Proactively Building Capabilities for the Post-Acquisition Integration of Information Systems

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Proactively Building Capabilities for the Post-Acquisition Integration of Information Systems

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Abstract

To gain the strategic benefits of acquisitions, firms must successfully execute post-acquisition IS integration. Unfortunately, a key reason acquisitions regularly fail is because firms fail to successfully leverage the post-acquisition IS integration capability. This capability is not found in non-acquisitive firms. Although research has shown that this capability must be built during the years preceding an acquisition, it has not comprehensively explained what the capability is, nor how it is proactively developed.

Through an engaged scholarship learning partnership, this PhD examines how Maersk, proactively built their post-acquisition IS integration capability prior to their first acquisition. By adopting the resource-based view and its extension into dynamic capabilities this PhD contributes mid-range theory that describes and explains this proactive capability building process. Firms can leverage this useful knowledge when building their own IS integration capability to become capable of executing post-acquisition IS integration.

Resume (Dansk)

Det er nødvendigt at gennemføre en vellykket IT-integration, hvis man for alvor vil høste de strategiske fordele ved virksomhedsopkøb. Desværre går det ofte galt, da det kræver en særlig kapacitet i form af ressourcer og kompetencer, som den opkøbende virksomhed ikke nødvendigvis har, især hvis den ikke har tradition for opkøb. Forskningen har påvist, at opbygningen af sådan en kapacitet tager flere år, og bør være på plads inden opkøbet gennemføres. Det er imidlertid underbelyst hvad denne kapacitet mere præcis består af, og hvordan den kan opbygges proaktivt.

Gennem et samarbejde baseret på principperne om "engaged scholarship", undersøger nærværende ph.d.-afhandling hvordan en virksomhed uden tradition for opkøb, Maersk, proaktivt opbyggede deres kapacitet i forhold til den efterfølgende IT-integration forud for deres første opkøb. Ved at anlægge et ressourcebaseret perspektiv (resource-based view) og dets overbygning, dynamiske kapaciteter, (dynamic capabilities) bidrager afhandlingen med en teoretisk forklaring og beskrivelse af denne proaktive kapacitetsopbygning. Andre virksomheder, der ønsker at opbygge kapaciteten til at udføre vellykket IT-integration efter et opkøb, kan forhåbentlig få gavn af afhandlingens opdagelser.

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I think there's a naïveness in most corporate cultures, that have little or no experience with acquisitions, that the getting ready part of an acquisition is a short process – when in fact it is a long process. Acquisitions usually impact every part of a corporation. That is, if you don't have an acquisitive culture, if you don't have a culture of acquiring and integrating, it will be a long, painful, process. There is an assumption that acquisitions are a lot easier than they actually are. Dramatically so! Head of EA & M&A at Maersk

Chapter 1: Introduction

Mergers and acquisitions (M&A)[1] are components of various corporate strategies, including entry into new markets, consolidation, vertical integration, and organisational transformation (Haspeslagh and Jemison 1991a). In 2017, 49,448 acquisitions were recorded, with a total value of more than US$3.6 trillion (Hershorn and Thomson Reuters 2018). In particular, mega deals combining large multi-business organisations accounted for more than 50% of the transaction value.

Acquisitions have been a source of great opportunity for some companies, including Cisco, CEMEX, and Santander (Busquets and Álvarez 2015; Kanter et al. 2007; Toppenberg et al. 2015), but are frequently challenging and problematic for many. It is widely recognised that acquisitions often fail to deliver the anticipated value of the deal (Marks and Mirvis 2011; Tarba et al. 2010; Wijnhoven et al. 2006). Short- and long-term financial measures show that 60–80% of all deals destroy rather than create value (King et al. 2004).

Failure has motivated studies to examine threats to acquisition success (see Haleblian et al. 2009 for a general overview). One such threat comes from the challenge in realising the aims of the deal (Habeck et al. 2000; Koi-Akrofi 2016). After the purchase has gone through, the two companies must be brought together through a structured integration process. This process is known as *post-acquisition integration*. Failure to successfully execute post-acquisition integration introduces significant risk to acquisition success.

[1] Although the terms are often used interchangeably, in this thesis *acquisition* is used with reference to an organisational transaction where one party clearly dominates the integration decision-making and is ultimately responsible towards shareholders for the realisation of deal value. For an elaborate definition, see the subsection Key terminology.

Post-acquisition integration is a subject of study in many academic disciplines as it impacts all aspects of an organisation. Sales, operations, finance, HR, IT, and the organisation's culture must be considered, planned for, and managed through integration (Bodner and Capron 2018; Cartwright and Schoenberg 2006; Cooper and Finkelstein 2014; Gomes et al. 2013; Haleblian et al. 2009; Jemison and Sitkin 1986). Taken together, the combined literature on post-acquisition integration contributes a rich understanding about the challenges of integration and their potential resolutions (Cartwright and Schoenberg 2006; Haleblian et al. 2009; Henningsson et al. 2018). Yet, despite the vast amount of research, value creation through acquisitions remains unpredictable and, too often, an elusive success story.

Compounding the challenge, the dynamic nature of modern business makes research into post-acquisition integration solutions a hunt for a moving target (Henningsson and Carlsson 2011). As business practices evolve, so do acquisition ambitions and the conditions for acquisition integration success. This evolution is particularly visible in the increasing pervasiveness of IT throughout organisations and its impact on business processes (Dawson et al. 2010; Grover and Ramanlal 1999; Keen 1991; Venkatesh 2000). Today, companies are heavily dependent on IT to enable corporate information systems (IS) that are critical for their strategies and operations (Santhanam and Hartono 2003; Wade and Hulland 2004). This creates a challenging and ever moving environment to integrate into.

