

HUMAN RESOURCES IN TECHNOLOGICAL M&AS: TARGET FIRM INVENTORS' POST-M&A ORGANIZATIONAL CONTEXT

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INTRODUCTION

Under the basic assumption that human resources are one of the most important knowledge reservoirs of the firm, previous research on technological M&As has focused on post-M&A target firm inventor retention ((Hussinger, 2012); (Ranft, 2006)). This stream of research has considered the retention of the target firm's key inventors as a significant success factor for technological M&As ((Paruchuri, Nerkar, & Hambrick, 2006)). However, besides the member-focused view of previous literature on post-M&A inventor retention, their organizational context should also be taken into consideration, as once the target firm's inventors are retained, it becomes important to consider who they work with, and what role they perform in the post-M&A merged entity.

For a successful external knowledge sourcing through technological M&A, the firm should understand the paradox between post-M&A knowledge preservation and synergy realization ((Puranam & Srikanth, 2007); (Ranft & Lord, 2002)). That is, the acquirer firm's knowledge integration efforts simultaneously disrupt the target firm's knowledge reservoirs ((Ranft & Lord, 2002); (Risberg, 2001)). This relationship has continuously been identified in the literature on technological M&A which has shown that the target firm inventors are being disrupted by the acquirer firm's knowledge integration efforts ((Graebner, 2004); (Paruchuri et al., 2006); (Puranam & Srikanth, 2007); (Schweizer, 2005)). However, previous research has not yet determined which organizational contexts can leverage the paradox between post-M&A knowledge preservation and synergy realization.

To address this gap, this research investigates the impact of the target firm inventors' organizational context on firms' open innovation performance through technological M&As. Specifically, the study investigates two dimension of inventor retention, i.e., target firm inventor network retention (who do they work with), and target firm inventor field retention (in what field do they work after the M&A). This study develops theoretical arguments that those organizational contexts have different impacts on each side of open innovation, i.e., knowledge preservation and synergy realization. Through empirical tests employing a dataset comprised of technological M&A deals conducted in the biopharmaceutical industries from 2001 to 2009, this

research finds positive effects of inventor network and field retention on post-M&A knowledge preservation, while, at the same time, they negatively affect post-M&A synergy realization.

THEORY AND HYPOTHESES

Target firm inventor retention and target firm knowledge preservation in technological M&As

According to the theory of organizational learning and the knowledge-based view, organizational knowledge is complexly embedded in the knowledge reservoir, i.e., member, task, tools, and their networks ((Argote & Ingram, 2000)). Among those knowledge components, inventors and their networks are the most significant knowledge reservoirs of the firm since valuable knowledge tends to be more complexly embedded among individuals ((Argote & Miron-Spektor, 2011)). When inventors of an organization repeatedly conduct their R&D projects, they form distinctive inventor networks which formulates organizational routines and processes ((Kogut & Zander, 1992); (Paruchuri & Awate, 2016)). The knowledge accumulated in those inventor networks is mostly tacit knowledge, which is hard to imitate or transfer ((Kogut & Zander, 1992)). The individuals of an organization share their routines, norms, practices, decision making processes, and problem solving mechanisms through interpersonal networks ((Haspeslagh & Jemison, 1991)). Further, as technological solutions of research become more complex, they become heavily embedded in the network ((Carnabuci & Operti, 2013)). As a result, the true nature of organizational knowledge is not embedded in individuals, but rather resides in their networks. This knowledge, which is embedded in the inventor network, is the most valuable knowledge that should be transferred to the acquirer firm through technological M&A.

The research fields in which the target firm inventors specialized in before the M&A should also be retained in order to achieve a high level of knowledge preservation. The target firm inventor field retention implies that the knowledge embedded in tasks and member-task networks can be preserved. An inventor's specialized knowledge is formulated through the accumulation of field-specific experiences, i.e., experience from successively performed tasks ((Cohen & Levinthal, 1990); (Toh, 2014)). Those task experiences provide inventors with the process of learning by doing, which can be the source of tacit knowledge of individuals ((Argote & Miron-Spektor, 2011); (Eckardt, Skaggs, & Youndt, 2014); (Schilling, Vidal, Ployhart, & Marangoni, 2003)). However, the formulated context-specific knowledge which is retained in the task can be damaged if inventors leave their field of expertise and start to work in new field ((Jones, 2009)).

In summary, the post-M&A retention of the inventor networks and the inventors' original research field would help the target firm's knowledge preservation. Retaining these significant knowledge reservoirs will maximize the target firm's knowledge preservation.

