Insights from a Review of the Literature on Post-Merger Information Systems/Information Technology Integration

Dragos Vieru[1], Suzanne Rivard[2] & Vincent Dutot[3]

[1] École des Sciences de l'Administration, Distance Learning University of Québec (Télé-Université), Montréal, Canada

[2] Department of Information Technologies, HEC Montréal, Montréal, Canada

[3] ESG Management School, Paris, France

Correspondence: Dragos Vieru, 5800 rue Saint-Denis, Montréal, QC, G1K 9H6, Canada. Tel: 1-514-576-2168. E-mail: dragos.vieru@teluq.ca

Abstract

The paper presents an assessment of Information Systems (IS) and Information Technology (IT) literature on mergers and acquisitions (M&A). Although the last decade has seen an increase in research on the challenges associated with the integration of IS/IT during the post-merger integration (PMI) phase, substantial gaps in our knowledge exist. Our literature review analyzes IS/IT studies in terms of their theoretical perspective, logical structure, knowledge relevancy, and the nature of the IS/IT phenomena studied. Finally, it identifies five methodological and theoretical issues that open the way to future research.

Keywords: post-merger integration, IS/IT integration, literature review

1. Introduction

Mergers and acquisitions (M&A) are a major strategic tool for business growth and repositioning (Weber & Tarba, 2012). Indeed, global M&A deals rose from $823 billion in 2004 to $2.77 trillion in 2007, and 2.3 trillion in 2013 (Economic Times, 2013). A *merger* usually involves full amalgamation of two or more separate organizations into a third (Marks & Mirvis, 2001). An *acquisition* refers to the purchase of a target organization for absorption into the acquiring organization. The literature, be it in management, economics, business history, industrial organization, or finance generally holds the term "merger" to include both phenomena (Wijnhoven et al., 2006). Hence, this paper will use the term *merger* instead of M&A.

A merger comprises three phases. The first two–pre-merger and merger decision–involve strategic and financial analyses that determine the potential benefits. The third phase, post-merger integration (PMI), is the process of actual value-creation that will hopefully materialize when the organizations are merged (Larsson & Finkelstein, 1999). A number of organization and management scholars analyze the PMI process by providing frameworks or analyzing various issues related to the process of decision-making (i.e., Larsson & Finkelstein, 1999; Pablo, 1994). Others study the integration process by adopting a processual approach (i.e., Vaara, 2001). Despite much research on various strategic and organizational issues that arise during the post-merger process, this literature devotes relatively little attention to the issue of IS/IT integration.

In PMI settings, IS/IT integration represents a process of change that comprises "*changes in IS strategy, IS structure, and systems supporting the combined IS and business units that allow them to function as a whole*" (Mehta & Hirschheim, 2007, p.145). IS scholars have found that early assessment of the IT "fit", representing the match or lack of differences between the IT configurations of the merged organizations, is key to successful post-merger integration (Buck-Lew et al., 1992; Johnston & Yetton, 1996). Yet, studies that focus on this topic seem to be few and are mainly focusing on the process of post-merger IT integration without paying much attention to dynamics of this process and the business integration process.

In a similar vein, the professional literature also emphasizes the importance of IT integration during the post-merger phase (Sarrazin & West, 2011). A common barrier to successful mergers has been found to be the incompatibility of the information systems of the merging parties, which makes the integration task extremely challenging (Worthen, 2007).

These examples, culled from the IS practitioner literature from the last 10 years, reveal a lack of understanding of whether some of the difficulties in post-merger integration are linked to poor pre-merger IS planning or to the failure of post-merger IT integration initiatives to deliver the expected benefits. Overall, it seems to be a gap between the management and organization literature on one hand and the IS literature on the other, concerning the role of IS/IT integration during the post-merger synergy creation: the former doesn't acknowledge the importance of IS/IT integration, and the latter doesn't analyze the dynamics of the interdependent relationship between the processes of IT and business integration enough. This motivated our study that reviews the academic literature on PMI integration in order to evaluate what we know and what we don't know on the role of IS/IT in this context.

2. Post-Merger Integration: Main Perspectives

Post-merger integration is defined as the mechanism of coordination of the activities of the merging organizations to bring to fruition the potential synergy identified in the pre-merger phase (Shrivastava 1986; Birkinshaw et al., 2000). Mergers have been studied by academics through various theoretical lenses. Four schools of thought dominate the literature on mergers, each of which has distinct theoretical foundations and central hypotheses: 1. Finance and Economics; 2. Strategy; 3. Organization theory; and 4. Process perspective (Haspeslagh & Jemison, 1991; Larsson & Finkelstein, 1999). The *Finance and Economics* School is concerned with potential wealth creation by proposing different economic models. The *Strategy* school advances the concept of strategic "fit" which is defined as "the degree to which the target firm augments or complements the parent's strategy" (Jemison & Sitkin, 1986). These two schools focus mainly on the pre-merger and merger phases. Studies that use the *Organization theory* perspective advance the concept of organizational "fit" to refer to the similarities between the administrative and cultural practices of merging firms as well as personnel characteristics (Datta, 1991; Sales & Mirvis, 1984). This stream of research focuses on the post-merger effects of the impact of the mergers on organizational structures and work relationships and how individuals respond to merger issues (Haspeslagh & Jemison, 1991). Finally, the *Process perspective* school provides an analytical construction of the integration process.

Most of the literature based on the Finance and Economics and Strategy schools of thought presents contradictory results regarding the realization of potential in post-merger organizations (Larsson & Finkelstein, 1999). As these two perspectives have not been able to explain these outcomes, Organization theory and Process perspective scholars have begun to focus either on post-merger organizational integration (i.e., Larsson & Lubatkin, 2001; Schweiger & Denisi, 1991) or on factors influencing the management of the integration process (i.e., Vaara, 2002; Birkinshaw et al., 2000; Greenwood et al., 1994). These studies advance the idea that the creation of potential synergies relies on the effective management of the post-merger integration process (Greenwood et al., 1994).

Both the Organization theory and Process schools consider that paying attention to the eventual strategic and organizational differences in the early stages of the integration process is crucial for the successful management of the post-merger integration process (Jemison & Sitkin, 1986). This means that a pre-merger analysis of strategic relatedness and organizational compatibility indicates only the potential for value creation and anticipated difficulties in implementation (Haspeslagh & Jemison, 1991). The realization of this value-creation potential and the avoidance of severe difficulties during the PMI phase depend on how the PMI process is managed (Birkinshaw et al., 2000).