After an acquisition, the newly combined organisation must integrate the business processes in line with the purpose of the acquisition deal. To enable these business processes, the supporting IS must also be integrated. This process is known as *post-acquisition IS integration.* Literature recognises the vital role IS integration plays in contributing to deal synergies (Benitez et al. 2018; Fuhrer et al. 2017; Tanriverdi and Uysal 2011, 2015). Sarrazin and West (2011) quantify this contribution, estimating that 45–60% of expected benefits from acquisitions directly depend on

IS integration. These include both enabled business processes and synergies derived from IT consolidation. The organisation cannot function as expected until this process is successfully completed (Evgeniou 2002; Henningsson and Carlsson 2011; Mehta and Hirschheim 2007). Shareholders recognise the value contingent on the successful post-acquisition IS integration, making their perception of the acquirer's ability to integrate known via stock market reactions (Tanriverdi and Uysal 2015).

Because of its importance and major contribution to the value of an acquisition, IS integration is recognised as one of the most challenging aspects of post-acquisition integration (Fuhrer et al. 2017). The literature regularly cites IS integration as a major cause of acquisition failure. PwC found that over 80% of acquirers do not believe they have the ability to integrate IT (Shay 2002). Studies also report the inability to integrate IT as the second most common reason for acquisition failure, resulting in billions of dollars in losses (Accenture 2006; Moyer 2009).

There have been many high-profile cases of IS integration leading to acquisition failure. When Wells Fargo acquired First Interstate Bancorp, a disastrous IT integration left the bank unable to effectively service its customers, even losing customer records (Popovich 2001). This failure cost the bank US$150 million in write-offs and lost it thousands of customers. Similarly, Maersk's 2005 acquisition of P&O Nedlloyd is often recalled as a botched acquisition, due to poor IT integration (Wright 2007, 2009). Finally, a decrease in production and delay in deliveries were the visible effects of poor post-acquisition IS integration resulting from Global Medical's acquisition of Health Tech (Russo and White 2013). In the light of these and other cases, the market generally doubts the ability of acquirers to successfully execute post-acquisition IS integration and frequently penalises the stock price of acquiring firms where the market sees this as a risk (Tanriverdi and Uysal 2011).

A growing academic literature emphasises the importance of post-acquisition IS integration (see Paper #1 of this thesis for an in-depth review). One foundational finding is post-acquisition IS integration takes four different *approaches*[2]: absorption, coexistence, best-of-breed, and renewal (Johnston and Yetton 1996; Wijnhoven et al. 2006; Yetton et al. 2013). The choice of which IS integration approach to use is contingent on the rationale for undertaking the acquisition because each integration approach leverages different IT resources to achieve the integration outcome.

For example, absorption requires that one of the two companies possess an IS that is sufficiently scalable to support the combined organisation and the technical competence to migrate data (Yetton et al., 2013). In contrast, a best-of-breed approach involves a politically sensitive process of negotiating system by system which part of the IS to keep in each organisation and the technically complex task of consolidating two different IT platforms (Henningsson and Kettinger 2016a). These examples show how post-acquisition IS integration follows one of the four distinctly different integration approaches and how each approach leverages a unique set of IT resources and capabilities.

Research has also shown that the IT resources and capabilities required to carry out post-acquisition IS integration are not found in companies that are not acquisitive (Yetton et al. 2013). These capabilities are not general IS management capabilities (Tanriverdi and Uysal 2011). Instead, they are the results of significant, purposeful efforts to build them, with the time taken measured in years. Resources such as flexible IT infrastructure (Benitez et al. 2018), temporary agents (Henningsson and Øhrgaard 2016), and enterprise architecture (Toppenberg et al. 2015) have been found to positively contribute to successful outcomes in post-acquisition IS integration (Henningsson et al. 2018). Despite such work, the studies of individual contributing IT resources

[2] Literature sometimes refers to these as integration strategies, methods, or approaches; this dissertation uses the term *IS integration approaches*.

have not produced a holistic view of the pre-acquisition IT resources that enable post-acquisition IS integration.

Furthermore, it is the finished versions of the IT resources, honed over an extended period and over multiple acquisitions, that are presented. These have been augmented by reactive learning cycles and are only partial representations of their initial state. Henningsson (2015) shows how acquirers learn to execute successful post-acquisition IS integration over a series of acquisitions. They build on the outcomes of one to improve on the next. Henningsson finds that an acquisition that fails to realise its objectives can generate important learnings that improve value creation in subsequent transactions. These learnings are applied to the IS integration capability and to its underlying IT resources to develop them. Along the same lines, Yetton et al. (2013) argue that the IS integration capability is highly tacit, and therefore recommend building dedicated teams that can accumulate IS integration experiences across acquisitions.

Once established, the IS integration capability becomes a source of competitive advantage through its ability to redeploy superior IT assets and capabilities across the combined firm to create IT-based value from the acquisition. Acquirers with superior post-acquisition IS integration capabilities should feel confident in acquiring other businesses (Tanriverdi and Uysal 2011). However, despite the numerous studies of post-acquisition IS integration, it remains a threat to successful acquisitions (Fuhrer et al. 2017; Tanriverdi and Uysal 2015; Wijnhoven et al. 2006).

A focus on reactive learning or learning from experience is a consistent theme running through the above literature. This helps one to understand how great serial acquirers, such as Cisco and CEMEX, have learned to become successful serial acquirers through experiencing many acquisitions. However, there are many companies involved in acquisitions that are not serial acquirers. Instead, they conduct a few isolated deals with long periods in between (Kanter et al.

2007). These one-off acquirers must go through a proactive preparation process to develop their post-acquisition IS integration capabilities.

