Proximity, Knowledge Transfer, and Innovation in Technology-Based M&As*

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Abstract
This paper presents the findings from a qualitative study on the extent to which three dimensions of proximity—geographic, cognitive, and organizational—impact knowledge transfer and innovation post-M&A. Findings show that the elements of proximity substantially influence both knowledge transfer and innovation although the nature of the impact varies and is influenced by the type of management interventions or lack thereof post-M&A.

1. Introduction
Mergers and acquisitions (M&A) are an important means to acquire necessary knowledge resources to enhance firms’ innovative capabilities. The principal objective of this study is to understand knowledge transfer in technology-based M&A. Specifically, this study proposes a conceptual framework and provides empirical evidence of how three proximity dimensions—geographic, cognitive, and organizational—and management interventions impact knowledge transfer and innovation in technology-based M&A.

Technology M&A has a unique potential to yield superior innovative performance by combining technological knowledge found in two companies [1]. But transferring knowledge, especially tacit knowledge, is not easy. Proximity between firms plays a big role in the process of knowledge transfer [7]; however, the impact of proximity has yet to be investigated in-depth in an M&A setting.

Proximity, in the context of M&A, refers to the similarity in various aspects such as location, knowledge base, practice, and culture, between two firms involved in M&A. Scholars have looked at the impact of geographic proximity on knowledge transfer between universities and industries (e.g., [34, 35]).

Geographic proximity has also been suggested to have an impact on knowledge transfer within a single organization [37] and between industrial organizations [21]. However, there are different dimensions to proximity—such as geographic, cognitive and organizational—as Boschma [3] has argued. Our understanding of how these different dimensions affect knowledge transfer is incomplete. This study initiates research on this topic in the context of technology-based firms that have engaged in merger or acquisition. M&A activity in technology-based industries is significant and on the rise, thus the present study is timely in terms of providing empirical evidence on innovation performance post M&A.

Furthermore, in the current literature, the role of management in knowledge transfer and value creation is well recognized, though not entirely understood. It is posited that management can determine how firms are integrated, which can influence the success of knowledge transfer [19]. Managers may help shape the conditions under which knowledge transfer takes place. When proximity dimensions exert a negative influence on knowledge transfer and innovation, such as alienating cultural practices [6], management can intervene to mitigate or offset this impact.

Given the above, the present study undertakes an empirical investigation of three cases of technology-based M&A. The aim is to examine how various proximity dimensions and management interventions influence knowledge transfer and innovation in post-M&A technology-based companies.

2. Proximity and management intervention
Geographic Proximity. Physical closeness between firms provides the possibility for participants to have greater social interaction, which is crucial to the transfer of tacit knowledge. Although the availability of advanced communication tools and efficient transportation has reduced some communication barriers, it cannot replace the social presence of participants. This implies that greater geographic distance, to some extent, hinders communication. Cairncross [6] argued that, with the...
emergence of ICT and faster transportation modes, distance has died or is irrelevant. Desrochers [13] and Rallet and Torre [30] disagree—distance still matters and close proximity remains the best way to ensure effective communication regardless of modern communication channels and transportation. Rallet and Torre [30] claim that the development and use of ICT could facilitate the transfer of technological knowledge, but that it is impossible to completely eliminate barriers due to geographic distance. Desrochers [13] cites the importance of technology clusters as an indication of the importance of physical proximity for knowledge transfer and innovation.

Cognitive Proximity. Complementarity in technological knowledge and capabilities is important in determining cognitive proximity. Perez and Soete [27] argue that firms need to have some shared knowledge in order to understand the technological knowledge of partners. Too much shared common knowledge, however, reduces learning potential, e.g., limits sources of novelty, and causes a competence trap where a firm no longer develops necessary technological assets that conform to market developments [25]. Chaudhuri [8] found that technical incompatibility often slows down product development while Breschi et al. [5] suggest that firms develop new technologies related to their existing knowledge bases faster. It seems that a moderate level of similarity between two firms’ knowledge bases is positively related to innovation [1, 13, 25].