Overall, while the Finance and Economics and Strategy schools concentrate on the potential synergies of the mergers and tend to ignore the challenges of the PMI phase (Haspeslagh & Jemison, 1991), the other two schools approach the issue of post-merger value creation by concentrating on the factors that affect and the management of the PMI process. Considering this, we only focused on the latter two schools for identifying studies on PMI issues.

3. IS/IT Post-Merger Integration–A Literature Review

We conducted a two-phase literature review that covered the past 25 years. First, we searched the strategic management and organization literatures for articles that focused on the post-merger integration phase (Organization theory and Process perspectives), and we cross-examined the articles in order to identify studies that included IT/IS integration elements. Second, we identified, in the IS literature, articles on post-merger IT integration.

We used two main sources: 1). Databases: ABI/INFORM and Science Direct with emphasis on: a) scholarly journals such as, Academy of Management Journal, Academy of Management Review, Strategic Management Journal, Organization Studies, Long Range Planning, Strategic Change, Information & Management, European

Journal of IS, Journal of IT, JAIS, and Journal of Strategic Information Systems that cover strategic and organizational issues; and b) the top 5 IS journals according to the MIS journal rankings provided by AISNet namely: MIS Quarterly, Information Systems Research, Communications of the ACM, Management Science, and Journal of MIS; 2). The "ancestry" technique of article identification (cf. Cooper, 1998), which implies reviewing citations from the articles previously identified. Accounting, Auditing & Accountability journal and the proceedings of HICSS, ECIS and AMCIS were then included. We excluded articles from the practitioner-oriented literature and from specialized conferences (e.g., the Post Merger Integration Conference). We are confident that the variety and quality of the publications included in our review provide an adequate sample on the existing research on post-merger integration.

The search yielded 92 articles, 25 of which focused on IS/IT integration. These 25 articles, with one exception (Granlund, 2003), were published in IS journals. A content analysis helped us identify common concepts as well as each article's theoretical perspective. We based our analysis on Krippendorff's (2004) framework that defines content analysis as "a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use" (Krippendorff, 2004, p. 18).

3.1 PMI Schools of Thought

According to our literature review, the two schools of thought approach the topic of how to successfully attain the potential post-merger synergies differently. On one hand, according to the Organization theory perspective on PMI, the success of a merger is dependent on the choice of integration approaches and the careful planning of new structures and processes (Larsson & Finkelstein, 1999). At the core of this perspective on PMI is the assumption that integration problems can be predicted before the process of PMI begins. On the other hand, the Process school questions management's ability to anticipate differences that may impede the post-merger organizational compatibility, such as cultural and management practices. During the pre-merger planning phase, managers usually put more emphasis on the strategic differences and less on identifying the organizational differences due to the historical importance that is given to the strategic part of the deal (Greenwood et al., 1994). It has been suggested that greater attention should be given to emerging processes when studying diverse issues in the post-merger phase (Empson, 2001; Greenwood et al., 1994).

Thus, according to the Process perspective, post-merger management of organizational differences should focus mainly on the "*challenge of balancing integration and autonomy*" (Graebner, 2004, p. 751), or what Haspeslagh & Jemison (1991) have called, "*the issue of boundary management*" (p. 142). This reflects a dilemma of how much integration of and how much autonomy among the merging parties is needed to achieve potential synergies. Researchers have addressed this dilemma by proposing integration approaches that they deem appropriate given some of the merging parties' strategic and organizational characteristics (Ranft & Lord, 2002). The Process perspective on PMI considers that the choice of integration approach is one of the most important strategic decisions to make in mergers (Pablo, 1994; Zollo & Singh, 2004, Stahl et al., 2013). To deal with the issue of boundary management some researchers have proposed various typologies of integration approaches based on strategic and organizational dimensions (e.g., Haspeslagh & Jemison, 1991; Marks & Mirvis, 2001). Others propose to concurrently implement different approaches in different business units of the same firm (i.e., Schweizer, 2005). These works, based on case studies of selected mergers, provide prescriptive viewpoints of the effectiveness of the management of different integration approaches (Ellis, 2004).

3.2 IS/IT Integration Studies

We evaluated the IS articles by using a two-step approach to better circumscribe the nature and the contribution of each identified study: We first used a concept-centric approach to evaluate each article along two dimensions: the *school of thought* (Organization theory and Process (Note 1) perspective) to which it belonged and its *logical structure* (Note 2). Two main themes emerged from this analysis, one for each school. The results of this analysis are synthesized in Table 1. Second, we analyzed each of the 25 articles for its *knowledge relevancy* to practice or to academia.

3.2.1 Theme 1: Process Perspective School: Post-Merger IT Integration Process Management Challenges

Fully 21 of the 25 articles fell under the Process perspective. These articles are characterized by three lines of work: to propose IT integration strategies that will align the IT function with the business goals that emerge from the planned post-merger integration approaches; to identify/measure IT integration success factors; and to analyze the process of integration decision-making

In the first line of work the authors emphasize the importance of the concept of level of IT integration. In the literature on mergers it has been argued that realized synergy is greater than the sum of its parts (Hitt et al., 2001).

One measure to assess the outcomes of the interdependencies of the involved organizational structures in a merger is the level of integration, which can be defined as the degree of post-merger change in organizational structures (Pablo, 1994). Even though we couldn't find a formal definition, based on Wijnhoven et al.'s (2006) argumentation, the level of IT integration reflects "the level of strategic interdependence and organizational autonomy that the merging firm aims at" (p. 8). In this vein, a number of articles advance contingency frameworks that propose different degrees of IT integration according to: IS requirements, business objectives and merger goal (Giacomazzi et al., 1997); type of IS governance (Brown & Renwick, 1996); level of strategic importance of the IS function, lines of communication, organizational IS learning (Merali & McKiernan, 1993); "fit" within and between the IT configurations of the merged entities (Johnston & Yetton, 1996; Henningsson & Yetton, 2011); or IT-business alignment requirements (Wijnhoven et al., 2006; Mehta & Hirschheim, 2007; Alaranta & Henningsson, 2007; Yoo et al., 2007; Seddon et al., 2010; Tanriverdi & Uysal, 2011). These contingency frameworks were empirically tested and different levels of IT integration were found to be appropriate for different merger synergies.

