

Knowledge Cleansing in Post-Acquisition Integration

Drawing Big Picture of Knowledge Management

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Abstract—Based on four post-acquisition experiences of one global medical system manufacturing firm, this study examines how knowledge cleansing occurs in post-acquisition integration. The two factors are important in explaining cleansing after the acquisition: the perceived strategic value of acquired knowledge and the target firm's certainty level on protecting its knowledge. The case finding shows four cases are divided into two high-cleansing and two low-cleansing cases. Both the combination of high value of knowledge and high certainty of knowledge protection and the combination of low value of knowledge and low certainty of knowledge protection turned out as high cleansing. In contrast, high-low and low-high combinations of the two factors resulted in low cleansing. Based on this categorization, the study develops the process model of knowledge cleansing in post-acquisition integration. This study sheds new light on the knowledge management study in post-acquisition integration. It is also expected to improve the understanding of corporate knowledge management in its mature stage, which is the situation of most firms today.

Keywords — Knowledge, Cleansing, Knowledge expansion, Knowledge reduction, Post-Acquisition Integration, Case study

I. Introduction

Knowledge inundation, a chronic condition an organization suffers from ongoing difficulty managing and acting on what it learns and already knows, has emerged as an undeniable reality that many knowledge-intensive firms face today. In mergers and acquisitions (acquisitions hereafter) [1], knowledge inundation became a significant issue due to the compressed temporality of M&As [1, 2]. During post-acquisition integration (PAI hereafter), acquiring and target firms experience massive knowledge inflow caused by introducing new technologies, products, and business practices from the acquisition partners, which require immediate feedback [3].

Besides, imperfect knowledge management as part of post-acquisition integration aggravates this complicated situation by exclusively focusing on knowledge acquisition and sharing. Knowledge inundation in PAI reduces the efficiencies and effectiveness of corporate knowledge management by causing disturbances in communications and collaborations between acquiring and target firms and slowing down the knowledge flows throughout the firm [4].

To overcome these challenges, the firms under the PAI needed to find ways to improve their knowledge management systems and practices by carefully analyzing their important knowledge and then devising an organizational system that seamlessly connects the acquisition partners. Among the solutions for knowledge inundation in PAI, knowledge cleansing is promising. It was founded on the idea that the knowledge assets over the entire firm could be arranged for better access and retrieval, and the knowledge flow of the firm could be balanced by cleaning out redundant and unnecessary pieces from the entire knowledge asset in PAI. Simply put, cleansing is a purposeful organizational activity that deletes a certain part of knowledge from the organization's memory [5]. However, knowledge management has focused on knowledge accumulation plans and activities such as knowledge acquisition, sharing, creation, retention, and integration. Knowledge accumulation has long been considered the first necessary condition for knowledge management success and organizational growth [6] [7].

With this perspective in mind, this study examines how and why the elimination of existing knowledge from an organization, called cleansing, occurs in PAI and presents three findings. First, cleansing in PAI is closely associated with four different integration patterns after the acquisition, and these four patterns determine the level of cleansing. Second, cleansing in PAI depends on both the strategic value of target knowledge and the certainty of the protection of target knowledge. Finally, cleansing in PAI is a two-way strategic interaction between acquiring and target firms rather than one-way decision-making and implementation from an acquiring firm.

II. Conceptual Background

A. Knowledge Expansion Approach

Knowledge expansion refers to the organizational approach to knowledge management that favors increasing and accumulating corporate knowledge assets through knowledge sharing over the communication network of official corporate communication channels and the community of practice. Knowledge is accumulated by intentional and systematic acquisition, creation, and distribution. Knowledge management has focused exclusively on adding and spreading corporate knowledge.

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For instance, a well-known CECI model of knowledge creation (Nonaka, 1994; Nonaka et al., 1998) argues that the essence of effective knowledge management boils down to the spiral increase of organizational knowledge through the incessant interactions between tacit and explicit knowledge. Similarly, the knowledge-based view stresses that a firm's unique capability lies in effectively integrating specialized knowledge [8] [9]. On the other hand, knowledge diffusion through sharing over social networks has emphasized the organizational benefits realized by the prevalence of knowledge over the entire firm [10].

Knowledge expansion has been prevalent in the research on knowledge management in PAI [11] [12]. These studies stress the importance of acquiring new knowledge from acquisitions or establishing a vibrant knowledge network across the acquiring and target firms in PAI.