Organizational Proximity. Organizational proximity is an overarching concept that divides into two sub-groups: cultural and structural proximity. Cultural aspects are related to elements such as language, established practices or rules that regulate the relations, and interactions between individuals and groups [2]. Structural aspects pertain to how firms are regulated at the macro level, such as structure, systems, hierarchy, and power. Organizational proximity minimizes uncertainty and increases the effectiveness of coordination, and consequently facilitates knowledge transfer [3]. In M&A studies, the most closely aligned concept to organizational proximity is organizational fit. According to Datta [12], organizational fit is the level of compatibility in management styles and organizational systems between the acquiring and the acquired firms.

Management Intervention. Research from the organizational behaviour discipline repeatedly emphasizes post-M&A integration as the key to M&A success or failure [2, 28]. Management can intervene when proximity dimensions—such as alienating cultural practices [4]—exert a negative influence on knowledge transfer and innovation. Ranft and Lord [31] stress management of human capital in the transfer of knowledge in technology M&A settings. Poorly managed M&A often result in the loss of key employees, and hence the loss of their knowledge and skills, which are critical in post-M&A innovative performance. It seems that the relevant question to ask is not whether M&A is good or bad for knowledge transfer and innovation in general but what factors influence the outcome.

Given the above overview, we asked two central research questions: (1) How do various dimensions of proximity influence knowledge transfer and innovation? and (2) How do management interventions help resolve difficulties associated with proximity factors and facilitate integration and knowledge transfer? The present study looks at innovative performance on the basis of the change in incremental and radical innovation. Incremental innovation involves improvement of an existing product or process by exploiting existing technological knowledge and capabilities within a firm [22]. Radical innovation, on the other hand, involves development of a new product or process to transform the marketplace by exploring new technological opportunities [22, p. 5].

3. Research design and methods

A qualitative research design is appropriate given the complex setting of M&A and the relation to knowledge transfer and innovation. Qualitative research allows researchers to gain insights on how the phenomenon takes place and to determine factors that have a significant influence on the outcome [11, 26].

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<tr>
<th>Pseudonyms</th>
<th>M&amp;A Motive</th>
<th>Industry</th>
<th>Employees</th>
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<tr>
<td>Cansoft acquired by GiantSoft</td>
<td>Acquire knowledge and capabilities</td>
<td>Computer Software</td>
<td>Acquirer: 100,000 Acquiree: 5,000</td>
</tr>
<tr>
<td>FutureTech acquired by BrightTech</td>
<td>Market expansion, Acquire knowledge and capabilities</td>
<td>Telecom</td>
<td>Acquirer: 1,000 Acquiree: 1,500</td>
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<tr>
<td>MajCom merged with NextCom</td>
<td>Market expansion</td>
<td>Telecom</td>
<td>MajCom: 1,500 NextCom: 2,000</td>
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The cases involved three Canadian technology firms, all of which had an international component as they were either acquired by or merged with a foreign company. Table 1 provides a brief overview of the cases in terms of their M&A status, motive, industry,
The advantage of our collaborative work. The two companies were Acquisition of CanSoft by GiantSoft—was undertaken. Thus, a strategic acquisition—as it GiantSoft was worried that CanSoft might be the next decision-making support tools for senior managers. provided software solutions to enterprises, in particular a market leader in a consolidating market segment that Canada and was active in more than 100 countries. It was a successful software development company based in the US and was a business technology solution provider, offering hardware, software, and services. CanSoft was a market leader in a consolidating market segment that provided software solutions to enterprises, in particular decision-making support tools for senior managers. GiantSoft was worried that CanSoft might be the next target for competitors. Thus, a strategic acquisition—as it was seen by GiantSoft—was undertaken.

The product investment funnel was given as an example of how a new technological opportunity came to be. It started with regular face-to-face meetings between the organizations’ research teams to screen for potential opportunities based on their technological knowledge and capabilities. Once an opportunity was identified, a project team was formed to assess the feasibility. Feasible projects were given the go ahead to undertake further R&D and product development.

To preserve the acquired know-how, GiantSoft retained employees who had a strong understanding of the products, technologies, and markets and eliminated duplicate supporting positions, such as administrative and finance staff.