In the second line of work, factors, such as IS participation in merger planning, level of IS standardization, programming language incompatibilities (Stylianou et al., 1996; Robbins & Stylianou, 1999), IS personnel retention (Hwang, 2004), resistance to change, cultural readiness, and learning capacity (Alaranta, 2005) have been empirically found to have an impact on the results of the process of IT integration. In their longitudinal study, Main & Short (1989), stress the importance of planning the post-merger IT integration, without however, revealing the outcomes.

Finally, in the last line of work, researchers analyze the process of integration decision-making by providing process models that enhance our understanding of the relationships between design decisions, implementation activities and IT integration outcomes (Mehta & Hirschheim, 2004; Granlund, 2003).

Most of the studies – with the exception of three articles that present a logical structure of a process model – advance variance models. These articles describe the relationship between IT integration and business integration by following the traditional deterministic IT research agenda, that is, "to understand the consequences of information technology (whether models, techniques, or devices), given specific objectives" (Orlikowski & Barley, 2001, p. 146).

3.2.2 Theme 2: Organization Theory School: Post-Merger IT HR Integration Challenges

Only four IS studies were found that adopted this perspective. Their authors analyzed the IS human resources integration challenges. Factors such as individuals' acceptance of new IT (Huang & Chuang, 2007), incentive mechanisms, career uncertainty, autonomy removal (Alaranta & Viljanen, 2004), or cultural differences (Weber & Pliskin, 1996; Stahl et al., 2013) have been empirically found to have an impact on the outcomes of the process of IT integration. These authors suggest that if management fails to take the above aspects into consideration, the post-merger integration process risks facing problems such as cultural clashes (Weber & Pliskin, 1996) and high employee turnover including highly-skilled IT staff (Alaranta & Viljanen, 2004).

Overall, the articles present the relationship between the two processes of integration from a deterministic view by adopting variance models and none advances a process model approach to study how the events unfold over time.

Table 1. Summary of the literature on post-merger IS/IT integration

	Variance Models		Process Models	
	T1: Post-Merger IT Integration Process Management Challenges	T2: Post-Merger IT Human Resources Integration Challenges	T1: Post-Merger IT Integration Process Management Challenges	T2: Post-Merger IT Human Resources Integration Challenges
Process School	Alaranta (2005)		Granlund (2003)	
	Alaranta & Henningsson (2007)		Mehta & Hirschheim (2004)	
	Brown & Renwick (1996)		Mehta & Hirschheim (2007)	
	Brown et al. (2003)			
	Buck-Lew et al. (1992)			
	Giacomazzi et al. (1997)			
	Henningsson & Yetton (2011)			
	Hwang (2004)			
	Johnston & Yetton (1996)			
	Main & Short (1989)			
	McKiernan & Merali (1995)			
	Merali & McKiernan (1993)			
	Robbins & Stylianou (1999)			
	Seddon et al. (2010)			
	Stylianou et al. (1996)			
	Tanriverdi & Uysal (2011)			
	Wijnhoven et al. (2006)			
	Yoo et al. (2007)			
Organization School		Alaranta & Viljanen (2004)		
		Huang & Chuang (2007)		
		Stahl et al. (2013)		
		Weber & Pliskin (1996)		

3.3 Type of Knowledge Relevancy

A research paper entails a reasoned argument that presents the reader with supporting evidence for its conclusions and contains a certain level of abstraction when describing the study's tenets and methodological procedures. Drawing on the tenets of the argumentation theory (Toulmin, 1958) and on the discourse of practice of relevance (Benbasat & Zmud, 1999) we created a four-quadrant typology of knowledge relevancy (Figure 1), along two dimensions: the level of abstraction and the level of the knowledge's trustworthiness. Based on Benbasat and Zmud's (1999) description of "relevancy", we consider that an article can be: a) relevant to practitioners by having "implementable" implications and providing a "painless" approach (less abstraction, pragmatic tone, more real life facts) for IS professionals to access a "state of knowledge" that will be used to solve a problem or make the most of an opportunity; and b) relevant to IS researchers by stimulating critical thinking with a "scholarly" tone, and elaborated illustrations of the theoretical foundation and methodologies used. Regardless of the direction–practitioner or academia–in which an article is leaning, however, it may contain valid or flawed argumentation. Indeed, "*relevancy doesn't imply that research needs to be carried out in a less rigorous fashion*" (Benbasat & Zmud, 1999, p. 5).
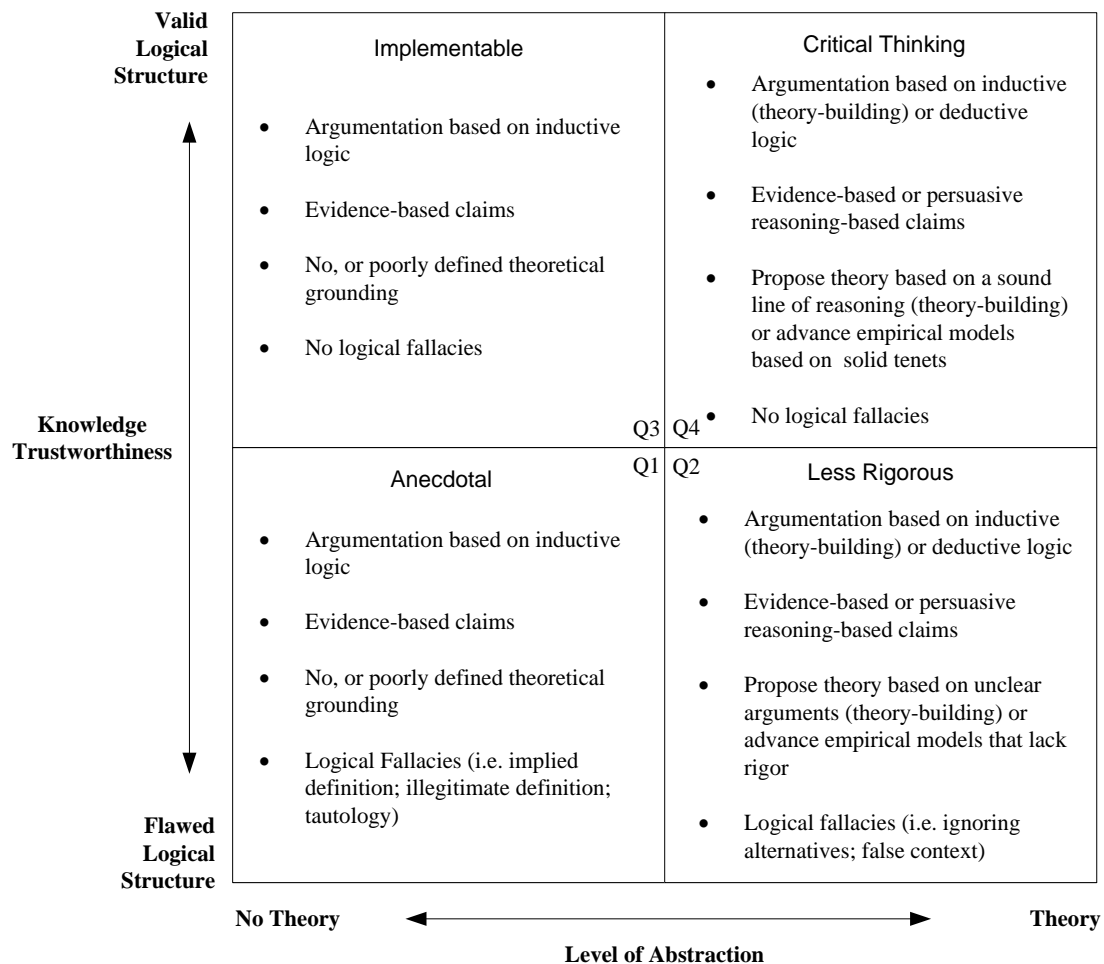
Figure 1. Typology of knowledge relevancy

