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TAKING STOCK AND LOOKING FORWARD: A SCIENTOMETRIC ANALYSIS OF IS/IT INTEGRATION CHALLENGES IN MERGERS

Complete Research

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Abstract

The last decade has seen a rise in research on the topic of challenges associated with information systems (IS) in corporate mergers and acquisitions (M&As). Although this proliferation of research has the potential to significantly improve our understanding of IS challenges in M&A activity, absent is the necessary step of consolidating and integrating extant knowledge. In this paper, we review the domain of IS integration in M&As with focus on the theory building in the area. We identify and analyse 48 articles, published in 13 journals and 5 conference proceedings based on their theoretical contribution. Based on the analysis we point out gaps in the literature and suggest directions for future research.

Keywords: Mergers & Acquisitions, Post-merger integration, IS integration, Literature review, Scientometric analysis

1 INTRODUCTION

Organizational mergers and acquisitions (M&As) have reached the levels of more than 40.000 per year globally in recent years (Thomson-Reuters, 2012). Paralleling this practical importance, M&A activity has increasingly become a focus of study in several academic fields. Typical findings from these studies suggest that M&As rarely lead to value creation. Financially, it has been estimated that between 60-70% of all acquisitions in the private sector rather destroy than create financial value, as measured by either short-term performance measures, long-term performance measures, or firm value (Haleblian et al., 2008).

Haleblian et al. (2008) recently surveyed M&A research in the accounting, economics, finance, management and sociology literatures from 1992 to 2007. The survey identified 864 articles seeking explanation into the challenges to mergers and how they are overcome. The emerging picture is one of M&As as highly multifaceted phenomena of which no single approach can give a complete account. Financial, strategic, managerial, sociological, organizational, and psychological factors have all contributed explanations and sound normative strategic and tactical recommendations from analysis of organizational culture to implementation of organizational change. However, the picture is still incomplete. Despite the extensive research in the area, findings remain imprecise and inconclusive (Haleblian et al., 2008). In addition, as the business practices and global conditions for doing business evolve, so do also the foundations for value creating M&As. Consequently, the explanation to value creating M&As becomes the hunt for a running target (Henningsson & Carlsson, 2011). Explanatory models need to be revised based on the developing conditions for doing business.

In a world where organizations are becoming, from top to bottom, dependent on their information systems (IS), IS is playing a continuously more important role in the realization of value from M&As. It is estimated that 45-60% of the expected benefits from M&As are directly dependent on IT integration (Sarrazin & West, 2011). In addition, a survey by Accenture points to factors relating to IT integration as the second most important reason for merger failures (Accenture, 2006).

As a response, the last decade has seen a rise in research on the topic of challenges associated with IS in M&As. In our literature search, described below, we identified 48 articles on the topic. However, the research area is described as fragmented and scattered, with significant gaps in the extant knowledge base (Wijnhoven et al., 2006; Mehta & Hirschheim, 2007; Henningsson & Carlsson, 2011). As a result, cumulative knowledge creation and direction of research to unexplored areas are hampered. With the purpose of enabling the research field to fully take stock on existing research and to direct future research, this paper presents a scientometric analysis of the knowledge advancements within the domain of IS integration in M&As. The formal research question guiding the review is:

***RQ:** In relation to IS/IT integration challenges in mergers & acquisitions, what theoretical development has taken place in the area?*

We attend to this research question by a two-part analysis of the type of theory developed, focusing on a) the nature of theory as categorized by Gregor's (2006) taxonomy of theory types used in IS research, and b) the area of theorization as suggested by empirically induced categories. Our contribution lies in the identification of patterns and gaps in the extant literature, and the provision of directions for future research. The analysis shows that the extant research on issues of IS integration in M&As has heavily favoured some types of theory building, leaving important gaps in the collective understanding.

The mergers and acquisitions literature frequently uses the terms "merger" and "post-merger" to cover both activities; the merger of equals, and merger by acquisition in which the parties are non-equal in terms of their size and power (Wijnhoven et al. 2006). This paper follows the prior writings in the use of the term. "Acquisition" and "post-acquisition" are used to emphasize that the situation in question involves the power difference between the acquirer and the acquired parties. The acquired party may be an entire company or a smaller asset (Wijnhoven et al. 2006).

The remainder of this paper is divided into four sections. The next section covers the design of the analysis. We then present the findings of the analysis. Finally we discuss general patterns and directions for future research, and make a short conclusion.

2 Scientometric analysis

Leyesdorff defines scientometrics as "the quantitative study of scientific communication" (Leyesdorff 2001, p.i), while Lowry et al. (2004) consider it "the scientific study of the process of science" (Lowry et al. 2004, p. 30). Lewis et al. (2007) recommend scientometric studies to advance the ongoing evaluation and improvement of an academic discipline. Scientometric studies have been conducted on a broad range of topics in IS research such as on IS as a reference discipline or the epistemological structure of the IS field in general (Kroenung and Eckhardt 2012; Grover et al. 2006). In this study we selected the scientometric approach for its structured, systematic procedure, compared to a narrative, literature review, for instance (Leyesdorff, 2011).