**Proximity dimensions**

**Geographic proximity** is hard to define with global companies like the acquirer, as they often have multiple divisions with their respective head offices and regional offices, in addition to the corporate headquarters. Difficulties arise around the question of which locations should be taken as the best measurement of distance/proximity. In this case, there were at least three possibilities; CanSoft’s headquarters vis-à-vis GiantSoft’s headquarters, GiantSoft’s software division head office, or GiantSoft’s Canadian head office. According to interviewee CS2, the distance between the two companies’ headquarters was less than a one hour flight and twenty minutes drive from the airport. For GiantSoft/CanSoft, there was no clear evidence that geographic distance impacted knowledge transfer negatively. Several reasons might explain this result.

The first reason is whether or not a company has experience operating in a distributed manner. Global companies, like GiantSoft with numerous offices and R&D centres around the world, are experienced at dealing with geographical issues.

GS1: “You had two organizations that were used to working in a geographically distributed way. So it wasn’t a challenge to have them working together in a geographically distributed way.”

Second, GiantSoft made it possible for a core group of employees and managers to travel, where lengthy discussions and face-to-face contacts were required. Where travel was not possible, teleconferencing was utilized. Third, GiantSoft developed and invested in infrastructures around collaborative work environments, which enabled global cooperation. On day one, all CanSoft employees were given new laptops, which were equipped with the necessary tools pre-configured to connect to GiantSoft, just like the rest of GiantSoft employees.

CS2: “The advantage of our collaborative work environments is that we could continue developing the technologies with several parallel streams but we have to keep in touch with each other to ensure that technologies can be integrated.”

**Cognitive proximity.** The two companies were similar in base knowledge (elemental building blocks), but differed considerably in domain expertise (specialization and depth of know-how). They shared significant similarities in base technologies and practices, as they used common technologies and associated knowledge in the same software development disciplines (e.g., the same programming language and compilers). That resulted in similarity in product architecture, which in turn made the collaboration around knowledge transfer easier. CanSoft had always deliberately aligned certain standards with the big players in the industry and the acquirer was among them. That contributed to their cognitive proximity. The compatibility of technologies
and alignment in standards allowed bringing together strengths to improve existing products and develop new products.

CS1: “CanSoft had a long relationship with GiantSoft even before the merger—our software has basically always run on their hardware systems.”

Organizational proximity. At the national cultural level, it was pointed out that although there are minor differences between the mindsets of Canadians and Americans, the differences were not significant from a knowledge transfer standpoint. Corporate similarities and differences were considered to be more relevant. At the corporate level, one of the similarities was the collective mentality toward innovation, characterized as trying to lead the industry rather than follow it.

CS1: “CanSoft is always known for being leading edge. We are not in the industry to follow other people; we are in the industry to lead. GiantSoft is the same thing.”

However, the organizations differed in several respects, such as employees’ attire, working hours, and entrepreneurial orientation. E.g., CanSoft was more entrepreneurial and new ideas were more likely to be embraced and result in new projects. Moreover, there were differences regarding the use of open-source technology. GiantSoft had a strict policy, which resulted in immediate elimination and replacement of all open-sourced technologies at CanSoft.

These cultural differences were seldom detrimental to knowledge transfer. The results might be credited to measures taken by management before and after the acquisition, GiantSoft invested heavily in cultural aspects of integration. It implemented programs to assess and promote understanding of differences and that helped to resolve conflicts quickly.

GS2: “We invested very heavily in understanding the cultural differences, the impact that our plans would have on the cultural differences and what those cultural differences would mean.”

CS3: “Those resulted in action plans to address what we could address. So the whole process was about letting people get the stuff off their chest and identifying deficiencies in the process from people who saw it happening.”

CS2: “Culturally it’s been amazing when people are focused on an idea of creating value; that’s what they’re focused on and cultural differences just step aside.”

Outcome. The acquisition was deemed successful by both organizations; CanSoft was “seamlessly integrated” into GiantSoft as stated by interviewee CS1. The once small partner that helped to optimize GiantSoft’s products had become the leading unit of one of the software sectors within GiantSoft’s Software Group. GiantSoft successfully retained the majority of CanSoft’s employees. The retention of these employees promoted knowledge transfer and innovation. Both incremental and radical innovations resulted. Incremental innovation came from combining and enhancing existing product and technology. After the acquisition, the two organizations had access to each other’s knowledge and capabilities which enabled them to learn and to improve their products.