In this vein, we assessed also the knowledge trustworthiness of an article in terms of correctness of use of appropriate methods and analyses (Benbasat & Zmud, 1999) and validity of the logic of argumentation. For the latter, we used Hart's (2001) six prerequisites for an article to be considered as having a sound logical structure: a reliable structure to sustain proper argumentation; clear concept definition; reasons for claims; substantiated assumptions; avoidance of logical fallacies; use of legitimate and relevant, not anecdotal, evidence.

The four quadrants are:

Q1: The Anecdotal – The articles in this view are often characterized as "popular literature" that advance claims based on "anecdotal" evidence;

Q2: The Less Rigorous –The articles categorized in this quadrant challenge reader's causal assumptions with interesting ideas but based on unclear arguments, or in the case of empirical studies, by inappropriate or/and less rigorous methodologies.

Q3: The Implementable – The authors' argumentation is prescriptive without much abstraction. The articles that fit this description, even though they are published by scholarly journals, target mainly the practitioner audience;

Q4: The Critical Thinking – These articles present a high level of rigor and knowledge trustworthiness and are published by top academic journals.

Table 2. Knowledge relevancy of the IS/IT in PMI articles

Source (empirical/conceptual)	
Type of relevancy (quadrant)	
Q3	Q4
Alaranta (2005) (empirical)	Alaranta & Henningsson (2007) (empirical)
Alaranta & Viljanen (2004) (conceptual)	Brown & Renwick (1996) (empirical)
Brown et al. (2003) (empirical)	Giacomazzi et al (1997) (empirical)
Buck-Lew et al. (1992) (empirical)	Granlund (2003) (empirical)
Hwang (2004) (conceptual)	Henningsson & Yetton (2011) (empirical)
Main & Short (1989) (empirical)	Huang & Chuang (2007) (empirical)
McKiernan & Merali (1995) (empirical)	Johnston & Yetton (1996) (empirical)
Merali & McKiernan (1993) (empirical)	Mehta & Hirschheim (2004) (empirical)
Seddon et al. (2010) (empirical)	Mehta & Hirschheim (2007) (empirical)
Stahl et al. (2013) (conceptual)	Robbins & Stylianou (1999) (empirical)
	Stylianou et al. (1996) (empirical)
	Tanriverdi & Uysal (2011) (emprical)
	Yoo et al. (2007) (empirical)
	Wijnhoven et al. (2006) (empirical)
	Weber & Pliskin (1996) (empirical)

Our analysis of the knowledge relevancy showed that 10 articles are situated in Q3 and 15 are positioned within Q4. A summary of the results is presented in Table 2. The outcomes reveal that approximate 1 out of 3 studies have a prescriptive nature and address the practitioners. These articles propose "implementable" solutions for IS professionals to solve problems or deal with challenges in a post-merger IT integration context. The rest of the studies are relevant to IS scholars by adopting a "scholarly" tone, proposing a high level of theoretical abstraction, and providing rigorous explanations of the methodologies used.

4. Discussion

Our review shows that although IT "fit" has been found to be an important dimension of post-merger integration (Buck-Lew et al., 1992) and that IT integration has been found to have an important impact on the outcomes of a merger (Wijnhoven et al., 2006), the topic, especially the interrelatedness of the processes of IT and business integration, has received relatively little attention. Five issues are raised and suggestions for future research are proposed.

4.1 Issue 1: Dilemma of Integration vs. Autonomy in IS Literature on PMI

In a synthesis of the research on different approaches for PMI, Ellis (2004) argues that firms' decision on how to approach the process of PMI depends on two organizational strategic dimensions: the need *for strategic interdependence* that illustrates the extent to which the two firms involved in the merger augment or complement each other in terms of products and customers; and the *need for organizational autonomy* that can be defined as the degree of cross-boundary interaction and coordination between the merging firms. A number of studies emphasizes that the "issue of boundary management" should be dealt with by simultaneously providing multi-level, different integration approaches that would ensure, on one hand, a certain degree of organizational autonomy for some business units, and on the other hand, an environment that enables, if necessary, sharing work practices and knowledge for other business units (Ranft & Lord, 2002; Graebner, 2004; Schweizer, 2005).

Despite the focus on the management of differences, studies on PMI fail to mention if there is also a dilemma of integration versus autonomy at the IT function level. The practitioner literature, however, suggests the existence of such a dilemma. According to this literature, some firms, fearing costs and complexity, never integrate their information systems and therefore synergy gain is minimal. Others focus on the potential synergy gains and without much planning, implement an absorption approach by choosing one information system over another, often frustrating both customers and employees (Aberg & Sias, 2004). In terms of if and how much it needs to

integrate the post-merger IT functions, Carayannis and Chanaron (2007) recommend that IT management would be in a better position to make a decision in these matters if it had access to the correct information and understood how business processes work.

While IS researchers agree that differences in post-merger IT functions need to be dealt with (Buck-Lew et al., 1992; Johnston & Yetton, 1996), we find that IS studies in PMI settings focus mainly on the processes of change in IS strategy and IS structure and do not address this potential dilemma. There is a need for empirical research to study the decisional process of IT function integration in complex post-merger settings that reflect a mix of business integration approaches. Examining the PMI dilemma at the IT function level would contribute to a better understanding of the dilemma at the organization level.