2.1 Scope delimitation and article selection

Following Pateli and Giaglis (2004), in the first step, we defined the scope of our search. It can be characterized along three dimensions: the outlets, which are covered by our search, the relevant time span, and the search terms used. In our search procedure, we then performed two separate rounds: initial search and subsequent backwards search by investigating the reference lists of the selected articles (Yang and Tate 2012; Webster and Watson 2002).

To determine the specific papers for our literature review we used a database-driven approach (vom Brocke et. al 2009, Webster and Watson, 2002) using a list of research material from academic journals and conference proceedings. Specifically, the search was focused on literature on the 110 journals of the AIS Journal Ranking list (AIS, 2012) and the AIS international and regional conferences (ICIS, AMCIS, ECIS, PACIS).

An initial full-text search was conducted for peer-reviewed content in Business Source Complete (1989-2013) and ScienceDirect (1989-2013). The following search terms, chosen very broadly to gather a large pool of candidate articles, were used in the databases covering the chosen journals.

To develop the set of relevant search terms for our review, we started with the terms *Integration* and *Acquisition*. From basic literature on Acquisition Integration we extracted further, more specific terms, such as *Merger*, *Serial*, *Post-Merger* and *Planning* (Auerbach and Silverstein 2003) and ended up with the following search criteria.

*[(acquisition) OR (integration) OR (post-merger) OR (acquisition AND integration) OR
(post AND merger AND integration) OR (serial AND acquisition) OR (integration AND planning)]*

The search resulted in 638 publications. By reviewing the titles and abstracts of these publications, 480 publications were directly judged as not relevant for the topic (i.e. publications dealing with acquisition and integration of new IT systems). Another 110 publications were removed after a full review of the paper. The removed publications were written about tangential topics to M&A-integration or had a very limited amount of information on the M&A integration process.

To ensure integrity of our search, we conducted a backward search for additional articles. (Webster and Watson 2002). In our backward search we reviewed the reference lists of our sample of articles to identify relevant articles outside our predefined scope of journals and conferences. The backwards search resulted in the identification of 5 additional articles.

Finally a set of 48 articles (Appendix A), published in 13 journals and 5 conference proceedings, were chosen for further review. The distribution per publication year is displayed in Figure 1.

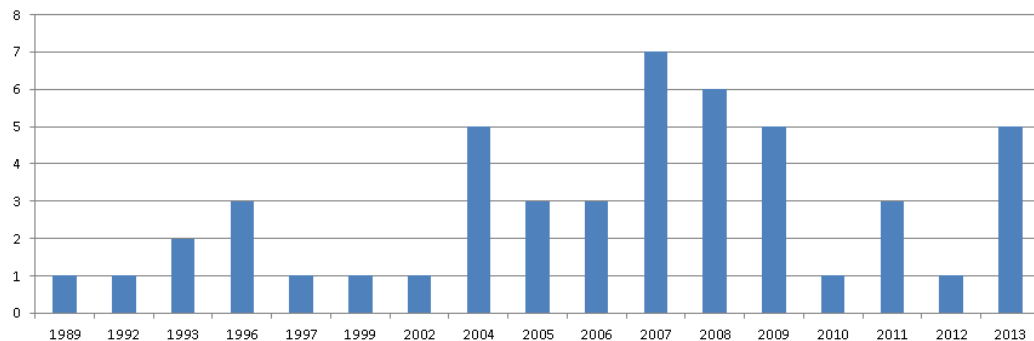


Figure 1. Yearly distribution of articles

2.2 Content coding and categorization

Analysis of the 48 articles was partitioned into three subtasks: data reduction, data display, and conclusion drawing (Miles & Huberman, 1994). As part of the data reduction, the 48 articles were coded in two steps to investigate a) theory type, and b) the area of theorization.