CS3: “We now ship our product working on one of their servers, which we had never done before. We were only able to do that with access to the hardware and the skills, so that’s a new thing.”

CanSoft gained access to GiantSoft’s research capabilities such as R&D labs, research technologies, and intellectual property rights, which accelerated its development progress for certain forward-looking concepts and reduced project expenses. It was able to commercialize research technology coming from GiantSoft’s R&D lab in order to bring products to market. Access to GiantSoft’s technological knowledge base contributed to CanSoft’s ability to a) exploit existing knowledge and capabilities of GiantSoft, and b) to explore new technological opportunities (radical innovation).

CS3: “(We had) access to technologies, which we otherwise would have to license from other companies, to combine with our products to make a bigger solution.”

CS3: “We are just on the verge of launching a whole new product around social networking capabilities, which came about as a result of some research technology of GiantSoft that we’re commercializing.”

Moreover, being part of GiantSoft, CanSoft expanded its thought process around big technological concepts and leveraged GiantSoft’s brand to undertake and participate in projects that were not feasible due to a lack of credibility as a small firm. GiantSoft’s brand, gave them the credibility, legitimacy and capability to take on transformational initiatives and gave them “a massive push forward into the next generation of software” as interviewee GS1 stated.

CS2: “So those large and truly transformational initiatives ... we just would not have the resources to either create on our own or even, in some cases, participate in.”

Acquisition of FutureTech by BrightTech

This case involves the acquisition of Canada-based FutureTech by BrightTech from the UK. The acquisition took place in 2002 following the infamous high-tech bubble. FutureTech was a subsidiary created by GrandFuture on the run-up to the bubble by pooling together a number of optical components units, including some externally acquired. Optical components, at the time, were seen as the backbone to
the future super-fast Internet traffic and so business boomed. But when the market for optical components collapsed, FutureTech was put up for sale.

BrightTech, an equally hard-hit optical component supplier, agreed to purchase FutureTech. BrightTech was a company that designed and manufactured high performance optical Internet communications products. The reasons for BrightTech to acquire FutureTech were that it was active in the same business, FutureTech’s technologies were more mature than BrightTech’s and provided the latter with technological advances, and by acquiring and combining FutureTech’s knowledge and capabilities with its own, BrightTech was expecting to become a major player in this industry, offering a full range of products from components to complete systems. This combination would also yield synergies in operations, i.e., cutting operating costs and R&D expenditures.

Proximity dimensions

Geographic proximity. In some respects, distance was a disadvantage to the flow of knowledge between the companies’ R&D teams as well as manufacturing. Difference in time zones and some 3,000 miles between BrightTech and FutureTech formed a barrier to the flow of know-how. First, it hindered employees from developing working relationships and building trust. Face-to-face contact was seen as vital to establishing trust and close working relationships. In addition, because the transfer of the manufacturing facility involved physical objects, it required technical people to travel and share their experience.

FT1: “A lot of info you can only transfer by being there talking and looking at things. It’s difficult to do that on the phone. There is a limit to what you can do.”

BT1: “For the knowledge transfer… the main thing is that you develop a relationship with people from the other end. Once you have built a relationship, you feel like you are on the same team and working toward the same goal.”

Interviewees believed that geographic distance affected tacit knowledge being transferred, because this type of knowledge held by people could only be learned and shared when they were physically present to see and to participate in it. But when transferring other types of explicit knowledge, which could be more easily documented, geographic proximity was less of an issue. Being in different time zones worked against the transfer of knowledge, it prevented effective communication on a daily basis during regular business hours. However, morning hours in the Canadian office overlapped with afternoon hours in the UK. The overlap was used to hold conference calls.

Cognitive proximity. When asked to describe the extent to which technological knowledge differed between the companies, interviewees indicated there was not much difference. Similarities in base knowledge eased knowledge sharing, as employees from both companies could communicate technological issues freely. They were also similar in terms of the employees’ skills, training, and experiences, although they were serving different types of customers. FutureTech had more corporate customers, while BrightTech had more military contracts, so there was not much overlap in product offerings. Overlap in skill sets and being active in the same technologies suggests minimal differences in domain expertise. This limited BrightTech’s capability to develop and introduce radical innovations, though BrightTech was able to combine FutureTech’s knowledge and capabilities to introduce incremental product innovations.