4.2 Issue 2: Knowledge Sharing in Post-Merger ISD

Post-merger IT integration often involves the development of new IS that will span the boundaries of previously independent organizations. These systems are aimed at enabling the implementation of the emergent work practices reflected by the adopted PMI approaches. Thus, successful development of ISs that are to support the merged organizations is a critical issue. The IS literature on PMI mentions that there is a need to develop and implement IS that will "bridge" or enable a "best-of-breed" IT functionality (Wijnhoven et al., 2006), however there is no research on how these IT artifacts are developed.

One of the objectives of the PMI is to ensure that conditions for cooperation among personnel from the merged organizations are created and decision-making design is based on accurate information (Schweiger & Goulet, 2000). Knowledge sharing between the merged companies is a key factor for successful integration (Hebert et al., 2005). Despite the fact that this line of work emphasizes the central place that knowledge sharing has in the PMI process, researchers haven't paid attention to the relationship between practices of knowledge sharing and post-merger integration approaches. Also, researchers who examined the "issue of boundary management" have not explored the notion of boundaries. In most studies, boundaries themselves have been taken for granted. In those studies that focused on knowledge sharing and acknowledged the co-existence of multiple professional- and departmental-based boundaries (e.g., Schweizer, 2005; Lord & Ranft, 2002; Empson, 2001), the question of how individuals involved in collaborative efforts span those boundaries, was not addressed.

A number of studies show that knowledge sharing is a difficult task. Organizations face challenges such as how to motivate employees to share knowledge (Wasko & Faraj, 2005), create trust (McEvily et al., 2003), or bridge different work practices (Brown & Duguid, 2001). The IS development literature has traditionally linked the success of systems development initiatives to the effective collaboration and knowledge sharing among individuals that are members of different professional communities (Suchman, 2002; Karsten et al., 2001; Levina & Vaast 2006). Knowledge sharing is challenging during ISD efforts. Better approaches to sharing knowledge may avoid this problem (Byrd et al., 1992), but due to the contextual nature of knowledge, often times this is not enough to develop an effective IT (Luna-Reyes et al., 2005). Large ISD projects usually involve processes of knowledge sharing that cut across organizational boundaries that separate project stakeholders within the same corporation.

While, as the above suggests, knowledge sharing among the members of a single organization is difficult, it is even more challenging in a PMI context, since the actors involved abide by different local, social and cultural rules based on different organizational contexts (Empson, 2001; Schweizer, 2005). The critical importance of post-merger knowledge sharing (Yoo et al., 2007) and IS integration (Mehta & Hirschheim, 2007), and the challenge to share knowledge during ISD efforts (Orlikowski, 2002; Levina & Vaast, 2005) notwithstanding, our literature review has revealed that there are no any studies that focus on understanding the process of knowledge sharing during the post-merger development of IS. Examining the practices of knowledge sharing during the IS developments in PMI settings would increase our understanding of how new ISs may help or impede the implementation of post-merger work practices.

4.3 Issue 3: Paucity of Scholarly Articles on Post-Merger IS/IT Integration (Issue of Relevancy)

According to Davison et al. (2005) the significance of academic research work is materialized when it is published. However, not all published material is equal in quality. This problem is especially found in the field of IS where descriptions and implementations of new technologies often appear in non-refereed work or in practitioner oriented literature. In this article, from the outset of our literature review we eliminated professional publications. Use of such sources was restricted to factual information due to the low theoretical background and application dependency. Quality IS research literature from peer-reviewed journals served as the major base of our literature review as it provided sufficient theoretical background as well as leaded for additional references on the specific subject of PMI.

Despite the obvious limitation of this analysis of not being able to cover all possible peer-review journals, we are confident to posit that IS literature is scarce in examining such an important and actual topic of interest, that is, the IT/IS integration in post-merger settings, by providing only 25 articles in the past 20 years. Thus, more scholar-oriented studies are needed in this line of research.

4.4 Issue 4: Process versus Variance Models

Only three of the reviewed studies' logical structure was of a process nature. It has been argued that IT-driven organizational change is a social process (Orlikowski, 2002), and that a theory of change is best framed as a process theory rather than as a variance theory (Van de Ven & Poole, 1995). It has been argued however, that the interaction between IT and humans in an organizational environment cannot be regarded as a one-dimensional, causal relationship (Orlikowski & Baroudi, 1991). In the case of a radical change such as a merger, process models can handle more complex causal relationships than variance models can and provide an explanation of how the inputs and outputs are related at different levels of analysis, rather than simply identifying the relationship like the variance models do.

A process theory explains how a sequence of events that unfolds through time leads to some outcome (Van de Ven & Poole, 1995). Process theory can provide explanations on how one micro-level event leads to and affects the ensuing one. It can also shed light on how a macro-level pattern may trigger the succession of micro-level events. In this perspective, the post-merger development of an IS can be described as a process that entails a "sequence of individual and collective events, actions, and activities unfolding over time in context" (Pettigrew, 1997, p. 337). The resulting view of the process tells a rich story of the events taking place within a target situation by explaining how influential factors interact, such as knowledge sharing, how they collectively lead to future action, and what constrains them. Moreover, the dynamic approach of the process theory seeks a holistic explanation and assigns temporal, pluralistic and asymmetrical properties to an organizational process.

Process models that are analyzed with appropriate strategies can also be used by IS researchers as complementary to deterministic-type models in terms of the source of otherwise unobservable elements that might increase the internal and external validity of the variance models (Sabherwal & Robey, 1995).

4.5 Issue 5: Need for Composite Multi-Level Theories of Change

Our analysis, based on the knowledge relevancy dimension, identified only 16 articles from a total of 25 that present a solid theoretical foundation. These studies, with the exception of Mehta and Hirschheim's (2004), advance mono-lens theories of change. Organizational change, however, is difficult to explain without recourse to several theoretical lenses that are often used separately in analyzing a single process (Lapointe & Rivard, 2007). It has been suggested that a composite theory is more appropriate to explain change (Poole & Van de Ven, 2004). In this view, the process of change is governed by four different "motors" (life-cycle, teleological, dialectical, and evolutionary), which are generic mechanisms derived via induction from the narrative stories of events of organizational change. A multi-level combination of "motors" will accurately describe the "what", "how" and "why" of organizational change. Researchers should consider using such composite theories of change that include different "motors" that act at different levels of analysis when analyzing post-merger IT integration. For example, we can consider the post-merger IT integration process in an organization from a dual-motor perspective, teleological and dialectical. We assume that change is driven by the actions of individuals, usually managers that try to create a new organizational form. These individuals are usually assumed to be rational as they are perceived in the traditional teleological models of IT adoption. However, a teleological perspective of change at the micro level of analysis oversimplifies or overlooks the period of organizational transition from the old practices to the new ones imposed by new organizational arrangements and eventually supported by a new technology. A dialectic motor at the organizational level of analysis describes how the divergent goals of individuals produce organizational change. At the same time, because the dialectical process encapsulates teleological forces in opposition, the two motors are coexistent in an interdependent relationship.