The lack of research into this process presents a research gap. While much is understood about the reactive accumulation and codification of experiences as a means by which to become successful at acquisitions, the process of proactive capability building is not understood. This thesis researches the above gap in the post-acquisition IS integration literature, contributing to our understanding of how IT organisations proactively develop the IS integration capability for the first acquisition.

Overarching Research Question

Motivated by the above gap in the literature, this PhD project was created as an industrial PhD collaboration between a university (the Copenhagen Business School) and a company (Maersk). The purpose of this research project is to help departments of non-acquiring companies to proactively develop their post-acquisition IS integration capability. The intent of this project is not to develop a grand theory that can be applied to all situations. Rather, through close collaboration, rich data collection, and rigorous analysis, the goal is to develop a substantive theory (Gregor 2006; Van de Ven 2007) that describes what, and explains how, the IT department proactively prepares for their first acquisition. It is the aim of this study to prescribe actions for proactive IS capability development that align with the goals and objectives of modern IT departments (Davis and Olson 1985; Gregor 2006).

To do this, I adopt the engaged scholarship approach of Andrew Van de Ven (Van de Ven 2007). He describes engaged scholarship as a *"participative form of research for obtaining the different perspectives of key stakeholders (researchers, users, clients, sponsors, and practitioners) in*

studying complex problems" (Van de Ven 2007, p. 9). Adopting this collaborative approach typically generates more insightful knowledge than researching a practical problem in isolation.

Following this method, I entered into a learning partnership with an appropriate case company, Maersk. Building on an agreed foundation of joint problem ownership, we designed a research project founded on the gap in knowledge on post-acquisition IS integration and on a need for improving understanding of a practical problem facing the case company. Motivated by the lack of understanding of how proactive post-acquisition IS integration capability building is undertaken, and controlled within the context of this engaged scholarship programme, the overarching research question spanning the PhD project is as follows:

Research question: *How does the IT department of a non-acquiring firm proactively develop the critical post-acquisition IS integration capability in anticipation of an acquisition?*

This question adopts a process perspective of the IT department and seeks to discover how it progresses from being incapable, to being capable to successfully execute post-acquisition IS integration. To better understand the problem of capability development, the overarching research question is partitioned into two sub–research questions.

Drawing on the understanding that IT capabilities are enabled by underpinning IT resources (Barney 1991; Wade and Hulland 2004), the first sub-question seeks to identify the IT resources required for post-acquisition IS integration. While some of these IT resources have been identified, a holistic approach to identifying what should be built to enable successful post-acquisition IS integration has not been undertaken. Additionally, previous studies have confirmed that these resources do not exist in a non-acquisitive firm. Identifying these resources will contribute answers to what non-acquisitive firms should proactively develop during the preparation period. Therefore, with an aim to contribute a more granular and nuanced resource-

based model of IS integration, the first sub-question is:

Sub–research question 1: *What IT resources must a non-acquiring IT department develop to effectively deliver post-acquisition IS integration?*

The second sub–research question guiding this study concerns to the process a potential acquirer must undertake to establish the IS integration capability. It is known that this capability is not present in non-acquiring firms (Tanriverdi and Uysal 2011; Yetton et al. 2013). Yet research on the capability itself is sparse, and where it is mentioned, the discussion centres on its benefits rather than on how it can be built (Benitez et al. 2018; Mehta and Hirschheim 2007; Tanriverdi and Uysal 2011). The limited research that does discuss its development is based on reactive learning. It finds the capability is highly tacit and based on acquirer-specific knowledge. It is built by a dedicated team who, through acquisition experience, develop an understanding of the IS integration challenge and the organisation's specific ability to handle it (Henningsson 2015; Seddon et al. 2010; Toppenberg et al. 2015). Despite stating that the capability is a requirement for success that must be built in the years preceding an acquisition, the literature does not offer answers to how a non-acquiring firm should proactively develop this capability. The challenge of different capability requirements for the different integration approaches compounds the problem. Because of this, without an appropriate understanding of the challenge at hand, there is a risk that proactive preparation may not be effective.

Although the process of learning via accumulation of experiences to reactively refine and perfect the post-acquisition IS integration capability has been studied, little is known about how a non-acquisitive company can proactively execute an anticipatory capability building process. Therefore, with an aim to contribute a process explanation to this understanding the research is guided by the second sub–research question:

Sub-research question 2: *How can a first-time acquirer proactively close the IS integration capability gap in the pre-acquisition preparation phase?*

To answer these questions, I entered into an engaged scholarship learning partnership with Maersk's IT department as an industrial PhD fellow. At the time of my entering this partnership, Maersk was classified as a non-acquiring firm but had just initiated a programme to develop its post-acquisition IS integration capability. During the three years I studied the phenomenon of proactively building this capability, I recorded the events of the preparation by collating various data sources. This was primarily supported by 96 interviews with a broad range of key stakeholders as well as unrestricted access to documentation and other data developed by Maersk IT as part of this programme. During the research period, Maersk went from being a non-acquiring company with no IS integration capability to completing its first acquisition and the subsequent integration of a rival shipping company. Chapter 3 explains my methodology in fuller detail, and Chapter 4 provides a rich, detailed description of the case.