FT1: “The base technology was common. In other words, the people spoke the same language. They weren’t trying to transfer knowledge that nobody understands.”

BT1: “As to the base knowledge, the university degrees of the employees, and the amount of experience were very similar.”

Organizational proximity. In terms of cultural proximity, there were both similarities and differences at national and corporate levels. The two companies shared much in common at the national culture level, because Canada and the UK are quite alike.

FT1: “There are some differences, but culturally UK and Canada have some fairly strong similarities, and they spoke the same language.”

At the corporate level, cultures diverged slightly more e.g., working hours were more flexible in Canada. The cultural differences were not seen as having a significant impact on knowledge transfer. The two firms differed more significantly in structure, such as reporting style, hierarchical structure, and role fulfillment by employees and managers. According to interviewee FT2, there was a chain-of-command hierarchy at BrightTech, employees needed permission from managers before doing something new, unlike the structure at FutureTech, where employees had more freedom to do what they needed to do.

FT2: “In North America, reporting structure is very relaxed, whereas in Europe, it’s more a chain-of-command.”

Interviewees experienced some confusion and difficulties in communications because of the differences in organization structures. Employees did not always know who the decision-maker was and who to talk to when they needed something, and as a result, employees voiced in a mid-merger survey that there was a need for clear job descriptions and an organizational chart, so people from different sides knew who was doing what, and whom to turn to when
needed. Interviewees noted that closer organizational proximity between them (e.g., similar organization structure, and role/job descriptions) would have minimized occurrences of miscommunication.

**Outcome.** BrightTech gained access to FutureTech’s customers mainly in North America, as well as the knowledge and capability to serve them. The transfer of products and technology, including the manufacturing facility from Canada to the UK was deemed successful. BrightTech retained most of the R&D employees and those working at the manufacturing facility for the short term. In the end, no significant turnover was experienced.

BT1: “That enabled us to create a large portfolio of products to serve a broader customer base.”

FT1: “We transferred successfully all the products we wanted to transfer to the UK and we started new products.”

As a result of the transfer of knowledge and capabilities, BrightTech’s capacity for incremental innovation increased but radical innovation was elusive. The new company doubled the number of highly qualified engineers and the stock of technologies. In addition, the patents and technological knowledge transferred boosted product development processes at BrightTech. BrightTech unveiled many technologically enhanced laser products, based on technological knowledge and capabilities transferred from FutureTech.

FT1: “There was a lot of knowledge transfer interaction around the various products, which enhanced their functionalities.”

BT1: “The products and production technologies were all transferred. So that was what BrightTech was buying; BrightTech was buying the know-how and the product line.”

**Merger between MajCom and NextCom**

This case involves the 2007 acquisition of US-based NextCom by Canada-based MajCom, but officially the deal was dubbed a merger of equals (henceforth a merger). Both MajCom and NextCom were active in the telecommunication equipment market. MajCom saw an opportunity to acquire/merge with NextCom, one of its competitors based in the US.

MajCom’s main reason for this merger was to gain market share. Traditionally, MajCom had been successful in the enterprise market space and had about 40 percent of its sales in the US. NextCom, on the other hand, was stronger in the small business space and had about 90 percent of its sales in the US. By merging with NextCom, MajCom could capitalize on NextCom’s strong sales and service organization to expand its existing sales channels. Moreover, the merger would yield compelling operating synergies, as well as give the new company more bargaining power towards its stakeholders.

The combined company had three R&D centers (two NextCom R&D centers—one each in the US and EU, and a third R&D center at MajCom in Canada), and two major product lines, one for small businesses and another for large enterprises. The integration however was mainly occurring between MajCom teams responsible for small business products and NextCom’s US R&D and product teams, which were likewise focused on small business products. This integration decision meant that small business product portfolios needed to be consolidated, and this included a decision to terminate one of NextCom’s two key projects to develop the next generation technology that would replace the current technology.

**Proximity dimensions**

**Geographic proximity.** Distance between the firms was seven hours by plane. This had an impact on knowledge transfer, despite the fact that the two had some global operations. MajCom had significant revenues generated outside its home-country, while NextCom had offices around the world and a subsidiary in the EU. Interviewees suggested that if there were greater physical proximity, i.e., co-location, there would have been more fruitful collaboration, due to the availability of face-to-face contact.