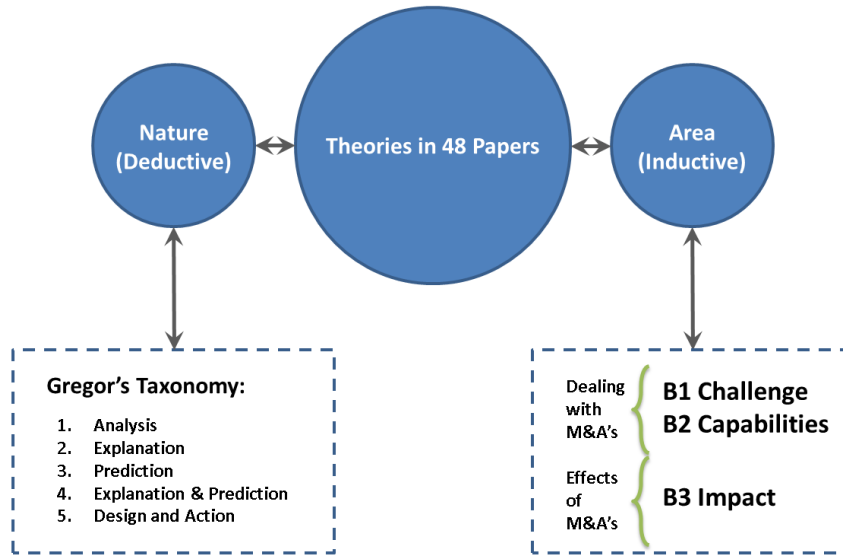


Figure 2. Partition of papers into sub-tasks

Two different coding techniques were used (Figure 2). To frame the types of theories developed in the literature we used Gregor’s (2006) *taxonomy for theory in information systems research* framework. The taxonomy identifies five categories of theories: theories for *analysis*, *explanation*, *prediction*, *explanation and prediction*, and *design and action* (Table 1). In the widest meaning of theory, all theoretical constructs say something about a specific area of interest (Gregor, 2006).

<i>Theory Type</i>		<i>Distinguishing Attributes</i>
I.	Analysis	Says what it is. The theory does not extend beyond analysis and description. No causal relationships among phenomena are specified and no predictions made.
II.	Explanation	Says what is, how, why, when, and where. The theory provides explanations but does not aim to predict with any precision. There are no testable propositions.
III.	Prediction	Says what is and what will be. The theory provides predictions and has testable propositions but does not have well-developed justificatory causal explanations.
IV.	Explanation & Prediction	Says what is, how, why, when, where, and what will be. Provides predictions and has both testable propositions and causal explanations.
V.	Design and Action	Says how to do something. The theory gives explicit prescriptions (e.g., methods, techniques, principles of form and function) for constructing an artefact.

Table 1 – Theory types in IS research from Gregor (2006).

Following the identification of theoretical elements in the papers by using Gregor’s pre-defined categories (Table 1), we used empirically inducted coding categories to identify the areas which theories seek to analyse, explain, predict or enact. To induce emergent coding categories we used the process of constant comparison (Strauss and Corbin, 1994). In this process the researcher looks for

similarities and differences in categories until no significantly new categories emerge. The full list of coding categories is available from the corresponding author upon request. We then searched to cluster codes into more general themes. In doing so we arrived to three broad theoretical areas, that we label Challenge theories, Capability theories, and Impact theories.

To ensure objectivity and reliability in the setting process, we set up a codebook, including proof-texts for each value in the categories of types two and three. The content analysis was performed by two researchers (Krippendorff, 2004). The achieved inter-rater reliability (c.f. Holsti, 1969) was 98%. Disagreements were resolved through discussion.

3 RESULTS OF THE SCIENTOMETRIC ANALYSIS

Our analysis of the nature of theory developed showed that of the 48 investigated papers, 8 had their primary theoretical contribution in theory for analysis, 23 in theory of explanation, 4 in theory for prediction, 7 in theory for explanation and prediction, and 6 in theory for design and action.

By empirical induction (see above), analysis of the area of theorization identified four broad areas address:

- B1. Challenge theories: 19 papers. Theories that address the characteristics of the post-acquisition IS integration challenge.
- B2. Capability theories: 22 papers. Theories that address the acquirers' possibilities to attend to the post-acquisition IS integration challenge.
- B3. Impact theories: 7 papers. Theories that address the impact of post-acquisition IS integration on other issues.

How the theoretical contributions are distributed with respect to nature and area are of theorization is presented in Table 2. In the next we present the theoretical contributions for each area in more detail.

Area / Nature	A1. Analysing	A2. Explaining	A3. Predicting	A4. Explaining and predicting	A5. Design and action	Total
B1. Challenge	3	9	1	3	3	19
B2. Capability	3	11	3	4	1	22
B3. Impact	2	3	0	0	2	7
Total	8	23	4	7	6	48

Table 2 – Nature and area of theoretical development in IS/M&A research

3.1 Challenge theories

Motivated by the growing dependence of IT in the operation of organizations, early research on IS integration in M&As started to explore the IT integration challenges. In total 19 papers has its primary theoretical contribution in understanding of the challenge that lay ahead of acquiring or merging organizations. Thus far, those theories have mainly been of analytical or explanatory character, and to a limited extent research has produced advice on how to deal with the challenge. However, despite the low number design and action theories in this area, it's still the area where half of the design and action theories have been developed.

Among the challenge theories, we identified three distinct sub-categories of theories that deal with the role of IS integration, the IS integration process, and the business-IT alignment challenge. The broad conclusion regarding the role of IT integration in this stream of research is that the principal contribution of IS integration rest in the realisation of contingent business benefits (Mehta & Hirschheim, 2007; Johnston & Yetton, 1996; Wijnhoven et al., 2006; Giacomazzi et al., 1997). IS

integration is assumed to enable synergies, which in turn increase shareholder wealth by making the value of the merged firm greater than the sum of the standalone values of the two firms (Tanriverdi & Uysal, 2013).