During the process of studying the proactive capability building, I authored five papers on the subject of post-acquisition IS integration and Maersk's journey. These are listed in Table 1. I submit these five papers and this dissertation as the answer to the research questions. Each paper adopts a theoretical perspective useful for answering the specific research question addressed within it. At a meta level, to build a theoretical understanding of the proactive development of the post-acquisition IS integration capability and to answer the research questions, this dissertation adopts the resource-based view and specifically its extension into dynamic capabilities. This provides a theoretical lens through which one can understand the IT resources and capabilities that contribute to competitive advantage through enablement of the recombination of firm IT resources during an acquisition. The lens of the resource-based view has been applied extensively throughout the literature on post-acquisition IS integration. My dissertation extends the existing

Full paper title	Shortened reference
Paper #1: A Review of Information System Integration in Mergers & Acquisitions	Paper #1
Paper #2: The Paradox of Post-Acquisition IS Integration Preparation: Preparing Under Incomplete Information	Paper #2
Paper #3: Building IT Resources for Post-Acquisition IS Integration in Novice Acquirers	Paper #3
Paper #4: Developing Acquisition IS Integration Capabilities: The Learning Processes of Novice Acquirers	Paper #4
Paper #5: Validating Acquisition IS Integration Readiness with Drills	Paper #5

Table 1 – Research publications

understanding by applying the lens to a fresh challenge, the proactive preparation by non-acquiring IT departments. Chapter 2 provides a detailed overview of the resource-based view, its application within the literature, and my point of departure.

While each paper is explained in detail in Chapter 5, the central discussion conveyed across those papers is summarised in three core themes:

- **Theme 1:** In the existing literature on post-acquisitions IS integration, the challenges faced by firms that lack the IS integration capability, which they need to prepare for a forthcoming acquisition, is an important knowledge gap that requires attention.

- **Theme 2:** The IT resources and capabilities required for post-acquisition IS integration are unique and many, which must be built in advance, focusing on the requirements for the integration approach deemed most likely at the time.
- **Theme 3:** The preparatory building of an IS integration capability is a dynamic capability process that iteratively restarts as critical new information of the target and acquisition integration approach becomes available.

In conclusion, this research project seeks to understand how a non-acquiring firm without the capabilities needed for successful post-acquisition IS integration, can proactively build the capabilities in anticipation of an acquisition. This is a critical gap in the existing literature. I adopt an engaged scholarship approach in partnership with Maersk to longitudinally study the development of these capabilities in a firm without an IS integration capability. I adopt the resource-based view and specifically its extension into dynamic capabilities as a theoretical lens to study the phenomenon. From this three-year project, I submit five research papers and this dissertation as answers to the research questions. Before proceeding with describing my project, I present the layout of this dissertation and provide definitions of the key constructs employed.

Structure of Cover Manuscript

This dissertation consists of five peer-reviewed publications (introduced in Chapter 5 and included in full as Appendix 5) and this cover manuscript. In this section, I describe the contents of the dissertation, which is organised as follows.

The literature on acquisitions and post-acquisition IS integration has a long history. Chapter 2 presents a review of this stream of work to ground this research project in the state of the art and identify the research gap that motivates this research. In addition, Chapter 2 presents the resource-based view and its extension into dynamic capabilities as the theoretical framework for this

dissertation. It reviews the contribution of this theory to understanding post-acquisition IS integration and justifies the choice for adopting it in this study. Drawing on the discussion of the literature and theoretical frameworks, a conceptual model is developed throughout this chapter. This conceptual model describes and frames the problem and focus of this study.

Chapter 3 presents the post-positivist philosophical stance adopted in this research and describes engaged scholarship, which is the overarching approach to research adopted. In addition, I explain the methods used to collect and analyse the data. First, I present the method used for the literature review and the methodological extension developed as part of this study. Then I detail the rationale for electing to study Maersk as a single case and describe the data collection and analysis.

Chapter 4 provides a rich description of the Maersk case as it prepared for acquisitions by proactively building its post-acquisition IS integration capability. The story is told through the words of those involved in the project, recounting the years committed to it. It covers the period leading up to and including the acquisition and integration of Hamburg Süd, a large global container shipping company.

Chapter 5 presents a synopsis of each of the five research publications submitted in this thesis. Their inclusion provides an overview of each paper and acts as an introduction to the full papers found Appendix 5.

Chapter 6 presents the findings of the overall research project. These have been derived from the individual papers submitted in full in Appendix 5 and which are summarised in Chapter 5. However, in Chapter 6, the findings are presented within a holistic framework. This identifies the findings that transcend individual papers to contribute findings towards the research questions.

Chapter 7 reviews the contributions of the dissertation. In it the contributions are aligned with the

two sub-research questions presented above and with the existing literature on post-acquisition IS integration. Chapter 7 also discusses the implications of this research project on academia and practice.

Finally, Chapter 8 concludes the dissertation and discusses potential issues and opportunities of the research. Following that references are listed, and a series of appendices complete the thesis. This includes the five research papers submitted and additional supporting reference material.

Key terminology

This section aims to provide clarity to the reader on key concepts used throughout this dissertation and the accompanying papers. Due to my evolving understanding of the concepts while studying, some minor deviations may exist in the use of these terms between the dissertation and the individual papers. It is the intent of this section to provide definitions for the terms that are acceptable to both academic and practitioner audiences, thus providing the reader a clear understanding.

Mergers and acquisitions: Mergers and acquisitions (M&A) are the combination of two firms into a new entity or the transfer of ownership of one into the other (Marks and Mirvis 2001). Although the terms are commonly used interchangeably, there is a distinction between the two (Reed et al. 2007). This distinction is based on the level of equality derived from size and power differences between the two companies (Wijnhoven et al. 2006). Where equal parties come together, this is termed a merger, and where non-equal parties combine, an acquisition of one firm by another (Brown and Renwick 1996). The two terms are defined below.