In summary, drawing on the belief that knowledge is a valuable resource leading to a firm's competitive advantages [13], the knowledge expansion approach pursues the active acquisition and accumulation for the capitalization of knowledge. Since adding knowledge is of primary importance to a firm, a certain amount of redundant knowledge over the entire firm is preferred rather than avoided [14], and losing knowledge is regarded as undesirable [15]. Considering organizations (including firms) as self-regulating activity systems [16], knowledge accumulation without certain guidelines and limitations might cause a serious problem for a firm in managing knowledge. Literature suggests that the decision effectiveness of human beings decreases after passing a certain point if the amount of available information keeps increasing [17], indicating that too much knowledge could harm decision effectiveness. Researchers and practitioners believe that the same problem can happen on the firm level when the amount of knowledge exceeds the capability of corporate management.

B. *Knowledge Reduction Approach*

In contrast, the knowledge reduction approach is a firm's intentional or accidental discharge of knowledge from its organizational memory. By pointing out that knowledge can be forgotten, lost, and removed, this approach recognizes that knowledge is like a living organism growing or decaying over time and needs careful management not to be hurt or damaged.

While knowledge loss and forgetting have been regarded as accidental occurrences with negative implications for the organizations involved [5], organizational unlearning is a more positive concept. It implies *“an organizational process through which one discards knowledge ...[which] makes way for new responses and mental maps [18].”*

It aims to eliminate knowledge from an organizational memory and is operationalized as changing beliefs and routines within the firm [19]. It is caused by external stimulus (environmental

change) from outside the organization and is followed by new learning.

Knowledge cleansing is an organizational move towards eliminating knowledge. It is a strategic, systematic initiative based on corporate knowledge management plans, and organizational unlearning is the critical mechanism on which cleansing is dependent. Organizations filter through arrays of seemingly confusing knowledge by applying a set of principles and norms [20]. Consequently, they reach a certain level of understanding of the problems they have to deal with and the situations they are facing [21]. Nevertheless, the need for a knowledge reduction approach in PAI has rarely been argued. Therefore, the study of knowledge cleansing is critical to narrowing the gap between the research and the situation at hand and improving the effectiveness of knowledge management in PAI.

III. Research Design

This study adopted a grounded theory-building approach [22] and replication logic of multiple case study research [23] as a research method. The study examined the four acquisition cases of a significant global medical system manufacturing and service company, MediTech MRI & CT Division (hereafter MediTech). The research was developed in 2 stages. At first, the study focused on two related but distinctive acquisition cases of MediTech, a global medical system manufacturing and service firm. MediTech, whose headquarters are located in Western Europe, acquired two divisions at the same time, the Magnetic Resonance Imaging (MRI hereafter) and Computed Tomography (CT hereafter) of MediSys, a US-based firm, and then established the new MediTech CT/MRI division by merging them with MediTech's prior CT and MRI (Case 3 and 4). Data collection and analysis revealed that these two acquisition cases are typical examples of massive cleansing, which can serve as literal replications for the study.

To broaden the scope of the theory, however, the study added two more cases from the same company's history: the acquisition of MROne and CTCom by MediSys. A few years before the acquisition, the target firm MediSys also carried out acquisitions with two other medical system companies, an open MRI system manufacturing company based in Northern Europe, MROne, and a Middle East-based multi-sliced CT system manufacturing company, CTCom, and these two acquisitions resulted in minimal cleansing. Thus, these two acquisition cases provided opportunities for theoretical replication (Cases 1 and 2). All acquisitions were primarily technology-oriented, and two technologically complementary firms were combined within the same industry.

Table 1. Description of Interviewees

Rank/ Position	Interview point	Affiliation						Total		
		MROne		CTCom		MediTech			MediSys	
		MRI	CT	MRI	CT	MRI	CT		MRI	CT
Managers	1 st round	1	1	1		0				6
	2 nd round	0	0	2	1	1	1	1	1	2
Engineers	1 st round	3	2	1	0	2	2	2	2	5
	2 nd round	0	0	1	0	1	0	1	0	2
	3 rd round	0	0	1	0	1	0	1	0	2
Other staffs	1 st round	3	0	2		4				6
Total		7	3	10		13				33

Data were collected and analyzed from 33 in-depth open interviews conducted longitudinally over three years, from the first to the fourth year of acquisition, to identify key themes of the topic (Glaser et al., 1967; Miles et al., 1984). Statements from the interviews were coded and combined into broader themes. As new themes emerged, we returned to the data sources to validate and elaborate on the findings. Finally, the relationships among emerging themes were examined.

iv. Four Types of Knowledge Cleansing in PAI

Data shows four distinctive types of knowledge cleansing: autonomy, symbiosis, implantation, and colonization. These are closely associated with different knowledge integrations in PAI. The explanation for each type follows.