Further, research in the stream of IS integration challenge (See, for example, Johnston & Yetton, 1996; Giacomazzi et al., 1996) reports that acquirers adopt one of four generic post-acquisition IT integration processes. These four processes represent very different actions, and thus, very different challenges:

- In absorption processes, the target's IT resources are retired and replaced by the acquirer's existing IT resources. Data from the target's IT systems are converted and transferred to the acquirer's systems. The assumption is that the target's operations can be supported by the acquirer's IT resources (Johnston and Yetton 1996; Wijnhoven et al. 2006).
- Co-existence can be partial or full. In the former, some of the acquisition's IT resources are replaced by IT resources from the acquirer, leading to partial standardization with some IT resources shared between the acquirer and acquisition. The acquisition's retained IT resources do not replicate IT resources in the acquirer. In full co-existence, the acquisition's entire IT resources are retained. Where necessary, bridges are built between the acquirer's IT and the IT retained from the acquisition. This approach suits acquirers with limited IT-based benefits (Johnston and Yetton 1996).
- Best of breed involves a conscious selection to be made between the acquirer's and the acquisition's IT-based business processes (Johnston and Yetton 1996). This strategy is adopted when some of the acquisition's IT-based business processes are considered superior. These business processes are frequently rebuilt on the acquirer's IT platform.
- In renewal processes, IT resources in both the acquirer and the acquisition are replaced by developing new IT resources. This process is adopted when the combined IT resources of the acquirer and the acquisition cannot support the new business strategies and capabilities in the post-acquisition organization. This is the case, for example, when the acquisition is made to reposition the acquirer's business strategy from a niche to a scale-based strategy.
- The four IT integration processes enable different business benefits. In order to maximize value creation, alignment between the acquisition strategy and the IS integration strategy is needed (Wijnhoven et al., 2006; Mehta & Hirschheim, 2007). If not, the combined organization will end up in mis-alignment post-acquisition. The acquirer has to select an IT integration process that enables the integration-contingent business value, while at the same time avoiding to destroy any value in the acquirer. For example, an absorption process that replace the acquisition's IS by the acquirers may destroy unique IT capabilities in the acquisition (Tanriverdi & Uysal, 2013; Yetton et al., 2013).

3.2 Capability theories

The challenges facing companies when engaging in the merger and acquisition integration process are vast. The extant literature covers a group of theories that address the acquirers' possibilities to attend to the post-acquisition IS integration challenge. In total 22 papers has its primary theoretical contribution in understanding of the capabilities needed to navigate the integration process that lay ahead of acquiring or merging organizations. As with the challenge theories, thus far, those theories have mainly been of analytical or explanatory character, and to a limited extent research has produced advice on the acquirers' possibilities to attend to the post-acquisition IS integration challenge. In addition, researchers seem to have begun to expand beyond these by focusing also, in a limited capacity, on the prediction & explaining/predicting theories.

IS integration analysis refers to the assessment of the acquisition's starting conditions: what competencies exist and what is the dependence on the target's IS (Böhm et al., 2011; Merali &

McKiernan, 1993). After signing the deal, the issues of how to shape the IS integration project are addressed in *IS integration planning* (Alaranta & Henningsson, 2008; Mehta & Hirschheim, 2007). From day one, when the acquirer obtains control of the new business, the technical work of the *IS integration implementation* takes place (Stylianou et al., 1996; Wijnhoven et al., 2006).

Part of the experienced problems of acquisition IS integration have been attributed to the absence of IS integration analysis and planning (Alaranta & Henningsson, 2008). As the business benefits are contingent on completed IS integration, IS functions are often expected to integrate IS as quickly as possible with minimal disruptions to the business (Wijnhoven et al., 2006; McKiernan & Merali, 1995). The pressure is exacerbated by external stress from shareholders and other stakeholders to realise promised synergistic effects (Mehta & Hirschheim, 2007; Johnston & Yetton, 1996).

The 22 capability theories break out into three areas of research. Majority of these papers (16) are part of the exploratory body of knowledge. Baro et al. (2008) focuses on organizational and information systems factors that affect post-merger IT integration performance. LeFave et al (2008) investigates the IT Resource Reconfiguration capability to attain its goals more successfully. They develop their theory through a case study of the merger of Sprint and Nextel focusing on cost savings. Tanriverdi & Uysal (2009) investigates the value created by the IT integration for the acquirer's shareholders. They look particularly at the acquirers with high levels of CBITI capabilities who obtain significantly higher abnormal operating performance. Böhm et al. (2011) take a dual view of the IT-related challenges in divestment and acquisition strategies, studying them as a single integrated transaction between a buyer and a seller and investigating how the IT carve-out and IT integration strategies influence each other. They develop a framework that linking IT/Biz and IT/Strategic Business Units for the process of divesting and Integrating a company or business unit between two companies. Henningsson & Yetton (2011) look at how and to what extent an acquisitions IT systems need to be integrated into the IT of the acquirer. They identify four initial business and IT strategic alignment conditions where the IT integration process is a simple one-step process exploiting existing business and IT capabilities.