MC1: “It wasn’t new to us in terms of having the challenges of managing an international company, but is certainly more challenging than if all your people are down the hall.”

NC2: “Most of the knowledge sharing had to be done over the phone, or by sharing documents, things like that, which wasn’t as efficient as having the ability to kind of go back and forth and have a discussion on the technical topic.”

NC1: “You can ship hardware back and forth, and then work on it remotely, but it’s not the same as being in that environment.”

To mitigate geographic barriers, at the beginning key technical people traveled, along with the management team. But with the economic downturn, travel was cut and replaced with video-conferencing. Though video conferencing allowed people to see and interact with each other, it did not provide for as much interaction as meeting in person and neither did it help foster close working relationships. As a result of the ‘travel freeze,’ the benefits that could have been achieved from collaboration were diminished.

The time zone overlap during a workday permitted people from the organizations to video conference and exchange e-mails. Interviewee NC3 suggested that if there was even less or no overlap in time zones, communication would have been more difficult.
**Cognitive proximity.** Because prior to the merger they were competitors, the two firms were close in cognitive proximity. They were both active in the same technical field offering comparable products. The difference between them was in the markets served.

MC1: “NextCom folks had a good knowledge of what a small business user needed, and the MajCom R&D people didn’t understand that market that well, but had a better knowledge of what bigger customers needed.”

In spite of different technical strengths for different market spaces, the two companies had a presence in each of the markets. The presence in the same markets limited the two companies’ abilities to differentiate themselves in terms of domain expertise. Because it was a merger between two competing companies, there was a lot of overlap in product portfolios and knowledge bases. During the integration, the overlapping product portfolios and technologies needed to be reconciled, which included the termination of a NextCom technology project. There was no consensus on why the project, which was seen as technically advanced and interesting by interviewees from both organizations, was terminated. There was the suggestion that it was a business decision, which did not take into account any technical aspects. But there was also the belief that there might have been a lack of ability on the side of MajCom to properly understand and assess what that terminated project was and what its impact would be.

**Organizational proximity.** No significant structural or national cultural differences that impacted knowledge transfer were identified.

MC1: “The Canadian business culture and US business culture, as well as rules and regulations, aren’t all that different.”

At the corporate level, cultural differences were greater in terms of product development process, views on the product life cycle, work environment, and participation. At NextCom, there was a management culture that was strict in terms of meeting product milestones and release schedules. NextCom did not tolerate any delay in the product development process. In addition, NextCom’s product design phase tended to include more technical details to minimize technical risks and the delay of product release, but the extensive design approach made the process rigid and time consuming. It was nearly impossible to add an additional feature to a product that had passed the design phase. In order to add such a feature, it was required to go through a series of formal procedures that were lengthy and complex.

NC3: “NextCom was more aware of trying to be more efficient, trying to plan things out to the nth degree, like over-engineering things. Because you’re trying to consider so many different things, it’s going to take longer.”

MC2: “NextCom people would do a lot of the development during the analysis/design stage which would de-risk their schedules... so their schedules are much longer but they also have more predictability.”

NextCom’s culture of over-engineering and strict time commitment led it to be more conservative in terms of developing new products and technologies, and in some cases to be less productive.

**Outcome.** The merger has been successful in terms of achieving the original intention for the deal (increase market share). It led to the elimination of a key competitor for MajCom in the US market. It gained a stronger market footprint and access to a strong sales organization, as well as the attractive service model of NextCom. But in terms of retaining key people, it had not been successful. It lost many technical employees associated with the continuing project, which MajCom wanted to retain. This loss hurt its ability to innovate.

The main sources of change in innovation as a result of the knowledge transfer were limited to incremental improvements of product, technology, and research process by combining existing technological knowledge and capabilities. An increase in development speed was the result of the large technology pool from which to draw the best technology from, and a larger technical employee base. Post-merger, MajCom leveraged strengths of the two organizations to provide a stronger portfolio. It was able to select the best products and product features (that were not terminated) of the two organizations and enhance them before bringing them to the market. Interviewees suggested that, without the merger, MajCom would not have been able to introduce a new portfolio of such strengths so fast for the small business space. The now merged organizations were able to reinforce weaknesses with new-found strengths to optimize the product portfolio.