Merger: A merger occurs when two parties come together under the premise of equal partnership (Gaughan 2010; Jemison and Sitkin 1986; Krishnamurti and Vishwanath 2008; Marks and Mirvis 2011). The two firms combine to create a new company with a common resource base and

common goals (Sudarsanam 1995). This can happen in two ways. Either one company buys the stock of another and absorbs the bought entity (Nakamura 2005), or a new entity is established and both firms merge together into it (Chen and Findlay 2003). Common to both approaches is the deliberate agreement between them that the two firms are joining together by their own choice and they both retain power over the newly merged firm (Marks and Mirvis 2011).

It is argued that the term *merger* is often used to avoid the negative connotations associated with one firm *acquiring* another and that in reality it is rare to see a true merger (Piekkari et al. 2005).

Acquisition: An acquisition involves the explicit buying of one company's shares or assets by another company (Chen and Findlay 2003; Giacomazzi et al. 1997; Marks and Mirvis 2011). This could happen with the approval of the firm being acquired or without (in the case of a hostile takeover) (Jagersma 2005). Often size disparity between the two firms supports the power balance towards the acquirer (Haspeslagh and Jemison 1991a; Søderberg 2006; Wijnhoven et al. 2006). Due to the power imbalance brought about by one firm explicitly purchasing the other, the acquirer gains ownership and managerial control of the acquired firm (Chen and Findlay 2003; Marks and Mirvis 2011; Nakamura 2005).

Post-acquisition integration: After two firms come together through a merger or acquisition, changes must be made to the two firms in order to achieve stability and deploy resources towards activities aimed at achieving a common set of organisational goals (Borys and Jemison 1989; Pablo 1994). The systems, people, cultures, assets, and organisational structures, which previously have been separate characteristics of the different firms, must be brought together under one entity (Mehta and Hirschheim 2007; Pablo 1994). This process is known as post-acquisition (or post-merger) integration. Bodner and Capron (2018, p. 2) define post-acquisition integration as *"the process that unfolds in the aftermath of the deal closure to reconfigure merging firms by*

redeploying, adding, or divesting resources, lines of products, or entire businesses, in order to achieve the expected combination benefits."

The degree of integration depends on the desired level of interdependence and autonomy between the two firms and can range from them staying separate entities to one firm absorbing the other (Angwin 2000; Haspeslagh and Jemison 1991a; Marks and Mirvis 2011). The process of post-acquisition integration involves all functions of the two firms, including finance and HR, and even the integration of corporate culture (Goulet and Schweiger 2000; Haleblian et al. 2009; Marks and Mirvis 2010).

Announcement date: The announcement date is the day when the two firms involved announce to the public, especially to the stock exchange, the intention to either merge or carry out an acquisition (Amihud et al. 1990; Dianita et al. 2013). The significance of this date is the opening up of information to the capital markets (Hannan and Wolken 1989; Schoenberg 2006). At this time, the investigation and planning that has previously been kept secret is revealed to the public.

Day One: Day One is the day the acquisition or merger deal is closed and the two legal entities become one (Mehta and Hirschheim 2004). It follows a period of integration planning that begins from the announcement date (Mehta and Hirschheim 2007). There are judicial limitations imposed by governments which restricts the level of integration planning and influence two independent firms can have (Chanmugam et al. 2005). These limitations are lifted on Day One as ownership is consolidated into one firm.

Acquisition process: There are many documented versions of how acquisitions unfold, with varying levels of attention on the events before and after Day One (Busquets 2015; Henningsson 2015; Merali and McKiernan 1993). This generally depends on whether the literature is focussed on the establishment of the deal or on the realisation of benefits through post-acquisition

integration. For the sake of simplicity, I present the following generic model, Figure 1, as an overview of the acquisition process for guidance to the reader.

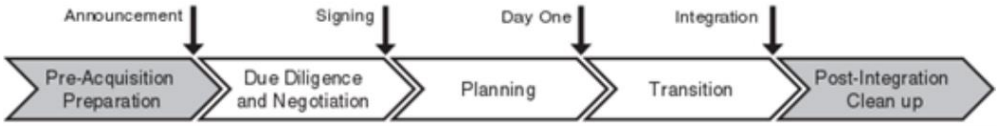

Figure 1 – Generic acquisition integration approach. Adapted from Henningsson (2015)

Chapter 2: Framing the Research

This chapter positions my thesis within its research field and presents the theoretical foundations upon which the study was conducted. I begin this chapter by detailing the strategic rationale for acquisitions and explain the role post-acquisition integration plays in realising expected synergistic benefits. After I discuss post-acquisition IS integration, I present key findings from a literature review completed as part of this project. These findings provide the point of departure from previous work, and from there I focus on the need to proactively develop unique IT resources and capabilities for successful post-acquisition IS integration. After that I present the theoretical perspective, the resource-based view and its extension into dynamic capabilities, as the lens through which I analyse the process of capability building in the IT departments of non-acquiring companies. Finally, throughout the chapter I build a conceptual model of the post-acquisition integration process, including the IT department's capability building process.

In addition to this section's overarching view of the PhD project, each research paper contains complementary theoretical perspectives. An overview of the papers is presented in Chapter 5, and the full details can be found in each of the specific papers contained in Appendix 5.

Acquisition Rationale

Acquisitions are the transactional exchange of firm ownership from one company to another (Chen and Findlay 2003; Giacomazzi et al. 1997; Marks and Mirvis 2011). While some firms may do this to catch up with competition, many undertake this transaction to create a competitive advantage (Capron 1999; Cartwright and Schoenberg 2006; Ferrer et al. 2013; Schoenberg 2006). The speed at which firms can renew their market position or source external assets or capabilities through acquisitions is unmatched by internal development or partnerships (Haspeslagh and

Jemison 1991b). The opportunities available through acquisitions, and the pace at which they can be realised, offer a convenient path to create competitive advantage.

