harder it is to disrupt their conventional mindsets. There are, however, few discussions regarding how individuals attempt to create innovative knowledge by disrupting their conventional organizational knowledge. Figure 1 considers the necessity of this disruption.

Figure 1: Process of Innovative Knowledge Creation in Multi-disciplinary Discussion



3.1 Preparation: Individual level

As Christensen (1997) claims, creating innovative knowledge requires that people disrupt past successful business knowledge. The model indicates the importance of having and envisioning a goal during the preparation phase of multi-disciplinary discussions in order to disrupt conventional way of thinking and understand the external knowledge. As Figure 1 shows, individuals need to envision their goal and understand why they need to disrupt their conventional way of thinking. Hirose (2023) points out the importance of having an image of the goal to disrupt one's conventional way of thinking and that companies which successfully launched new transformational projects succeeded in enabling the employees and managers to understand their business goal. Doing so allowed people to obtain the capacity to understand other knowledge. (Cohen & Levinthal, 1990; Zara & George, 2002; Todorova & Durisin, 2007). The past discussions emphasize that this capacity is path-dependent (Cohen & Levinthal, 1990; Zahra & George, 2002) because it is developed based on already-accumulated prior knowledge within an organization. In multi-disciplinary discussions, participants need to disrupt the path-dependency way of thinking and accept new value of external specialized knowledge. This capacity includes know-how regarding how to collaborate with other experts. After understanding their business goal vision, people will be able to understand the value of other specialized knowledge in multi-disciplinary discussions.

3.2 Understanding Other Experts' Knowledge: Individual and Group Level

As argued by Nonaka (1994) and Taylor and Osland (2003), understanding knowledge at the individual level at the initial stage is key to creating knowledge in an organization. However, most of the past literature that focuses on transferring technological or scientific knowledge lacks the perspective of managing knowledge generated in a different organizational context, which may disrupt the conventional organizational values of the knowledge receivers (Almeida, et al., 2005; Grant & Baden-Fuller, 1995; Hargadon and Sutton, 1997; Katz & Tushman, 1980; Makhija & Ganesh, 1997). These studies do not discuss the effect of organizational difference on the process of

knowledge transfer, such as how knowledge receivers reconsider and change their conventional norms, values, and assumptions to adapt to knowledge providers. As Walsham (2002), in quoting Polanyi (1967), explains, the process by which individuals transfer knowledge to one another is extremely difficult, particularly when the interest is to share knowledge among individuals who live in separate communities with different backgrounds, because they have conflicting assumptions based on their localised priorities and values.

To overcome this impediment, individuals need to transform their cognitive structure (Todorova & Durisin, 2007; Lei et al., 1997). In multi-disciplinary discussions, people need to understand the differences in the value evaluation of knowledge brought about by differences in organizational context and understand the value of other experts' knowledge. Doing so will enable to build a new cognitive structure that is incompatible with the conventional structure because their organization needs to counteract the tendency of conventional competence to undermine change. (Todorova & Durisin, 2007; Tushman & Anderson, 1986).

When individuals attempt to present their knowledge to other experts, they are not necessarily able to transfer their knowledge in the way they had expected (Crossan, et al., 1999; De Long et al., 2000). Past literature suggests that in the case of transferring technological or scientific knowledge, it is easier for the knowledge provider and receiver to share much of the same lexicon. In this case, knowledge can be transferred simply by assimilation. (Almeida, et al., 2005; Inkpen & Tsang 2005; Leonard & Swamp, 2004) However, in the case of knowledge exchange for generating innovative business, people need to interact and ask each other questions in order to understand each other's values and content (Brymer, et al., 2018). Thus, this is not simple assimilation because these individuals do not share the same lexicon.

3.3 Integrating With Experts of Other Fields: Group Level

In this phase, people need to exchange the value and contents with other experts and generate new knowledge by integrating their specialized knowledge at a group level. It is expected that as individuals create their own different cognitive maps depending on their environment, group discussion creates and refines common language, clarifies images, and creates shared meaning and understanding in order to distribute knowledge (Crossan et al., 1999).

When knowledge transfer is difficult, individuals try to clarify their communication through the use of metaphors (Crossan et al., 1999). Therefore, at group-level discussions, a shared understanding will be achieved by defining a common language called social activities. In order to promote understanding among other fields of experts, it is important to build a common language and image of various knowledge by interactions among individuals. At this stage, exchanging questions within the multidisciplinary group is the most important factor (Bentley Brymer, et al., 2018).. Participants' interactions and critical thinking through participatory processes and integration of different knowledge can lead to changes in participants' cognition or knowledge (Schneider et al., 2009).

Maltz and Kohli (2000) show that cross-functional teams, cross-functional training, and social activities improve internal communication and help to overcome internal conflict. De Long et al. (2000) point out the importance of the culture in encouraging social interaction to promote new knowledge sharing. They identify the cultural factors that promote social interaction as (1) organizational norms and practices that make possible frank exchanges between executives and members, (2) formal and informal interactions between individuals and groups, and (3) collaborations and learning from mistakes. Thus, group members should encourage social interaction to make clear what norms and practices need to be changed to reinforce more collaborative knowledge use before they directly try to convince individuals to share human knowledge (De Long et al., 2000).

3.4 Expanding Innovative Knowledge to the Organizational Level

In contrast with past discussions on knowledge creation, this model considers that each team member may belong to a unique organizational context, including large companies and high-tech ventures, business people, and engineers. Schein (2004) claims that if a group generates a common value, the group members will be able to transfer the new knowledge to other group of members. Larsson et al. (1998) point out that group members need to consider how to build their common achievement. Thus, in this phase, it is important to create a common business goal and values through multi-disciplinary discussion.

It is also important to understand the organizational differences among team members. Group members need to build trusting relationships by understanding differences in language use, practices, and ways of thinking among each member's organization (Lei et al., 1997; Van Winkelen, 2009). Some related articles stress the need to adjust both partners' "protocols" to enable alliance partners to learn from one another and share and create

knowledge (Lei et al., 1997; Van Winkelen et al., 2009). Doz (1996) stresses that a strategic alliance can be strengthened when a company recognizes and prepares for differences in organizational practices and rules with an alliance partnering company. Companies may need to set a rule that rewards innovative activities and encourages risk taking to create new knowledge (Kumar & Nti, 1998; Reid et al., 2001). This is because organizational values often prevent employees from sharing knowledge.

4. Conclusion

This study aimed to propose a new model for generating innovative knowledge through multi-disciplinary group discussions. Two main points set this study apart from past discussions on knowledge creation. The first is the importance of disrupting conventional ways of thinking and accepting the value of other experts' knowledge in order to understand it. While past literature on knowledge creation has emphasized the importance of sharing the same organizational values and practices, this study proposes how such innovative knowledge can be generated by disrupting conventional values and practices. Individuals tend to understand external knowledge based on their own past experiences. The study proposes that the model needs to consider how to disrupt these conventional ways of thinking to generate innovative knowledge. The second point is that this study provides a strategy for promoting understanding among various experts within a group. As a first step, group members need to recognize the differences in organizational context among team members, and provided they exchange questions based on this recognition, they will be more able to understand the specialized knowledge of other members. If group members share the ideology and common language, it will be easier for the team to generate innovative knowledge and extend that knowledge to other members of the organization. Finally, it is also crucial to generate common values and rules among team members.

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