Henningsson & Carlsson (2011) investigate how to leverage the potential benefits of M&A activity in relation to Corporate Strategy. The result is the proposal of the DYSIIM model for explaining how decisions taken about one aspect of the IT/M&A project dynamical affects other aspect of the project. Yetton et. al (2013) describes the experiences of Danisco (a global food ingredients company) as it followed a growth-by-acquisition business strategy, focusing on how a new CIO built the IT resources to ensure the IT organization was "ready to acquire. The paper illustrates how these IT capabilities expedited the IT integration following two acquisitions, one of which involved Danisco expanding the scale of its business and the other extending the scope. Based on insights gained from Danisco, we provide lessons for CIOs to realize business benefits when managing post-acquisition IT integration.

Chang et al. (2013) shows the IS integration strategy of two high-tech companies after M&A. The paper shows how the IS integration strategy during the M&A process is affected. The authors detail the issues to take into account when integrating two systems. Otherwise delays or disruptions of major operations may occur. Garcia-Canal et al. (2013) investigate how quick replacement of the Information and Communication Technology Systems (ICT) of the target company with the bidder's ICT is expected in absorptions, as the synergies stemming from these deals lie in the rapid integration of the acquired firm within the organizational structure of the bidder. However, the evidence from the literature shows that this is not always the case. The authors construct a typology of ICT integration strategies based on the speed of integration, which is understood as the extent to which the ICT system integration meets or exceeds the minimum technology transfer time due to other organizational requirements.

In addition to these, the remainder of the papers (6) can be said to be descriptive and explanatory. Chin et al. (2004) examines the choice of IT governance structure in organizations that grow through mergers, they arrive at several choice of IT governance structure in cross-border acquisitions and acquirer can make. Brunetto (2006) investigates the importance of carrying out a dual approach to IS integrations. The author compares different approaches to IS integration strategy and how the choice

of one can impact the capabilities of the acquisition. Henningsson et al. (2007) use the concept of SOA in M&A as a novel lens. The authors present seven relationships between properties of SOA and M&A. Morsell et al. (2009) investigates the role that four organizational and six information system factors, managed by leadership teams, play in predicting the success of post-merger information systems (IS) integration between two companies. The research results provide a hypothesized path model representing the ten factors described in the article. Seddon et al. (2010) presents a cross comparison of decisions made in two mergers to compare. The paper finds several that are similar and some that are dissimilar. They argue that the effect of advice from experts in M&A activities is highly relevant, but that decisions made in the integration are situationally dependent.

Johnston and Yetton (1996) investigate Strategic Fit and Organizational Fit as a means of determining integration success. They look at the Technical, organizational and strategic issues at the level of the IT organization. Zanner et al. (2008) investigate how at some firms, mergers and acquisitions (M&A) activity is part of a normal growth strategy in a competitive environment. They conclude that such firms accumulate a body of M&A knowledge that can be employed for the benefits of organisational continuity. Despite the significant risks associated with M&A failure, they are able to approach each new event with a set of experiential learnings that can better inform their actions. However, for other firms M&A represent rare occasions in the company's lifecycle. Valuable integration knowledge is inherently fragmented, making these firms especially vulnerable to M&A risks. A framework for task-based knowledge management is provided for inquiry, which reveals M&A learnings from a case study. The paper concludes that if organizational learning is used adequately it can enhance the firm's competitive advantage and mitigate against associated M&A risks.

3.3 Impact theories

Lastly, the merger and acquisition integration process can impact the broader enterprise in various ways. The extant literature covers a group of theories that address the impact of post-acquisition IS integration on other enterprise issues. In total 7 papers has its primary theoretical contribution in understanding how the merger and acquisition integration process impacts the broader enterprise. The body of knowledge in this category spans theories of analysis (2), explaining (4) and theories for design & action (1). Tanriverdi & Uysal (2013) look at how in mergers and acquisitions (M&A), a primary objective of acquirer is to integrate IT resources of the target with its own. They conclude that IT M&A integration is assumed to create synergies, which in turn increase shareholder wealth by making the value of the merged firm greater than the sum of the standalone values of the two firms. The resulting findings indicate that IT M&A integration does not always lead to greater value creation in M&A. The study makes a contribution by identifying the contingencies under which ITM&A integration creates wealth for acquirer's shareholders. Baker & Niederman (2013) use the lens of alignment theory to investigate how, for a firm to achieve M&A integration success, the business-IS strategies should be aligned during the M&A execution results indicate that successful, non-aligned M&A integrations can also occur, strongly supporting the emergent perspective of strategy formation in M&A integration as a valuable addition to the a priori formal planning view of strategy formation. Gurjar et al. (2002) investigates the IS integration in Vertical Acquisitions. They attempt to develop a conceptual framework for evaluating the impact of Information systems implementations on Mergers and Acquisitions.