5. Conclusion

The merging of organizations is a strategic practice that firms have adopted worldwide as a means of business growth and market expansion. Notwithstanding its critical role, our literature review found relatively few studies of the issue. Yet, the professional literature emphasizes the critical role of IT integration during the post-merger phase (Sarrazin & West, 2011), and identifies the incompatibility of the information systems of the merging parties as a major barrier to successful integration (Worthen, 2007). In this context, the merger of information technology in general and information systems in particular are likely to play an important role, since they are key in supporting business processes, be they operational or strategic. Given this importance, we analyzed extant literature in order to assess its contribution and to identify research avenues. In brief, future research would

contribute to the advancement of knowledge on this phenomenon by focusing on the dilemma of integration vs. autonomy in terms of IS and IT, examine the issue of knowledge sharing among the parties involved in an IS development project during the PMI phase, adopt a process perspective to explain IS/IT integration and aim at proposing multilevel models to explain the changes that take place during the PMI phase.

References

Aberg, L., & Sias, D. L. (2004). Taming Post-merger IT Integration. *McKinsey on Finance, 12*, 20–24.

Alaranta, M. (2005). *Integrating the Enterprise Systems after a Merger: Managing the Change in a Manufacturing Company*. Proceedings of the European Conference on Information Systems.

Alaranta, M., & Henningsson, T. (2007). *Shaping the Post-Merger Information Systems Integration Strategy*. Proceedings of 40th Hawaii International Conference on System Sciences, Hawaii, USA. http://dx.doi.org/10.1109/HICSS.2007.480

Alaranta, M., & Viljanen, M. (2004). *Integrating the IS Personnel after a Merger - Managing Challenges and opportunities*. Proceedings of the European Conference on Information Systems.

Benbasat, I., & Zmud, R. W. (1999). Empirical Research in Information Systems: The Practice of Relevance. *MIS Quarterly, 23*(1), 3–16. http://dx.doi.org/10.2307/249403

Birkinshaw, J., Bresman, H., & Håkanson, L. (2000). Managing the Post-acquisition Integration Process: How the Human Integration and Task Integration Processes Interact to Foster Value Creation. *The Journal of Management Studies, 37*(3), 395–424. http://dx.doi.org/10.1111/1467-6486.00186

Brown, C. V., & Renwick, J. S. (1996). Alignment of the IS Organization: The Special Case of Corporate Acquisitions. *The DATA BASE for Advances in Information Systems, 27*(4), 25–33. http://dx.doi.org/10.1145/252829.252833

Brown, C. V., Clancy, G., & Scholer, R. J. (2003). A Post-merger IT Integration Success Story: Sally Mae. *MIS Quarterly Executive, 2*(1), 15–27.

Brown, J. S., & Duguid, P. (2001). Knowledge and Organization: A Social-Practice Perspective. *Organization Science, 12*(2), 198–213. http://dx.doi.org/10.1287/orsc.12.2.198.10116

Buck-Lew, M., Wardle, C. E., & Pliskin, N. (1992). Accounting for Information Technology in Corporate Acquisitions. *Information & Management, 22*(6), 363–369. http://dx.doi.org/10.1016/0378-7206(92)90031-A

Byrd, T. A., Cossick, K. L., & Zmud, R. W. (1992). A Synthesis of Research on Requirements Analysis and Knowledge Acquisition Techniques. *MIS quarterly, 16*(1), 117–138. http://dx.doi.org/10.2307/249704

Carayannis, E. G., & Chanaron, J. J. (2007). *Leading and managing creators, inventors, and innovators: The art, science, and craft of fostering creativity, triggering invention, and catalyzing innovation*: Greenwood Publishing Group.

Cooper, H. (1998). *Synthesizing Research: A Guide for Literature Review*. Thousand Oaks, CA: SAGE Publications Ltd.

Curtis, G. A., & Chanmugam, R. (2005). Reconcilable Differences: IT and Post-merger Integration. *Accenture Outlook*, (2). Retrieved from http://www.accenture.com/Global/Research_and_Insights/Outlook/ReconcilableIntegration_old.htm

Datta, D. K. (1991). Organizational Fit and Acquisition Performance: Effects of Post-Acquisition Integration. *Strategic Management Journal, 12*(4), 281–297. http://dx.doi.org/10.1002/smj.4250120404

Davison, R. M., De Vreede, G. J., & Briggs, R. O. (2005). On Peer Review Standards For the Information Systems Literature. *Communications of the Association for Information Systems, 16*.

Economic Times. (2013). Retrieved from http://articles.economictimes.indiatimes.com/2013-10-24/news/43365989_1_dealogic-global-merger-and-a cquisition-ma-deal-volume

Ellis, K. (2004). Managing the Acquisition Process: Do Differences Actually Exist across Integration Approaches. In A. L. Pablo & M. Javidan (Eds.), *Mergers and Acquisitions: Creating Integrative Knowledge*. John Wiley & Sons.

Empson, L. (2001). Fear of Exploitation and Fear of Contamination: Impediments to Knowledge Transfer in Mergers between Professional Service Firms. *Human Relations, 54*(7), 839–862.

http://dx.doi.org/10.1177/0018726701547003

Giacomazzi, F., Panella, C. Pernici, B., & Sansoni, M. (1997). Information Systems Integration in Mergers and Acquisitions: A Normative Model. *Information & Management, 32*(6), 289–302. http://dx.doi.org/10.1016/S0378-7206(97)00031-1

Graebner, M. E. (2004). Momentum and serendipity: how acquired leaders create value in the integration of technology firms. *Strategic Management Journal, 25*(8–9), 751–777. http://dx.doi.org/10.1002/smj.419

Granlund, M. (2003). Management Accounting System Integration in Corporate Mergers: A Case Study. *Accounting, Auditing & Accountability Journal, 16*(2), 208–243. http://dx.doi.org/10.1108/09513570310472822

Greenwood, R., Hinings, C. R., & Brown, J. (1994). Merging Professional Service Firms. *Organization Science, 5*(2), 239–257. http://dx.doi.org/10.1287/orsc.5.2.239

Hart, C. (2001). *Doing a Literature Review: Releasing the Social Science Research Imagination*. London: SAGE Publications Ltd.