A. *Autonomy: Minimal cleansing based on agreed role assignment*

The case of MediSys' acquisition of MROne is characterized by minimal cleansing on both sides. This is caused by an acquiring firm's attempt to manage both acquiring and target knowledge within a newly merged firm separately as different parts of the entire corporate knowledge portfolio.

The acquisition of MROne by MediSys began with the agreement between the top management teams of the two companies after their three-year joint venture collaboration. At the time of the acquisition, MROne was a small company located in Northern Europe, which enjoyed moderate profits in the niche market from the production of conventional low-field, low-cost MRI systems. Over time, MROne had struggled for a more significant market share, investing a great amount of money in R&D. However, due to finite resources and the brand name as a small player in the market, it made only moderate commercial success, and the growth of the company reached its limit. Considering the tough competition in the medical system industry, the future of a small company like MROne needed to be made better. For this reason, MROne looked for a business partner who could support it with more resources and better marketing channels. After a few years of research efforts, it could launch the joint venture with MediSys, and then 3 years after, MROne voluntarily agreed to be a part of MediSys. From the MediSys MRI perspective, the acquisition provided the opportunity to expand its product portfolio. MediSys, a middle-sized medical system manufacturing and service company in the medical system industry, didn't have a chance to develop open MRI products with its resources. Although open MRI technology did not have the potential for a vast market, it was important for MediSys MRI because it was expected to help MediSys MRI compete with other global medical system manufacturing firms by expanding its product portfolio.

For this reason, pre and post-acquisition integration was devoted to transferring MROne's capability of producing low-field MRI into open MRI technology. In this procedure, MROne, a target firm, was confident in protecting its knowledge within a newly merged firm. After the acquisition, MediSys' marketing and sales force supported MROne's open MRI products. However, MROne was run almost as an independent organization in development and manufacturing without much integration or interruption from MediSys. One of the former MROne managers said,

“Before the acquisition, we had an idea that open MRI would be good for us. But we didn’t have enough resources to go forward. So, the acquisition triggered this activity. When both MediSys and MROne people decided what the future of this company would be, they decided that MROne would go for low cost and open MRI.”

The acquisition provided a new growth opportunity for both companies. MROne has been considered promising and highly competitive in open MRI systems development because open MRI was based upon the low-field, low-cost MRI technology, on which MROne has already developed expertise for a long time. By focusing on a different MRI development and production domain, MROne could secure its position within a newly merged firm and avoid internal competition with an acquiring firm after the acquisition. This independent, autonomous operation based on minimal knowledge cleansing led to a cross-fertilization through active knowledge sharing and work collaboration between the two sites over the general MRI application and system development after the acquisition.

B. Symbiosis: Limited cleansing as the result of competitive knowledge coexistence

The second case, MediSys' acquisition of CTCOM, is also characterized as limited cleansing. In this case, however, the reason comes from the fact that both acquiring and target firms accepted the coexistence of two bodies of knowledge from each side, which was drawn as the best solution for their intense struggles for knowledge within a newly merged firm.

Before the mutual agreement on their roles and specialties, MediSys and CTCOM had a tough time due to the conflict over sharing knowledge and collaborating for product development. Especially for MediSys CT, acquiring CTCOM's CT scanner development technology and know-how was their primary concern because MediSys CT was in deep trouble due to the project delay for their next CT scanner product. Its ambitious development efforts for the 4th generation CT scanner failed because of its wrong prediction of market demand. The new project for another product development didn't make meaningful progress, and as a result, MediSys CT was in danger of being left behind by its competitors. For this reason, MediSys was desperate to acquire CTCOM because CTCOM was already about to launch its new product, 3rd generation multi-sliced CT scanner, on the market.