Giacomazzi et al. (1997) look at what role IS plays in the value creation and destruction of integration and what are the sources. They construct a decision support model for IS integration in relation to mergers. Focus on IS integration strategies; what is and what should be deciding what should be integrated and to which extent. Mehta & Hirschheim (2004) study which IS-related decisions that are made after a merger and what provoke them. In their research they use three lenses: the Wall Street effect, organizational power differentials, and business-it strategic alignment. The result is an extension of theory with three categories as a foundation for future research, no empirical evidence. Alaranta (2005) investigates the post-merger framework by Motwani (2002). The researchers extend

theories for ERP-implementations. They conclude that besides change mgmt., issues related to successful PMI include M&A factors, factors related to company expertise & resources and factors related to software and vendor. Bhabra & Rheume (2008) investigate the impact of M&As on firm value in three emerging IEC defined information sectors, by examining the impact on decision about M&A on the acquiring firms shareholders. The evidence presented show that diversification strategies produce growth in the investigated sectors. Lastly, Alaranta (2005) provide an extension of a framework for IS success in M&A. The authors compare current success literature with specific article and define four categories of success issues for integration are proposed.

4 Discussion and Conclusion

This paper intended to review the extant research on IS issues in M&As, synthesize the findings into categories and suggests directions for future research. We identify 48 articles published in 13 journals and 5 conferences that deals with IS issues in M&As as their primary topic.

The findings from our scientometric analysis raise several key points. Table 2 displayed the distribution of the papers, with respect to nature of theory developed, and the area of theorization. Table 2 showed the reviewed articles have primarily focused on the building of theories for analysis and description and explanation, while theories for prediction and, in particular, design and action are far in between. This can be seen as natural, given the limited research in the area. A frequent argument is made that the field is sparsely investigated and that initial, exploratory theoretical development is needed (e.g. Henningsson & Carlsson, 2011; Henningsson & Yetton, 2011). However, after 48 papers there now is a theoretical body to build upon and limited room for exploratory studies. Instead there is now increasing possibilities to build theories for design and action based on extant explanatory and prescriptive theories.

To move towards theory for prediction and ultimately for action, the research domain of IS/IT integration in M&As would require further empirical analysis of empirical data, and design-oriented studies based on either action or design research methodologies. For case-based research, studies needs to move beyond the purely exploratory approaches and careful build on the existing theory in studies to further theory in specific directions.

Regarding how different areas of theory development have been approached with different theory types, there are three combinations that are completely lacking attention from the extant literature on IS/IT issues in M&As (Table 2). Two of them deal with the impact of IS/IT integration projects. The impact category is also the generally least explored. This is a noteworthy absence of theory. Many authors describe IS/IT integration in M&As as very important, fundamentally reshaping events in the life of organizations. An important avenue for future research is the investigation of how these IS/IT integration projects influence the IT function of the organization, and the organization as a whole. We believe it is likely that these projects can have positive impact on the IT function by providing important learning experiences that enable more flexible IT resources or build the reputation of IT managers. The reverse is, however, also possible. Failure to support the corporate growth strategy can lead to a general decay in the reputation of the IT department, and addressing integration challenges consistently through patching systems together will over time ruin the IT agility.

To start the process of revealing the impact of IS/IT integration project on the organization, it is natural to start by studying M&As in domains where we can expect the integration project to have the highest impact. IT-intensive industries such as finance would be a typical example. Both qualitative and quantitative studies would be valuable. Qualitative case studies would be able to explain the processes and mechanisms by which impact takes place, while statistical analyses based on survey data could seek to measure the magnitude of the impact also beyond the most IT-intensive industries.

Regarding the explanatory theories that has been in the three broad areas of theorization, it is noteworthy the works in the stream on the IS integration capability all deal with the acquisition IS integration capability as a one-dimensional that does not recognize the heterogeneity of the post-

acquisition IT integration challenge (Stylianou et al., 1998; Robbins & Stylianou, 1999; Tanriverdi & Uysal, 2011; Henningsson, 2012). In contrast, the stream of research on the post-acquisition IS integration challenge concludes that the four processes represent fundamentally different IT integration challenges (Johnston & Yetton, 1996; Wijnhoven et al., 2006; Mehta & Hirschheim, 2006; Henningsson & Carlsson, 2011). Thus, a natural step to move the field forward would be to focus on explanatory theory that bridge the different strands of research, developing theory that includes a heterogeneous view on the IS integration capabilities.