Haspeslagh, P., & Jemison, D. B. (1991). *Managing Acquisitions – Creating Value through Corporate Renewal*. New York: The Free Press.

Hebert, P., Very, P., & Beamish, P. W. (2005). Expatriation as a Bridge over Troubled Water: A Knowledge-Based Perspective Applied to Cross-Border Acquisitions. *Organization Studies, 26*(10), 1454–1476. http://dx.doi.org/10.1177/0170840605057067

Henningsson, S., & Yetton, P. (2011). *Managing the IT integration of acquisitions by multi-business organizations*. Proceedings of the Thirty Second International Conference on Information Systems.

Hitt, M. A., Harrison, J. W., & Ireland, R. D. (2001). *Mergers and Acquisitions: Guide to Creating Value for Stakeholders*. Oxford: Oxford University Press.

Huang, E., & Chuang, M. H. (2007). Extending the Theory of Planned Behavior as a Model to Explain Post-merger Employee Behavior of IS Use. *Computers in Human Behavior, 23*(1), 240–257. http://dx.doi.org/10.1016/j.chb.2004.10.010

Hwang, M. (2004). Integrating Enterpri*se Systems in Mergers and Acquisitions.* Proceedings of the Tenth Americas Conference on Information Systems.

Jemison, D. B., & Sitkin, S. B. (1986). Corporate Acquisitions: A Process Perspective. *The Academy of Management Review, 11*(1), 145–163.

Johnston, K., & Yetton, P. (1996). Integrating Information Technology Divisions in a Bank Merger Fit, Compatibility and Models of Change. *The Journal of Strategic Information Systems, 5*(3), 189–211. http://dx.doi.org/10.1016/S0963-8687(96)80003-5

Karsten, H., Lyytinen, K., Hurskainen, M., & Koskelainen, T. (2001). Crossing boundaries and conscripting participation: representing and integrating knowledge in a paper machinery project. *European Journal of Information Systems, 10*(2), 89–98. http://dx.doi.org/10.1057/palgrave.ejis.3000395

Krippendorff, K. (2004). *Content analysis: an introduction to its methodology*. Sage.

Lapointe, L., & Rivard, S. (2007). A Triple Take on Information Technology Implementation. *Organization Science, 18*(1), 89–107. http://dx.doi.org/10.1287/orsc.1060.0225

Larsson, R., & Finkelstein, S. (1999). Integrating Strategic, Organizational, and Human Resource Perspectives on Mergers and Acquisitions: A Case Survey of Synergy Realization. *Organization Science, 10*(1), 1–26. http://dx.doi.org/10.1287/orsc.10.1.1

Larsson, R., & Lubatkin, M. (2001). Achieving Acculturation in Mergers and Acquisitions: An International Case Study. *Human Relations, 54*(12), 1573–1606. http://dx.doi.org/10.1177/00187267015412002

Levina, N., & Vaast, E. (2005). The Emergence of Boundary Spanning Competence in Practice: Implications for Implementation and Use of Information Systems. *MIS Quarterly, 29*(2), 335–369.

Luna-Reyes, L. F., Zhang, J., Gil-Garcia, J. R., & Cresswell, A. M. (2005). Information systems development as emergent socio-technical change: a practice approach. *European Journal of Information Systems*. http://dx.doi.org/10.1057/palgrave.ejis.3000524

Main, T. J., & Short, J. E. (1989). Managing the Merger: Building Partnership through IT Planning at the New

Baxter. *MIS Quarterly, 13*(4), 469–484. http://dx.doi.org/10.2307/248735

Marks, M. L., & Mirvis, P. H. (1998). *Joining Forces: Making one Plus One Equal Three in Mergers, Acquisitions, and Alliances*. San Francisco: Jossey-Bass.

Marks, M. L., & Mirvis, P. H. (2001). Making Mergers and Acquisitions Work: Strategic and Psychological Preparation. *The Academy of Management Executive (1993–2005), 15*(2), 80–94. http://dx.doi.org/10.5465/AME.2001.4614947

Markus, L, & Robey, D. (1988). Information Technology and Organizational Change: Causal Structure in Theory and Research. *Management Science, 34*(5), 583–598. http://dx.doi.org/10.1287/mnsc.34.5.583

McEvily, B., Perrone, V., & Zaheer, A. (2003). Trust as an Organizing Principle. *Organization Science, 14*(1), 91–103. http://dx.doi.org/10.1287/orsc.14.1.91.12814

McKiernan, P., & Merali, Y. (1995). Integrating Information Systems after a Merger. *Long Range Planning, 28*(4), 54–62. http://dx.doi.org/10.1016/0024-6301(95)00027-G

Mehta, M., & Hirschheim, R. (2004). *A Framework for Assessing IT Integration Decision-Making in Mergers and Acquisitions*. Proceedings of the 37th Hawaii International Conference on System Sciences.

Mehta, M., & Hirschheim, R. (2007). Strategic Alignment In Mergers And Acquisitions: Theorizing IS Integration Decision making. *Journal of the Association for Information Systems, 8*(3), 143–174.

Merali, Y., & McKiernan, P. (1993). The Strategic Positioning of Information Systems in Post-acquisition Management. *The Journal of Strategic Information Systems, 2*(2), 105–124. http://dx.doi.org/10.1016/0963-8687(93)90003-S

Orlikowski, W. J. & Barley, S. R. (2001). Technology and Institutions: What can Research on Information Technology and Research on Organizations Learn from Each Other? *MIS Quarterly, 25*(2), 1465–165. http://dx.doi.org/10.2307/3250927

Orlikowski, W. J. (2002). Knowing in Practice: Enacting a Collective Capability in Distributed Organizing. *Organization Science, 13*(3), 249–273. http://dx.doi.org/10.1287/orsc.13.3.249.2776

Orlikowski, W., & Baroudi, J. (1991). Studying Information Technology in Organizations: Research Approaches and Assumptions. *Information Systems Research, 2*(1), 1–28. http://dx.doi.org/10.1287/isre.2.1.1

Pablo, A. L. (1994). Determinants of Acquisition Integration Level: A Decision-making Perspective. *Academy of Management Journal, 37*(4), 803–836. http://dx.doi.org/10.2307/256601

Pettigrew, A. (1997). What is Processual Analysis? *Scandinavian Journal of Management, 13*(4), 337–348. http://dx.doi.org/10.1016/S0956-5221(97)00020-1

Poole, M. S., & Van de Ven, A. H. (2004). *Handbook of Organizational Change and Innovation*. New York: Oxford University Press.