MC1: “We’ve created new products; we’ve taken products that were kind of tired and just rejuvenated them with some new features and functionalities as opposed to starting it all from scratch.”

NC1: “We were able to create a combined portfolio out of the strengths of our products and use the complementary products from the other side to strengthen points in which we were weak. So, I think it’s given us a much fuller portfolio and stronger position across the board... I would say neither company could have gotten those capabilities introduced into their portfolios without the merger.”

MC2: “We were able to get new products up and running on their systems in one year or less, which is
It was found that... quite good... I think we're able to get product... in a year, as opposed to three or four years as it would've been otherwise.”

5. Results and Discussion

Proximity and Management Interventions

Geographic proximity. Each of the three cases indicates a relationship between geographic proximity and knowledge transfer. In keeping with prior studies [16, 33], geographic proximity has a positive impact on knowledge transfer. For GiantSoft/CanSoft, distance did not adversely impact knowledge transfer and innovation. Challenges of distance were overcome by utilizing travel and video conferencing. Being a large globally distributed company did not make face-to-face contact irrelevant or less important but reinforces that firms must recognize the role of interpersonal dynamics in the transfer of tacit knowledge.

Unlike GiantSoft/CanSoft, knowledge transfer in the other cases was more challenging due to the large distances. Employees of the newly combined MajCom did not cope well with the distance and this had a negative impact on knowledge transfer. A travel freeze imposed by the new management team did not help either. As indicated by interviewees at NextCom, the collaborative effort would have been more successful if there were more opportunities to meet MajCom employees. Dickson [14] proposes that technology-intensive, rapidly internationalizing firms need to build rapid trust for establishing successful collaboration. Such trust is built and evaluated quickly through intense interaction, shared vision, and an appreciation of the other’s complementary knowledge [10].

For BrightTech/FutureTech, distance was even greater. But the distance barrier was effectively diminished primarily by employee travel. A comparison of how post-M&A MajCom and BrightTech dealt with distance suggests that geographic distance can be mitigated by travel in addition to modern communication tools, but this requires management intervention.

Cognitive proximity. In terms of cognitive proximity, two aspects arise: base knowledge and domain expertise. The distinction between base knowledge and domain expertise has not been well established empirically [15, 20]. Most studies are conceptualized around the relatedness of technological knowledge and to a lesser extent the complementarity of technological knowledge.

Interviewees suggested that overlapping base knowledge is important for communicating technical knowledge, i.e., they need to have common fundamental scientific and technical principles (e.g., the same programming language for software developing companies), or they need to be in the same or closely related industry. This is in line with the theory of absorptive capacity [9], which posits that a minimum level of common knowledge is required to communicate with and to absorb knowledge from another. If not, transfer and leverage of knowledge and capabilities is unlikely and cumbersome.

Domain expertise is the firm’s knowledge and capabilities specific to a technological field. When two firms with dissimilar domain expertise merge there is opportunity to explore new technology due to available complementary knowledge and capabilities [18].

For all three cases, the organizations were cognitively proximate, there was wide overlap in base knowledge. The overlap at MajCom/NextCom, however, negatively affected knowledge preservation. Due to overlapping skillsets and product lines, MajCom terminated NextCom knowledge workers but in the process failed to retain individuals it wanted to keep. Employees left voluntarily, because they perceived that there was no future for them in the new company. Interviewees suggested that this affected MajCom’s, post-M&A capacity to innovate.

With respect to innovation, at both MajCom/NextCom and BrightTech/FutureTech, the impact was mainly incremental innovation, since they had the same domain expertise. And, there were insufficient complementary knowledge and capabilities to allow for exploration of radically new technological opportunities. In the GiantSoft/CanSoft case, although both were software firms they were truly different in the domains where they were active. GiantSoft was acquiring technological knowledge and capabilities for an emerging field in the software industry, where it mainly lacked expertise and where CanSoft was a leading player. Hence there was a large difference in domain expertise to provide complementary knowledge and capabilities that the new GiantSoft could leverage to create radical innovation.