From CTCOM's viewpoint, however, MediSys' difficult situation became an unstable factor that could jeopardize CTCOM's future within a newly merged firm throughout the post-acquisition period. More than anything else, CTCOM accepted MediSys CT's interest in CTCOM's technology and knowledge as a serious threat, lowering the certainty that it could survive by protecting its technology and knowledge after the acquisition. MediSys' unclear corporate strategy on

the post-acquisition integration and poor leadership even aggravated the situation. The post-acquisition integration progressed without any prepared plan. Before CTCOM was acquired, MediSys was a medical system subsidiary of G-Tech, an English company.

For this reason, the acquisition of CTCOM by MediSys was led more by G-Tech than MediSys CT. A CT development engineer of MediSys noted, “*Since MediSys CT didn't acquire CTCOM, we had no direct control over anything they did. We were two companies, and we actually didn't own them even after the acquisition.*”

The lack of a knowledge integration plan made both acquiring and target firms confused in terms of whether CTCOM could be the center of excellence in the domain of high-end multi-sliced CT scanner development and manufacturing and what and how much knowledge of CTCOM should be shared with MediSys CT. From CTCOM's point of view, the ambiguous attitude of MediSys CT on the future integration plan made CTCOM take a defensive posture on the opening of its CT technology because it felt a low certainty on protecting its knowledge within a newly merged firm. Naturally, two organizations with the same medical systems specialty entered the intense competition. Managers and employees from CTCOM were especially worried about their job security and the future of their organization. Consequently, they were suspicious about MediSys CT, and criticisms, finger-pointing, and excessive rivalry were prevalent throughout the newly merged firm. In this situation, integrating the expertise of CT system development and manufacturing was a challenging task and was never easy throughout the post-acquisition period. As a general manager of CT recollected, knowledge sharing was never an easy task for MediSys CT when CTCOM was not cooperative, even though the general CT scanner and other system development processes seemed similar between the two. One MediSys CT engineer recollected the difficulty he had faced every time he tried to learn from CTCOM as follows.

“Where we ran into the difficulty was in learning those small things or when we were about to deliver those pieces of information to people. The devil was always in the details. Theoretically, we could’ve done things the same way as they did in general, but getting them done was never easy for us. The nitty-gritty of all the little things became the problem.”

However, the turbulent situation changed when a new CT manager was appointed two years after the acquisition. He prioritized integrating two R&Ds as the priority of his agenda and presented ‘specialty demarcation’ as a solution. The basic idea of specialty demarcation was to specialize each of the two sides around its core capabilities; the newly merged company assigned each side a few development responsibilities called ‘centers of excellence.’ To do this, the company first identified each site’s expertise and relative competitiveness in CT scanner development. Then, based on the assessment, the responsibilities of each site in development and manufacturing were defined. A center of excellence could be assigned with a certain product or product component. Either way, a center of excellence is responsible for development and manufacturing. Once these knowledge boundaries were confirmed, all the development projects between the two sides were developed based on acknowledging each side’s vested rights. The fact that one side was assigned as the center of excellence in a certain domain didn’t necessarily mean that the other side didn’t have technical expertise in that same domain. However, the initiative and ultimate responsibility of the joint projects, such as planning, coordination, integration, and testing, belonged to the center of excellence. The new leadership and specialty demarcation significantly changed the relationship between the two sides. Once the domains and responsibilities for each site became clear, the excessive competition and conflicts between the two were stabilized over time. Further, R&D collaborations and knowledge sharing developed based on the trust toward the other. After a long period of turbulence, the MediSys CT division finally found a way to co-exist with each knowledge domain and specialty.

C. Implantation: Active cleansing of acquiring firm

Unlike the first and second cases, the third case, MediSys CT’s acquisition by MediTech, is characterized as a significant cleansing. Interestingly enough, however, the cleansing

mainly occurred within the acquiring firm to support the operations of the target firm, which is considered to have much more important technology than the acquiring firm.

MediTech acquired MediSys simultaneously through MRI and CT. This acquisition’s major focus was expanding the product portfolio by adding the CT division to the established business lines. Since MediTech had not developed strong CT capabilities, quickly acquiring an excellent CT capability was urgent for its future growth in the medical system industry.

To become a leading company in the industry, MediTech engaged in acquisitions in X-rays, ultrasound, nuclear medicine, MRI, and CT. The acquisition of MediSys, the last of these acquisitions, was considered the most complicated regarding the integration scope and degree because both MediSys and MediTech had MRI and CT businesses. However, the acquisition of MediSys CT was a successful investment. From MediSys’ point of view, the acquisition provided the opportunity to invest fully in the CT business. Before the acquisition, MediSys had been a part of a British company, G-Tech. A few years before the acquisition, G-Tech decided to concentrate on the telecommunication business. Based on the strategic plan, it purchased US telecom companies at premium prices.