There is a great need for any type of theory building in this area. Our overall judgement of the explanatory theories that exist are generally only scratching the surface of any part of the multifaceted act. Here, quantitative analyses are challenged by the difficulty to operationalize and measure capabilities. Data related to IT issues are also usually not collected by professional M&A monitoring agencies, which further difficulties with empirical analyses.

Our study is not without limitations, which also provide directions for future research. First, in the scope of the scientometric analysis, we defined a limited number of journals and conferences to accomplish our search. This means that there could be articles on M&As in IS in journals or conferences that we did not study in our analysis. This fact is considered a limitation for literature reviews generally. Choosing the top-rated publications in IS research and being consequent and rigorous in our literature search and documentation of analysis, we consider an acceptable limitation to the scientometric analysis. Nonetheless, future research may include a more extensive set of IS journals and conference proceedings to validate our findings.

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Appendix A. Extant literature on IS/IT integration in M&As

#	Year	Author(s)	Area of Theorization	Nature of Theory	Description
1	1989	Main & Short	Capability	Explaining	Process of post-merger integration IS planning and partnership building
2	1992	Buck-Lew et al.	Capability	Explaining	The proposal is made that IT fit should be explicitly considered in analysis of corporate acquisitions. An assessment of IT fit will refer to the IT environments of the 2 joining firms, the IT contribution each firm can bring to the combined firm, and the role that IT should play both in negotiating the acquisition price and in integrating the joining firms.
3	1993	Merali & McKiernan	Challenges	Explaining	Puts forward the importance of IS issues in post-acquisition management
4	1996	Stylianou et al.	Challenges	Design and Action	Suggest a variance model explaining what leads to IS integration success and test the model with a questionnaire
5	1996	Weber & Pliskin	Challenges	Explaining and Predicting	The findings point to a positive relationship between IS integration and effectiveness only when controlling for 1) IT intensity and 2) Organizational Culture differences between joining firms.
6	1996	Johnston and Yetton	Capability	Explaining	Technical, organizational and strategic issues at the level of the IT organization
7	1997	Giacomazzi et al.	Impact	Design and Action	Construct a decision support model for IS integration in relation to mergers. Focus on IS integration strategies; what is and what should be deciding what should be integrated and to which extent.
8	1999	Robbins & Stylianou	Capability	Predicting	Revise the model of Stylianou et al (1996). Suggest new dimensions and new variables. Test the refined model.
9	2002	Gurjar et al.	Impact	Design and Action	Attempts to develop a conceptual framework for evaluating the impact of Information systems implementations on Mergers and Acquisitions
10	2004	Chin et al.	Capability	Analyzing	Choice of IT governance structure in cross-border acquisitions
11	2004	Alaranta & Viljanen	Challenges	Explaining	Literature Review of current material on IS Personnel integration. Presents a framework with three dimensions for further study.
12	2004	Epstein	Challenges	Analyzing	Proposes the 5 Drivers of Success in Corporate Integration
13	2004	Hwang	Challenges	Analyzing	Discusses issues that are important to the integration of information systems in M&A. Highlights the need for ES integration for companies to position themselves favourably.
14	2004	Mehta & Hirschheim	Impact	Explaining	Extends theory with three categories as a foundation for future research, no empirical evidence.
15	2005	Alaranta (1)	Challenge	Explaining	Extends theories for ERP-implementations. Concludes that besides change mgmt, issues related to successful PMI include M&A factors, factors related to company expertise & resources and factors related to software and vendor
16	2005	Alaranta (2)	Impact	Explaining	Compares current success literature with specific article and defines four categories of success issues for integration are proposed.
17	2005	Holm-Larsen	Capability	Explaining and Predicting	Identified four research questions that are answered about the role of ICT in the M&A process.
18	2006	Brunetto	Capability	Predicting	Compares different approaches to IS integration strategy
19	2006	Henningsson & Carlsson (1)	Challenges	Design and Action	Presents a framework for studying managerial aspects of ES integration in M&A and depicts the frameworks utility with a case study