Hypothesis 1a. The retention of the target firm inventor network after a technological M&A has a positive impact on post-M&A target firm knowledge preservation

Hypothesis 1b. The retention of the target firm inventor research fields after a technological M&A has a positive impact on post-M&A knowledge preservation/utilization

Target firm inventor retention and post-M&A synergy realization

Despite its positive effect on knowledge preservation, inventor network retention may hinder post-M&A synergy realization. To achieve post-M&A synergy realization through technological M&As, the knowledge resources of the acquirer and target firm should be integrated and recombined ((Ahuja & Katila, 2001); (Larsson & Finkelstein, 1999)). However, even though the retained routines and processes embedded in the target firm inventor network would provide the tacit know-how and problem solving skills ((Argote & Ren, 2012)), they will only help the target firm inventor's exploitative activities, not the collaborative exploration between acquirer and the target firm for the following reasons:

First, the organizational inertia of the target firm inventors would also be retained as the inventor network is retained in the combined entity. The knowledge in the network such as "how to work together" or "who knows what" make people comfortable with reusing existing ties for successive projects ((Argote & Miron-Spektor, 2011); (Dai, Roundy, Chok, Ding, & Byun, 2016)). The target firm inventors would fall into a competency trap, having less motivation to explore the acquirer firm's knowledge assets and pursue integration ((March, 1991)). As a result of the target firm inventors' organizational inertia and the competency trap, the inventor network retention impedes post-M&A knowledge integration and thereby the synergy realization with the acquirer's knowledge base.

Second, the organizational routines and collective thinking retained in the target firm inventor network may cause conflicts between the acquirer and target firm inventor groups. One of the main barriers for post-M&A synergy realization is the firm's 'exposure to organizational disruption due to conflict between acquirer and target firm inventors' ((Sears & Hoetker, 2014)). When two rigid routines face each other, both groups of knowledge workers would compete rather than collaborate ((Paruchuri et al., 2006); (Puranam, Singh, & Zollo, 2006)). Those conflicts can actually damage organizational creativity by reducing the experimental recombination between the two different knowledge bases ((Björkdahl, 2009)). Thus, though the inventor network retention supports target firm knowledge preservation, it simultaneously impedes post-M&A synergy realization.

Hypothesis 2a. The retention of the target firm inventor network after a technological M&A has a negative impact on post-M&A synergy realization

Target firm inventor field retention can also deter post-M&A synergy realization. First, when target firm inventors change their research field after the M&A, inventors from both the target and acquirer firm face increasingly diverse knowledge ((Arts & Fleming, 2016)). The increased diversity provides more possible recombination sets for a collaboration, which would help the firm to create innovation with a higher novelty ((Cohen & Levinthal, 1990); (Faems, De Visser, Andries, & Van Looy, 2010); (Nieto & Santamaría, 2007)). When inventors face a diverse set of knowledge resources, their creativity would be increased by adopting their specialized problem solving skills to new resources ((Merton, 1973)). In technological M&As, a mixture of knowledge from different specializations would raise the organization's creativity and positively affect post-M&A synergy realization.

Next, to create synergy through novel innovation, the collaborative group of acquirer and target firm inventors should think outside of the existing routines or processes. Inventors

retaining the same research field would be bounded to their known solutions and routines ((Levinthal & March, 1993)). They would become path dependent to their existing problem solving routines ((Jain, 2015)). Especially when the target firm inventors face fluctuation in the post-M&A environment ((Ernst & Vitt, 2000)), they would try to collaborate less with the acquirer firm inventors. Inventors who change their research field, on the other hand, would not be limited by such path dependency and are more likely to adopt new perspectives and skills for their projects ((Ahuja & Lampert, 2001)). Therefore, to achieve a synergy realization of the acquirer firm and the target firm's knowledge base, a change in the research fields of the target firm inventors would be necessary.

Hypothesis 2b. The retention of the target firm inventor research fields after a technological M&A has a negative impact on post-M&A synergy realization.

EMPIRICAL ANALYSIS

The hypotheses were tested using a data sample of technological M&A deals conducted by firms in the biopharmaceutical industry. Information on M&A deals conducted between 2001 and 2009 by firms in the biopharmaceutical industry was collected from the Thomson Reuters SDC Platinum database. Information on the patents granted to each of the firms involved in the M&A deals was collected from the United States Patent and Trademark Office (USPTO) database. The patent data is used to track the retention of the target firm inventors ((Hussinger, 2012); (Marx, Strumsky, & Fleming, 2009)). Financial information for each of the firms was collected from the Datastream database. Since the study focuses on the impacts of the retention of the networks and research fields of the inventors that are retained after the M&A deal, also all M&A deals in which no inventor was retained were excluded. The final data sample includes 99 M&A deals.