Not all acquisitions require post-acquisition integration to realise the acquisition rationale. For example, some acquisitions are made by holding companies as investments, and others are done to shut down and remove competition. These are not of concern in this thesis, which focusses on acquisitions that require integration, specifically IS integration, to realise acquisition benefits.

A large body of literature discusses four broad synergy-creating rationales that are dependent on integration (Angwin 2000; Cartwright and Schoenberg 2006; Henningsson and Kettinger 2016a; Marks and Mirvis 2011; Schweiger and Very 2003; Singh and Montgomery 1987; Tarba et al. 2010). These are presented and described in Table 2.

Acquisition Rationale	Description
Economies of scale	Acquiring firms realise economies of scale when they can do more of the same with less. This occurs, for example, as combined firms consolidate their operations and support under one company that is smaller than the sum of two individual ones. In the context of this thesis, a good example is the consolidation of the two firms' IT departments, using one version of the same systems and reducing staff numbers.
Economies of scope	These occur when the combined organisation can leverage the unique capabilities of the acquired firm to benefit its offering. This is notable in vertically integrated acquisitions where owning forwards or backwards in the supply chain provides significant advantage to the existing business through its ability to source raw materials or ensure an available sales outlet.
Business improvement and innovation	Business improvement and innovation is an acquisition rationale whereby the firms come together to use the strengths of the other's products to innovate a significantly new joint offering. This is noticeable in the acquisitions by large technology companies who combine acquired technology with their platforms.
Strategic renewal	The final rationale is strategic renewal. In this the two firms invent a new state to integrate into. This could be, for example, a new headquarters or a new company culture.

Table 2 – Acquisition rationale

Acquisition rationale underscores the business case's justification of an acquisition and is developed prior to the acquisition beginning. Drawing on this understanding, I present Figure 2 as a conceptual model illustrating the relationship between acquisition rationale and anticipated competitive advantage. This figure will be developed throughout this chapter to build a conceptual model explaining post-acquisition IS integration.

Unfortunately, acquisitions generally fail to realise the anticipated rationale (Schoenberg 2006). Short- and long-term financial measures show 60–80% of all deals destroy rather than create financial value (see, for example, King et al. 2004). Generally, literature agrees that at least 50% of acquisitions fail to deliver on anticipated synergies (Alaranta and Henningsson 2008; Mehta and Hirschheim 2007). To realise the expected acquisition rationale, the acquiring firm must integrate the acquired company, a process that, when carried out incorrectly, leads to acquisition failure (Habeck et al. 2000; Haspeslagh and Jemison 1991a; Shrivastava 1986). This process and the challenges associated with it are discussed in the next section.

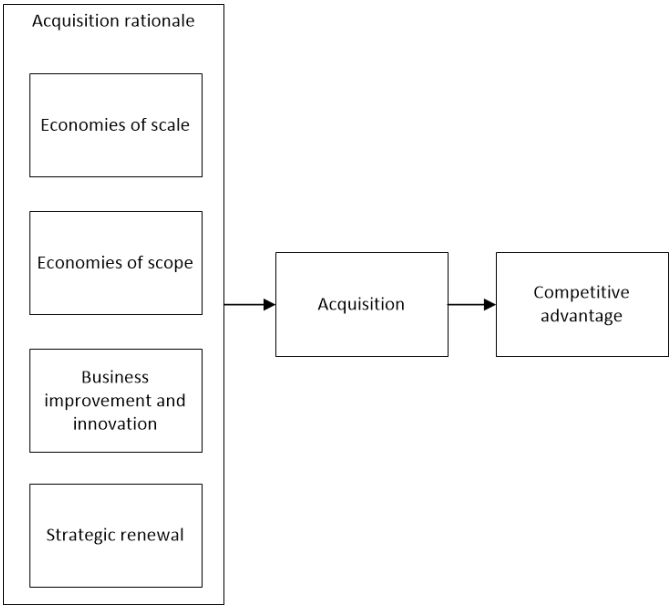

Figure 2 – Acquisition rationale in the conceptual model

Post-Acquisition Integration

After an acquisition is closed, the acquiring firm must integrate the target firm to realise the anticipated acquisition rationale. Failure to do so correctly often leads to acquisition failure (Habeck et al. 2000; Haspeslagh and Jemison 1991a; Shrivastava 1986). A significant stream of research has focussed on the challenges of integrating the two firms after an acquisition (Haleblian et al. 2009; Shimizu et al. 2004). This process is known as post-acquisition integration. Bodner and Capron (2018, p. 2) define this as *"the process that unfolds in the aftermath of the deal closure to reconfigure merging firms by redeploying, adding, or divesting resources, lines of products, or entire businesses, in order to achieve the expected combination benefits."* It is this process of integration that realises the business case that forms the acquisition rationale.

As presented in the previous section, there are varying rationales for acquisitions. These require different integration methods to realise the expected strategic goals. Haspeslagh and Jemison's (1991) model defines four types of organisational integration. It identifies two factors influencing the intended operating style, which direct the integration method. These factors are *the level of strategic interdependence* of the acquired firm and *the level of strategic autonomy*.

Presented as a two-by-two model, the four integration methods are positioned relative to the two factors' varying levels of influence. Figure 3 graphically presents Haspeslagh and Jemison's (1991) four methods of post-acquisition organisational integration in their two-by-two model.