Consequently, medical system manufacturing became a sidetrack, and MediSys became far away from major corporate business concerns. Situations were getting worse because of the downturn in the IT business, which put G-Tech in deep financial trouble. MediSys had to make a significant financial contribution to G-Tech without support from a mother company. Therefore, when G-Tech agreed with MediTech to sell out MediSys and invest money in their telecom business, the most responses in MediSys were comfort and welcome.

PAI was smooth and fast because both companies had a clear and urgent motivation for the acquisition. After the acquisition, MediTech CT quickly removed its development and manufacturing function from the site and only maintained a customer support function for old MediTech CT systems. MediTech CT US became a center of excellence, representing the CT business line of a newly merged firm that preserved its whole CT development and manufacturing even after the acquisition. However, a certain level of integration happened in marketing and other supporting areas like HR and IT. In addition, MediSys CT was requested to be a part of a new company by following its corporate policy and work procedures and connecting to the acquiring firm’s infrastructure and reporting system. However, since MediTech CT US had almost all the initiatives in research and manufacturing and there was no major counterpart division for coordination in MediTech, integration progressed without any major challenge.

D. **Colonization: Active cleansing of target firm**

Like the third case, MediSys MRI's acquisition by MediTech MRI can be characterized as active cleansing. The difference is, however, that most cleansing occurred within a target firm to improve its operational efficiency within a newly merged firm through integration.

Contrary to the acquisition of MediSys CT, the integration of MediSys MRI was turbulent from the beginning. Unlike CT, MediTech MRI already has the largest imaging modality in the entire medical system. As one of the major players taking big market share, it had advanced technology and expertise even before the acquisition. For this reason, there existed no urgency or strategic necessity for acquiring another MRI. Similarly, MediSys also had a large and competitive MRI division. It was known as one of the pioneering companies in MRI technology development. It came up with many first things in the industry in the past. The MediSys engineering team has over one thousand years of development experience. Three years after the acquisition, it generated about 300 new patents in MRI.

The biggest issue of this acquisition was that the two companies were perceived to have similar technology and expertise. The synergy from the acquisition was hard to expect in technology because it was believed that the acquiring company knew what the acquired company knew. Furthermore, the MRI products of both companies were almost the same, competing with each other in the market. This made the benefits of the acquisition even more questionable, at least in MRI.

In this vein, some MediTech people considered acquiring MediSys MRI a byproduct of CT acquisition, although others refused this negative feeling. Nevertheless, one thing seemed quite evident: MediSys MRI was not a primary consideration for MediTech, at least at the time of the MediSys acquisition. MRI was a part of the acquisition deal, but it was not the reason. Due to all these reasons, PAI was not implemented under the carefully designed roadmap.

MediTech actively tried to manage PAI. Moreover, the integration plans often changed unexpectedly. Consequently, MediTech decided to change the operation of MediSys after the acquisition. Three years after the acquisition, the MediSys research group and facility in England closed down, losing about 100 engineers. Four years after the acquisition, MediSys had to lose another 40-50 engineers because MediTech changed the plan to move the development and manufacturing responsibility of the 3T MRI machine to MediTech MRI US. People from both sites were even more frustrated, and the integration created more uncertainty.

A manager from MediTech MRI West Europe confessed to the difficult situation he was facing, which is as follows:

“MediTech has been struggling with massive integration issues, which it has never undergone. In particular, the issues of assigning responsibilities and works to each site and finding the best collaboration have been the primary issue for both MediTech Europe and MediTech US to date.”

v. **Discussions**

From the four cases, knowledge cleansing in different PAI situations converges to a particular pattern, characterized as the evolutionary interchanges of the acquiring firm's cleansing initiative and the target firm's appropriation response. Based on this understanding, a generalizable process model of knowledge cleansing in PAI can be formulated as follows.