The results show that the control variables *Absolute Size of Knowledge base*, *Knowledge Similarity* and *Acquirer Firm Size* have significant effects on *Post-M&A Target Knowledge Preservation*. This is consistent with the results found in prior literature ((Ahuja & Katila, 2001); (Kapoor & Lim, 2007); (Makri et al., 2010); (Papadakis, 2005)). It is also shown that *Network Retention* has a positive and significant ($p < 0.05$) effect on *Post-M&A Target Knowledge Preservation*, thereby supporting Hypothesis 1a. *Field Retention* also has a positive and significant ($p < 0.01$) effect on the post-M&A target knowledge preservation, thereby supporting Hypothesis 1b. The full model further confirms the positive and significant effects of both *Network Retention* and *Field Retention* on *Post-M&A Target Knowledge Preservation*. Therefore, Hypotheses 1a and 1b are strongly supported.

The control variables *Relative Size of Knowledge Base*, *Knowledge Similarity*, and *Acquirer Firm Size* have significant effects on *Post-M&A Synergy Realization*. *Network Retention* has a negative and significant ($p < 0.05$) effect on *Post-M&A Synergy Realization*, which supports Hypothesis 2a. The other dimension of inventor retention, *Field Retention*, also has a negative and significant ($p < 0.01$) effect on *Post-M&A Synergy Realization*, thereby supporting Hypothesis 2b. The full model further confirms the negative and significant effects of *Network Retention* and *Field Retention* on *Post-M&A Synergy Realization*. Therefore, Hypotheses 2a and 2b are strongly supported.

CONCLUSION AND DISCUSSION

This study addresses more profound dimension of post-M&A inventor retention: which fields do they work in, and whom do they work with after the technological M&A. Investigating a key trade-off dilemma of technological M&As, the study hypothesizes that, for retained inventors, their network and research field retention support the target firm's knowledge preservation, but will have a negative impact on post-M&A synergy realization. The findings of this research provide several theoretical contributions to different streams of research and also provide practical implications for managers of firms conducting technological M&As.

First, the theoretical model of this study contributes to organizational learning theory by examining the impact of various knowledge reservoirs of the organization in technological M&As. According to organizational learning theory, the knowledge of the firm is embedded in the knowledge reservoir which is comprised of member, task, tools and their networks ((Argote & Ingram, 2000)). Especially, a firm's significant knowledge resources are often complexly embedded in its organizational members, member-member networks, and the networks among member and other organizational reservoirs ((Argote & Miron-Spektor, 2011)). Though previous research has stressed the importance of human resources networks as knowledge reservoirs ((Castro-Casal et al., 2013); (Puranam et al., 2006)), it has not investigated the relationship between the retention of such knowledge reservoirs and the firm's knowledge transfer and creation. Using the context of technological M&As, this research investigated the impact of the retention of the member-member network and member-task network on post-M&A knowledge preservation and synergy realization, thereby enriching the literature on knowledge reservoirs of the firm.

Second, by exemplifying the tradeoff relationship of post-M&A knowledge preservation and synergy realization, the research contributes to the research on technological M&As. Prior literature on M&As has described the dilemma of technological M&As, i.e., the more the acquirer firm tries to integrate the target firm's knowledge resources, the less knowledge can be preserved ((Paruchuri et al., 2006); (Ranft & Lord, 2000); (Ranft, 2006)). By looking at the different impact of organizational contexts on both knowledge preservation and synergy realization, the study further increases the understanding of the dilemma and how knowledge preservation and post-M&A synergy realization can be actively influenced.

Third, the empirical findings of this study extend the research on inventor retention in technological M&As by exploring various dimension of post-M&A target firm inventor retention. Previous research on technological M&As has mostly focused on the post-M&A productivity of the target firm inventors, i.e., how much innovation do the target firm inventors create after the M&A ((Hussinger, 2012); (Kapoor & Lim, 2007)). The basic assumption of this literature is that the retention of key employee is beneficial for post-M&A performance, so it is important to keep target firm inventors from leaving the firm or being disrupted during the M&A ((Ernst & Vitt, 2000)). However, this research finds that while keeping the target firm inventors and retaining their organizational context may help to preserve their organizational knowledge, it negatively affects the synergy realization of the merged entity by inducing the collision of the rigid routines of both firms and decreasing the organizational creativity of the merged entity. These findings extend the research on inventor retention by questioning whether inventor retention is really always beneficial.

Besides theoretical contributions, the study provides the managerial implication that, for

a successful technological M&A, it is important to consider not only the retention of key employees but also their organizational context. Depending on the ultimate goal of the technological M&A, sometimes it might be better to disrupt the target firm knowledge and try to integrate both entities to foster a higher creativity of the merged entity and break the path dependency.

REFERENCES AVAILABLE FROM THE AUTHORS