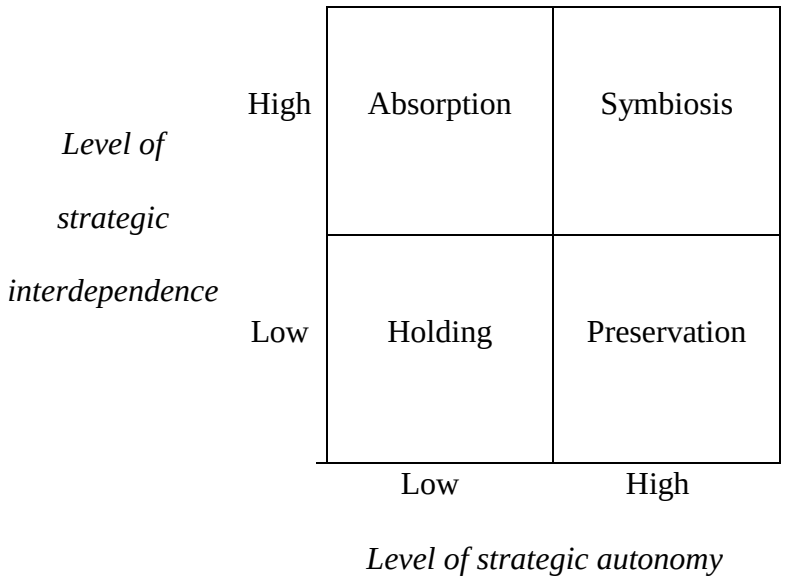

Figure 3 – The four firm integration methods. Adapted from Haspeslagh and Jemison (1991a)

Since the publication of Haspeslagh and Jemison's (1991) work, a fifth integration method has been put forward: transformational integration (Marks and Mirvis 2010). These five integration methods are presented and described in Table 3.

Excluding the holding method, these four firm integration methods each enable one of the synergy-based acquisition rationales presented in Table 2. The acquiring firm must select and apply the correct firm integration method that will realise the expected business benefits. These varying integration methods face very different challenges to success and therefore require different means to execute (Goulet and Schweiger 2000). The alignment of the deal rationale with the enabling firm integration method is presented in Figure 4. Comparing the descriptions of the firm integration methods shows how different the ways that acquirers go about realising the deal rationale can be.

Integration Method	Description
Holding	Low need for autonomy and low need for interdependence. This method requires little to no post-acquisition integration and can be compared to the role of a holding company. Due to the lack of integration, this method is of little relevance to this thesis.
Preservation	High need for autonomy and low need for interdependence. This method of integration works to maintain the capabilities and way of working of the existing firm. This method is used for acquisitions with the aim of realising economies of scope, adding new capabilities to the combined firm.
Symbiosis	High need for autonomy and high need for interdependence. This integration method aims to combine the best of the two firms to enhance each company's capabilities. The symbiosis method is applied when the aim of the acquisition is business improvement and innovation. It retains the best features of the two firms and combine them to work together.
Absorption	Low need for autonomy and high need for interdependence. In the absorption method one company (usually the acquired) adopts the ways and means of the other part, and the two independent companies become one consolidated firm based on the adoption of one firm's way of working. Like the strategies above, absorption is often used to realise economies of scale.
Transformation	This method calls for low autonomy and high interdependence (like the absorption method). However, unlike that in absorption, the desired end state does not exist yet—the combined company must create this newly integrated environment together. In this method, the two firms embrace a new way of working for the newly combined firm, replacing existing processes and capabilities with new ones. Transformational integration is useful for acquisitions aiming for strategic renewal.

Table 3 – Post-acquisition integration methods

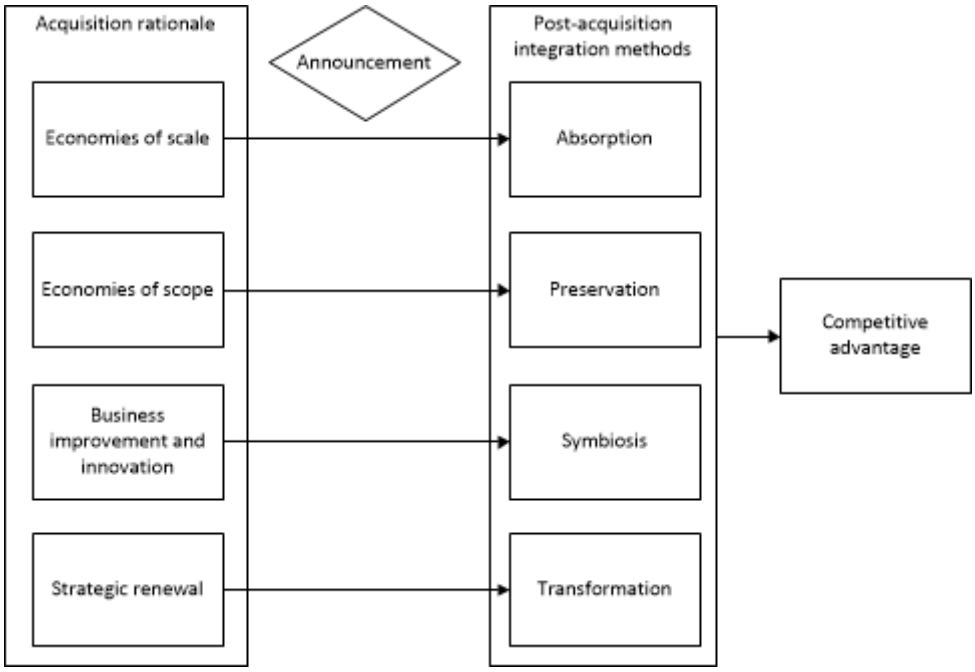

Figure 4 – Acquisition process with post-acquisition integration methods

The acquisition process model in Figure 4 has evolved from Figure 2 in two distinct ways. First, the "acquisition" event in Figure 2 has been removed from the model and replaced with two processes on either side of the acquisition's announcement. The first process shows the development of the acquisition's rationale. Within this, the business case is assessed and decided upon. This is finished when the acquisition is announced. After the announcement, post-acquisition integration is commenced. Successful post-acquisition integration leads to the anticipated competitive advantage.