In the first stage of the model, a target firm initiates a dual process to protect its knowledge right after the acquisition; on the one hand, it tries to impress an acquiring firm by actively appealing the value of its knowledge with the various records and other pieces of evidence and to do this, the target firm estimates its knowledge value in the relation with the acquiring firm. In the first case, MROne, a target firm, persuaded MediSys MRI, an acquiring firm, that MROne could contribute to MediSys' business by adding open MRI to the MediSys product portfolio within a newly merged firm. Although open MRI was not its current business, MROne tried to give MediSys MRI the conviction that it could start the business very soon with its low-field MRI development and manufacturing knowledge and experience, which was considered to be very similar to the open MRI technology, more than ten years. Similarly, in Case 4, MediSys MRI consistently tried to show MediTech the value of its knowledge by presenting that it had the same number of patents with its acquiring firm over the entire disciplines of the MRI system and kept on producing 15-20 patents each year. On the other hand, a target firm attempts to protect its knowledge assets by capitalizing on the acquiring firm's situation in PAI after it ascertained the possibility that it could protect its knowledge assets based on the various information and channels. In Case 2, CTCom recognized that it was not certain about protecting its knowledge because MediSys CT was desperate to acquire the multi-sliced CT scanner development technology from CTCom. At the same time, however, it was also evident that MediSys didn't have much control over CTCom because its mother company, G-Tech, took the lead over the entire acquisition.

Moreover, MediSys didn't clearly understand how much CTCOM's knowledge couldn't be shared by government regulation. CTCOM capitalized on this situation to protect its knowledge asset within a newly merged firm.

In response to these two-track strategies of target firms, acquiring firms assess the strategic value of the target knowledge, which is based on reviews of its past performance and the monitoring of the present level of capability. In our four cases, all acquiring firms engaged in this assessment before the cleansing decision-making. In Case 2 and Case 3, both MediSys CT and MediTech CT, acquiring firms, quickly concluded that their targets had a high strategic value of knowledge. In contrast, in Case 1 and Case 4, both acquiring firms realized that the strategic value of target knowledge was insignificant even though this target appealed to the value of their knowledge. This assessment led to i) the acquiring firm's attempts to find the target firm's new value by transforming its established capability to new technology (Case 1) or ii) gradual cleansing over time to remove the unnecessary knowledge overlap between the acquisition partners (Case 4).

In the third stage, the assessment of the target knowledge leads to the two tracks of the cleansing process. On the one hand, an acquiring firm makes a cleansing decision. Then, it implements it toward a target firm based on the assessment of the strategic value of its knowledge and the level of the target firm's knowledge protection. In this case, the cleansing decision includes the decision that an acquiring firm would not engage in the significant cleansing implementation. Among the four cases, both in Case 1 and Case 3, acquiring firms reached prompt decisions that they would not engage in significant knowledge cleansing from their target firm due to the well-organized acquiring firm's strategic plan capitalizing on the target knowledge (Case 1) or its critical strategic importance (Case 3). In Case 2 and Case 4, however, the cleansing decision and implementation were delayed because either an acquiring firm considered a difficult PAI situation caused by the resistance of a target firm (Case 2) or an acquiring firm didn't have a clear integration plan of corporate knowledge at the beginning. The cleansing decision led to either significant cleansing (Case 4) or limited cleansing (Case 1, Case 2, and Case 3) of a target firm.

On the other hand, an acquiring firm also decides whether or not it will engage in self-cleansing to support target

knowledge within a newly merged firm. This self-cleansing is a byproduct of target cleansing and a reflective, self-discovery

process in nature because it occurs from the comparison of knowledge values between acquiring and target firms, which is naturally followed by the self-evaluation of the true value of knowledge it has from a more relative, objective view. If the relative strategic value of target knowledge is much more valuable, the acquiring firm begins to consider active self-cleansing. For example, in Case 3, MediSys' high level of CT development, manufacturing technology, and experience led MediTech to appoint MediSys CT as a center of excellence within a newly merged firm. They initiated significant knowledge cleansing against MediTech CT.

In the fourth stage, target firms try to adjust some cleansing decisions from acquiring firms, not just follow them as suggested. The primary goal of this reactive implementation is to buffer the shock of cleansing decisions and try to protect its knowledge assets. How target firms respond to the cleansing implementation of an acquiring firm can be referred to as appropriation. Like a cleansing decision in the third stage, cleansing appropriation is mediated by the two conditions above. In our cases, target firms attempt appropriation about whether acquiring firms decide significant cleansing or not. In Case 2, CTCOM constantly watched the possibility of future cleansing and hesitated to reveal its knowledge repository and share its knowledge with MediSys. The protective attitude toward the knowledge came from the fact that it had a high value of knowledge from an acquiring firm's view, and thus, the certainty of the protection of its knowledge was not assured. The following comment of a general manager of CTCOM shows that his concerns about the knowledge protection of CTCOM were closely associated with his interest in the possibility of future survival within the newly merged firm.