Ranft, A. L., & Lord, M. D. (2002). Acquiring New Technologies and Capabilities: A Grounded Model of Acquisition Implementation. *Organization Science, 13*(4), 420–441. http://dx.doi.org/10.1287/orsc.13.4.420.2952

Robbins, S. S., & Stylianou, A. C. (1999). Post-merger Systems Integration: The Impact on IS Capabilities. *Information & Management, 36*(4), 205–212. http://dx.doi.org/10.1016/S0378-7206(99)00018-X

Sabherwal, R., & Robey, D. (1995). Reconciling Variance and Process Strategies for Studying Information System Development. *Information Systems Research, 6*(4), 303–328. http://dx.doi.org/10.1287/isre.6.4.303

Sales, M. S., & Mirvis, P. H. (1984). When Cultures Collide: Issues in Acquisition. In J. R. Kimberly & R. E. Quinn (Eds.), *Managing organizational transitions*. R. D. Irwin.

Sarrazin, H., & West, A. (2011). Understanding the strategic value of IT in M&A. *McKinsey Quarterly, 12*(1), 1–6.

Schweiger, D. M., & DeNisi, A. S. (1991). Communication with Employees following a Merger: A Longitudinal Field Experiment. *The Academy of Management Journal, 34*(1), 110–135. http://dx.doi.org/10.2307/256304

Schweiger, D. M., & Goulet, P. K. (2000). Integrating Mergers and Acquisitions: An International Research Review. In Cooper, C., & Gregory, A. (Eds.), *Advances in Mergers and Acquisitions*. London: Elsevier Science.

Schweizer, L. (2005). Organizational Integration of Acquired Biotechnology Companies into Pharmaceutical

Companies: The Need for a Hybrid Approach. *The Academy of Management Journal, 48*(6), 1051–1074. http://dx.doi.org/10.5465/AMJ.2005.19573109

Seddon, P. B., Reynolds, P., & Willcocks, L. P. (2010). *Post-Mergers IT Integration: A Comparison of Two Case Studies*. Proceedings of Pacific Asia Conference on Information Systems.

Shrivastava, P. (1986). Postmerger Integration. *Journal of Business Strategy, 7,* 65–76. http://dx.doi.org/10.1108/eb039143

Stahl, G. K., Angwin, D. N., Very, P., & Yildiz, H. E. et al. (2013). Sociocultural Integration in Mergers and Acquisitions:Unresolved Paradoxes and Directions for Future Research. *Thunderbird International Business Review, 55*(4), 333–356. http://dx.doi.org/10.1002/tie.21549

Stylianou, A. C., Jeffries, C. J., & Robbins, S. S. (1996). Corporate Mergers and the Problems of IS Integration. *Information & Management, 31*(4), 203–213. http://dx.doi.org/10.1016/S0378-7206(96)01082-8

Suchman, L. A. (2002). Practice-Based Design of Information Systems: Notes from the Hyperdeveloped World. *The Information Society, 18*(2), 139–144. http://dx.doi.org/10.1080/01972240290075066

Tanriverdi, H., & Uysal, B. V. (2011). CBITI and Acquirer Value Creation in Corporate Mergers and Acquisitions. *Information Systems Research, 22*(4), 703–720. http://dx.doi.org/10.1287/isre.1090.0250

Toulmin, S. (1958). *The Uses of Argument*. Cambridge: Cambridge University Press.

Vaara, E. (2001). Role-bound actors in corporate combinations: a sociopolitical perspective on post-merger change processes. *Scandinavian Journal of Management, 17*(4), 481–509. http://dx.doi.org/10.1016/S0956-5221(00)00002-6

Vaara, E. (2002). On the Discursive Construction of Success/Failure in Narratives of Post-Merger Integration. *Organization Studies, 23*(2), 211–248. http://dx.doi.org/10.1177/0170840602232003

Van de Ven, A. H., & Poole, M. S. (1995). Explaining Development and Change in Organizations. *The Academy of Management Review, 20*(3), 510–540. http://dx.doi.org/10.2307/258786

Wasko, M. M., & Faraj, S. (2005). Why Should I Share? Examining Social Capital and Knowledge Contribution in Electronic Networks of Practice. *MIS Quarterly, 29*(1), 35–57.

Weber, Y., & Pliskin, N. (1996). The Effects of Information Systems Integration and Organizational Culture on a Firm's Effectiveness. *Information & Management, 30*(2), 81–90. http://dx.doi.org/10.1016/0378-7206(95)00046-1

Weber, Y., & Tarba, S. Y. (2012). Mergers and Acquisitions Process: The Use of Corporate Culture Analysis. *Cross Cultural Management: An International Journal 19*(3), 288–303.

Wijnhoven, F., Spil, T., Stegwee, R., & Fa, R. T. A. (2006). Post-merger IT Integration Strategies: An IT Alignment Perspective. *The Journal of Strategic Information Systems, 15*(1), 5–28. http://dx.doi.org/10.1016/j.jsis.2005.07.002

Worthen, B. (2007). How Coty Tackled Post-Merger Supply Chain Integration. *CIO*.

Yoo, Y., Lyytinen, K., & Heo, D. (2007). Closing the Gap: Towards a Process Model of Post-Merger Knowledge Sharing. *Information Systems Journal, 17,* 321–347. http://dx.doi.org/10.1111/j.1365-2575.2007.00248.x

Zollo, M., & Singh, H. (2004). Deliberate Learning in Corporate Acquisitions: Post-acquisition Strategies and Integration Capability in U.S. Bank Mergers. *Strategic Management Journal, 25*(13), 1233–1256. http://dx.doi.org/10.1002/smj.426

Notes

Note 1. The Process school perspective on mergers and the Process model as a type of logical structure of a theoretical model are two different and unrelated concepts.

Note 2. The logical structure of a theoretical development "refers to the time span of theory […] and to the hypothesized relationships between antecedents and outcomes" (Markus and Robey 1988, p. 584). There exist two types of logical structure: variance models and process models. Variance models hypothesize linear associations between predictors and outcomes, whereas process models explain how outcomes of interest develop through a sequence of events (Mohr, 1982).

Copyrights