20	2006	Wijnhoven et al.	Capability	Analyzing	A new variant of the IT alignment model is developed and described, then empirically tested.
21	2007	Alaranta & Henningsson (2)	Capability	Design and Action	Planning effectiveness is possible to achieve in fundamentally different ways, dependent on the characteristics of the merger or acquisition at hand.
22	2007	Henningsson et al.	Capability	Explaining	Presents seven relationships between properties of SOA and M&A
23	2007	Alaranta & Henningsson (1)	Challenges	Explaining	IS Integration model for explaining the different approaches to post-merger IS integration planning
24	2007	Mehta & Hirschheim	Challenge	Explaining	IS Integration model for explaining the different approaches to post-merger IS integration planning
25	2007	Henningsson	Challenges	Explaining	Aims at assessing the fundamental mechanisms to why and thus when IS integration becomes an critical issue in M&As.
26	2007	Miklitz & Buxmann	Challenges	Design and Action	Focus on the integration of application systems in merged companies.
27	2007	Vieru & Rivard	Challenges	Analyzing	The paper assesses IS research on the role of Information Systems (IS) and Information Technology (IT) in the context of mergers and acquisitions.
28	2008	Baro et al.	Capability	Analyzing	Proposed research of Organizational and IS Factors through Survey of IS Executives
29	2008	Bhabra & Rheume	Impact	Explaining	Evidence presented to show that diversification strategies produce growth in the investigated sectors
30	2008	LeFave et al.	Capability	Explaining	A case study of the merger of Sprint and Nextel focusing on cost savings.
31	2008	Lin & Chao	Challenge	Explaining	IS Integration model for explaining the different approaches to post-merger IS integration planning
32	2008	Kathuria	Challenges	Explaining and Predicting	Large firms acquire small, technology-centric firms as an external source of knowledge and innovation. A major challenge in these acquisitions is to capture the knowledge of the acquired firm as well as to assimilate and utilize it in the acquiring company.
33	2008	Zanner et al.	Capability	Explaining and Predicting	A framework for task-based knowledge management is provided for inquiry, which reveals M&A learnings from a case study. The paper concludes that if organizational learning is used adequately it can enhance the firms competitive advantage and mitigate against associated M&A risks
34	2009	Morsell et al.	Capability	Explaining	Provides a hypothesized path model representing the ten factors described in the article
35	2009	Tanriverdi & Uysal	Capability	Explaining	Acquirers with high levels of CBITI capabilities obtain significantly higher abnormal operating performance
36	2009	Niederman & White Baker	Challenges	Explaining	Results are presented as the distillation of comments extracted from a wide variety of perspectives, organizational situations, and personal reflections by MIS professionals. Additional observations are noted, and several emergent questions aimed at furthering our understanding of this phenomenon are presented.
37	2009	Morsell et al.	Challenges	Explaining and Predicting	The results support the research hypotheses that quality of merger planning, quality of communication of merger activities to IS, quality of IS integration planning, degree of end-user involvement in IS integration activities, and quality of technical support to users during the IS integration each have a significant influence on post-merger IS integration success.
38	2009	Murphy & Platt	Challenges	Explaining	The authors investigate the policy decisions surrounding integration of systems during major bank mergers. In particular, they examine the relationship between the system integrations and overall perceptions of merger success.
39	2010	Seddon et al.	Capability	Explaining	The effect of advice from experts in M&A activities is

40	2011	Böhm et al.	Capability	Explaining and Predicting	highly relevant, but that decisions made in the integration are situationally dependent A framework is proposed linking IT/Biz and IT/Strategic Business Units for the process of divesting and Integrating a company or business unit between two companies. Two specific contributions to Theory: 1-Models IT transactions as the combined action of IT carve-out and IT integration 2-develops a transaction alignment model that explains the mutual influence between IT-carve-out and integration strategies. Contribution to practice: enables practitioners to better understand the link between the IT transaction and value creation in organization transactions of IT integration and divestiture.
41	2011	Henningsson & Yetton	Capability	Predicting	Identify four initial business and IT strategic alignment conditions where the IT integration process is a simple one-step process exploiting existing business and IT capabilities.
42	2011	Henningsson & Carlsson (2)	Capability	Explaining	DYSIIM model for explaining how decisions taken about one aspect of the IT/M&A project dynamical affects other aspect of the project
43	2012	Alaranta & Kautz	Challenges	Predicting	This paper develops a theoretical framework for the integration of information systems (IS) after a merger or an acquisition. The framework integrates three perspectives: a structuralist, an individualist, and an interactive process perspective to analyse and understand such integrations.
44	2013	Yetton et. al	Capability	Explaining	The authors illustrate how these IT capabilities expedited the IT integration following two acquisitions, one of which involved Danisco expanding the scale of its business and the other extending the scope. Based on insights gained from Danisco, we provide lessons for CIOs to realize business benefits when managing post-acquisition IT integration.
45	2013	Tanriverdi & Uysal	Impact	Analyzing	The resulting findings indicate that IT M&A integration does not always lead to greater value creation in M&A. The study makes a contribution by identifying the contingencies under which ITM&A integration creates wealth for acquirer's shareholders.
46	2013	Baker & Niederman	Impact	Analyzing	results indicate that successful, non-aligned M&A integrations can also occur, strongly supporting the emergent perspective of strategy formation in M&A integration as a valuable addition to the a priori formal planning view of strategy formation.
47	2013	Chang et al.	Capability	Explaining and Predicting	The paper shows how the IS integration strategy during the M&A process is affected. The authors detail the issues to take into account when integrating two systems. Otherwise delays or disruptions of major operations may occur.
48	2013	Garcia-Canal et al.	Capability	Explaining	The authors construct a typology of ICT integration strategies based on the speed of integration, which is understood as the extent to which the ICT system integration meets or exceeds the minimum technology transfer time due to other organizational requirements.