“We became a subsidiary of an American global company overnight, and they acquired us because of our knowledge; what will happen if they come to have our knowledge? Do they need us or not? We are not in the safest place in the world. We are so realistic about this issue. So, if that’s the case, why should we give our information to them?”

Appropriation was developed differently in Case 4; it was revealed to focus its capability on a certain domain of its new functional assignments. After the significant cleansing, MediSys MRI was assigned new missions: developing and manufacturing 7T, an advanced MRI scanner, and some parts of the MRI system, such as spectroscopy and RF coil. Among these, however, concentrating on the mission of developing and manufacturing the 7T MRI scanner was more beneficial to MediSys MRI because it was more advantageous to MediSys in building its knowledge and capability within a newly merged firm by taking the full responsibility for the whole MRI system development and manufacturing. The other two assignments participated in MediTech’s system development only by taking partial responsibility for one or two parts, even though that responsibility is critical in the entire system development. As one engineer of MediTech MRI correctly penetrates, *“It was proven that in the last few years quite difficult for MediSys to concentrate on spectroscopy competency. One reason is the resource drain due to the 7T core activity. They couldn’t allocate resources to the spectroscopy competency for this activity.”*

The outcomes of appropriation from target firms again become the basis of the assessment of the acquiring firm, and this also leads to another round of the cleansing process. In this regard, in Case 4, cleansing became even more significant to MediSys MRI over time. At first, MediTech MRI didn’t

decide to do a massive cleansing of MediSys MRI one year after the acquisition, except for the shutdown of the research facility for the high-end MRI scanners in England. However, the unexpected internal market competition between the two firms’ products forced MediTech to make the first cleansing decision, and MediSys had to stop its 3T MRI scanner product development. Furthermore, MediTech made a more significant cleansing decision two years after the acquisition. As a result, MediSys had to remove all its manufacturing functions from

its location. In this way, the cleansing process continues until a new company is satisfied with its development of knowledge management. The process of knowledge cleansing is illustrated in Figure 1.

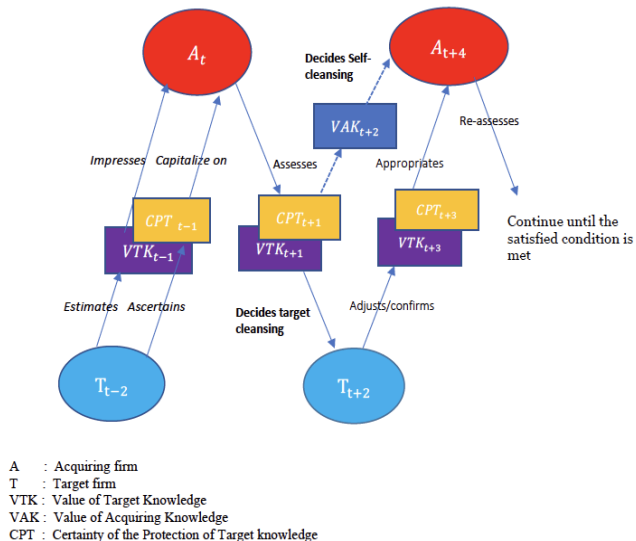


Figure 1 Evolutionary cleansing process in PAI

The model implies three important points. First, knowledge-cleansing in PAI is a two-layer process emerging from the interactions between acquiring and target firms rather than one way of cleansing decisions from an acquiring firm. Second, cleansing in PAI is rather an iterative process between cleansing decision-making and cleansing appropriation than a one-time procedure within a short period of PAI. Even though knowledge management in PAI is planned and implemented under time pressure, cleansing often goes through a few rounds of circulation, moving between cleansing decision-making and appropriations until satisfactory integration and allocation of knowledge between acquisition partners is achieved. Third, these interactions are mediated by both the strategic value of target knowledge and certainty of protection on target knowledge. In a nutshell, the acquiring and target firm is influenced by the two factors when they are cleansing knowledge.