For knowledge transfer to be effective, companies must share a sufficient level of base knowledge, which enables them to communicate [32]. For M&A between firms with dissimilar base knowledge, impediments to the process of knowledge transfer are expected.

Organizational proximity. It was found that individual aspects of organizational proximity, i.e., national and corporate culture, and structure seemed to have impacted knowledge transfer differently. Generally speaking, the greater the proximity (similarity in each of the aspects), the smoother the transfer of knowledge because fewer adjustments are required from either or both sides to collaborate.

On the structural side, differences required initial adjustments on the part of employees. CanSoft employees needed to get used to GiantSoft’s more
complex organizational structure, as it is a large enterprise with multiple divisions. It was difficult for some CanSoft employees to find their counterparts.

It can be concluded that generally greater organizational proximity is desirable for knowledge transfer. This is because this closeness minimizes the uncertainty and confusion, when employees from both firms interact. A lack of organizational proximity requires time and effort for employees to get used to the new organizational setting and to adjust to the differences. In some instances if the differences are considerably large, the process of transferring knowledge could be challenging. Scholars like Lubatkin [23] and Datta [12] have long suggested that organizational incompatibilities, such as differences in management style, organizational structure, and culture, affect post-M&A integration and cause problems in the realization of benefits to M&A.

However, there are situations when different organizational environments could provide opportunity for learning, as discussed in the case of MajCom/NextCom, where NextCom adopted a more flexible approach in its product development process from MajCom. A similar situation was seen in the case of GiantSoft/CanSoft, where there were stark contrasts in the firms’ structures. However, the structural issues were proactively dealt with. As a result, the negative impact of structural differences on knowledge transfer was minimized; at the same time, the differences contributed to a quicker adoption of a more structured product development process by CanSoft, which eventually helped CanSoft to improve its innovative productivity within the combined firm.

Knowledge transfer and innovation outcome

GiantSoft/CanSoft and BrightTech/FutureTech were successful in their knowledge transfer efforts and MajCom was only moderately successful. The proximity dimensions—geographic, cognitive, and organizational—as well as the retention of key employees influence the level of success achieved. In the MajCom case, knowledge transfer was moderately successful because it lost a significant number of technical employees associated with ongoing projects that the new management wanted to retain. Similarly, most of NextCom’s senior managers left the company. These managers could have provided needed stability and continuity post-M&A. They could have also played a role in realizing post-M&A value, both expected and serendipitous [17].

For incremental innovation, four categories of change are identified similar to those suggested by Man and Duysters [25], although in more detail. These categories are product optimization, that is using the combined technological knowledge and capabilities to enhance product capability and features; product recombination, that is using combined knowledge and capabilities to create new types of products; acceleration of product development (due to access to research facilities and a large pool of capable employees); and enhancement in firm’s R&D practices that improve productivity (such as, the adaptation of more structured R&D processes by CanSoft and more lenient product development processes by NextCom).

Although in all three cases incremental innovations were associated with the transfer of knowledge, GiantSoft/CanSoft was the most successful. CanSoft not only had various types of incremental innovation, it also had the opportunity to create new products by tapping into GiantSoft’s large knowledge base, where there was unused research and knowledge. On the other hand, BrightTech and MajCom mostly created incremental innovations based on the optimization of existing products. The firms leveraged each other’s technical strengths to increase the performance of their products and technology. For example, BrightTech was able to leverage some of FutureTech’s proven technology to accelerate its development process around various laser products.

GiantSoft was the only company that experienced radical innovation. It explored next generation technology and launched products in new fields. CanSoft, as a new unit within GiantSoft, was also able to take on projects that could change the marketplace by leveraging GiantSoft’s credibility and capabilities. Finally GiantSoft added a fundamentally different set of knowledge and capabilities to CanSoft by acquiring a second company. The newly gained knowledge and capabilities allowed it to develop substantially different products and technology going forward.

Our results support the conclusion drawn by Makri et al. [24] that knowledge transfer in M&A between firms with similar knowledge bases is positively related to incremental innovation, while knowledge transfer between firms with complementary technology and capabilities is positively related to radical innovation. Similarly, studies on R&D alliances found that when the knowledge bases between partners are too similar, there is little benefit to radical innovation but when technical knowledge is complementary, the benefits to radical innovation are greater [29].

8. References