References

- [1] M. Habeck, F. Kröger, and M. Träm, *After the merger*. FT Press, 2000.
- [2] M. A. Hitt, R. E. Hoskisson, R. A. Johnson, and D. D. Moesel, "The market for corporate control and firm innovation," *Academy of management journal*, vol. 39, no. 5, pp. 1084-1119, 1996.
- [3] C. J. Houtman, J. Kroesbergen, K. Lekkerkerker-Teunissen, and J. P. van der Hoek, "Human health risk assessment of the mixture of pharmaceuticals in Dutch drinking water and its sources based on frequent monitoring data," *Science of the Total Environment*, vol. 496, pp. 54-62, 2014.
- [4] Y. Yoo, K. Lyytinen, and D. Heo, "Closing the gap: towards a process model of post - merger knowledge sharing," *Information Systems Journal*, vol. 17, no. 4, pp. 321-347, 2007.
- [5] P. M. De Holan and N. Phillips, "Organizational forgetting as strategy," vol. 2, ed: Sage Publications Sage CA: Thousand Oaks, CA, 2004, pp. 423-433.
- [6] S. C. Chang and M. S. Lee, "The linkage between knowledge accumulation capability and organizational innovation," *Journal of knowledge management*, vol. 12, no. 1, pp. 3-20, 2008.
- [7] K. Kuwada, "Strategic learning: The continuous side of discontinuous strategic change," *Organization Science*, vol. 9, no. 6, pp. 719-736, 1998.
- [8] R. M. Grant, "Toward a knowledge - based theory of the firm," *Strategic management journal*, vol. 17, no. S2, pp. 109-122, 1996.
- [9] G. S. Kearns and R. Sabherwal, "Strategic alignment between business and information technology: a knowledge-based view of behaviors, outcome, and consequences," *Journal of management information systems*, vol. 23, no. 3, pp. 129-162, 2006.
- [10] M. T. Hansen, N. Nohria, and T. Tierney, "What's your strategy for managing knowledge," *Knowledge management: critical perspectives on business and management*, vol. 77, no. 2, p. 322, 2005.
- [11] E. Vaara, R. Sarala, G. K. Stahl, and I. Björkman, "The impact of organizational and national cultural differences on social conflict and knowledge transfer in international acquisitions," *Journal of Management Studies*, vol. 49, no. 1, pp. 1-27, 2012.
- [12] M. Makri, M. A. Hitt, and P. J. Lane, "Complementary technologies, knowledge relatedness, and invention outcomes in high technology mergers and acquisitions," *Strategic management journal*, vol. 31, no. 6, pp. 602-628, 2010.
- [13] J. C. Spender, "Making knowledge the basis of a dynamic theory of the firm," *Strategic management journal*, vol. 17, no. S2, pp. 45-62, 1996.
- [14] S. S. Wong, "Task knowledge overlap and knowledge variety: The role of advice network structures and impact on group effectiveness," *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*, vol. 29, no. 5, pp. 591-614, 2008.
- [15] G. Cattani, R. L. Dunbar, and Z. Shapira, "Value creation and knowledge loss: The case of Cremonese stringed instruments," *Organization Science*, vol. 24, no. 3, pp. 813-830, 2013.
- [16] W. Buckley, *Systems research for behavioral science: a sourcebook*. Routledge, 2017.
- [17] K. L. Keller and R. Staelin, "Effects of quality and quantity of information on decision effectiveness," *Journal of consumer research*, vol. 14, no. 2, pp. 200-213, 1987.
- [18] L. I. Hedberg, "Spectral synthesis in Sobolev spaces, and uniqueness of solutions of the Dirichlet problem," 1981.
- [19] A. E. Akgün, J. C. Byrne, G. S. Lynn, and H. Keskin, "Organizational unlearning as changes in beliefs and routines in organizations," *Journal of organizational change management*, vol. 20, no. 6, pp. 794-812, 2007.
- [20] R. A. Bettis and C. K. Prahalad, "The dominant logic: Retrospective and extension," *Strategic management journal*, vol. 16, no. 1, pp. 5-14, 1995.
- [21] K. E. Weick, K. M. Sutcliffe, and D. Obstfeld, "Organizing and the process of sensemaking," *Organization science*, vol. 16, no. 4, pp. 409-421, 2005.
- [22] B. Glaser and A. Strauss, *Discovery of grounded theory: Strategies for qualitative research*. Routledge, 2017.
- [23] R. K. Yin, *Case study research and applications: Design and methods*. Sage publications, 2017.