Secondly, the four firm integration methods are added within the post-acquisition integration process. An arrow from each acquisition rationale to a firm integration method shows the need for alignment between the two. For example, to realise the acquisition rationale of economies of scale, the post-acquisition integration must follow the firm integration method of absorption. This updated version depicting the process of acquisition to benefit realisation is presented as Figure 4.

Post-acquisition integration is a challenge faced by all functions of a firm and as such has been studied from many different angles, including finance, HR, and culture (see, for example, Goulet and Schweiger 2000; Haleblian et al. 2009; Marks and Mirvis 2010). Despite the understanding of the various integration methods and the best efforts of many to investigate this phenomenon, post-acquisition integration is still one of the major failing points in acquisitions. There is still a need for more research into this challenge, and Haleblian et al. (2009) highlight the need to focus on internal capabilities using perspectives such as resource-based and organisational learning. This thesis focusses on one aspect of the post-acquisition integration challenge: IS. In the next section I discuss the challenge of IS integration in acquisitions and present an overview of the current literature on the topic.

IS Integration in Acquisitions

One of the most challenging and critical aspects of post-acquisition integration is the bringing together of the two firms' IS (Accenture 2006; Harrell and Higgins 2002). There are unfortunately too many examples of IS integration being the cause of acquisition failure (Popovich 2001; Wright 2009).

Strong academic interest in this challenge has stimulated the study of post-acquisition IS integration for 30 years now (Henningsson et al. 2018; Toppenberg and Henningsson 2013). Despite this, IS integration is still regularly cited as one of the key contributors to negative acquisition outcomes (Henningsson and Kettinger 2016a; Mehta and Hirschheim 2007). Studies often rank it as one of the main reasons for acquisitions failing to realise their anticipated benefits, with some suggesting it is the second most common reason for acquisition failure (Accenture 2006).

Early research into the subject made two important contributions which have paved the way for continued study. The first contribution is the recognition of how IT contributes value to an

acquisition. Early findings revealed that IT's principal contribution to an acquisition is the creation of value through enabling IS-dependent business benefits (Böhm et al. 2011; Johnston and Yetton 1996; Main and Short 1989; Mehta and Hirschheim 2007; Wijnhoven et al. 2006). Sarrazin and West (2011) build on this notion by identifying two ways IT adds to the realisation of an acquisition's value. First, in alignment with the aforementioned research contribution, they acknowledge that IS integration results in the enablement of business practices. The second way IT adds value is the realisation of IT-related synergies. This could be from (for example) the consolidation of data centres, scale benefits such as lower per unit licensing cost, or the minimisation of the IT headcount. Through these two contributions, IS integration contributes between 35% and 60% of the overall synergy value of the deal (Sarrazin and West 2011).

The second research contribution is the identification of four post-acquisition IS integration approaches[3] (Buck-Lew et al. 1992; Johnston and Yetton 1996). These IS integration approaches

1. absorption
2. coexistence
3. best-of-breed
4. renewal

are presented in Table 4 along with descriptions and alternative names used in the literature. Through the application of alignment theory, Johnston and Yetton (1996) show a relationship between the four IS integration approaches and the firm integration methods. This finding shows the need for firms to align the correct IS integration approach with the firm integration method being used. This has been demonstrated through a real case of a merger between two banks failing due to lack of alignment between the business rationale and the chosen IS integration approach (Johnston and Yetton 1996).

[3] To avoid confusion and ensure clarity, when referring to the process of firm-level integration, I use "integration *method*"; when referring to the integration of IS, I use "integration *approach*."

IS Integration Method	Description	Alternative Names
Absorption	The newly acquired company is migrated to the acquiring company's IS platform, and the former's IS is retired (Johnston and Yetton 1996).	• Conversion (Buck-Lew et al. 1992) • Replacement (Ali et al. 2015) • Total integration (Giacomazzi et al. 1997) • Consolidation (Baker and Niederman 2014) • Use one company's system (Harrell and Higgins 2002) • Rip and replace (Henningsson and Kettinger 2016b) • Choose one (Land and Crnković 2011) • Take-over (Wijnhoven et al. 2006)
Coexistence	Some (or all) of the IS of the acquired company is kept and operated alongside the acquirer's. The remainder of the IS is retired (Johnston and Yetton 1996; Wijnhoven et al. 2006).	• Preservation (Chang et al. 2014; Gates and Very 2003) • Interface (Ali et al. 2015) • Maintain status quo (Harrell and Higgins 2002) • No integration (Giacomazzi et al. 1997) • Bolt on or combine (Henningsson and Kettinger 2016b)
Best-of-breed	The two companies' systems that perform the same function are compared, and the best system is chosen to be retained (Johnston and Yetton 1996).	• Take the best (Buck-Lew et al. 1992) • Standardisation (Wijnhoven et al. 2006) • Combine (Henningsson and Kettinger 2016b) • Merge (Land and Crnković 2011)
Renewal	After the acquisition, the company moves onto a new IT platform, retiring the IS of both companies (Giacomazzi et al. 1997; Wijnhoven et al. 2006).	• Replacement (Buck-Lew et al. 1992) • New (Ali et al. 2015; Harrell and Higgins 2002; Mehta and Hirschheim 2007) • Transformation (Baker and Niederman 2014; Busquets 2015) • Start over (from scratch) (Henningsson and Kettinger 2016b; Land and Crnković 2011)

Table 4 – IS integration approaches

These two research findings add more depth to the conceptual model. First, there is a need to introduce post-acquisition IS integration to the model as an enabling step to the realisation of the acquisition rationale. Second, the identification of the four IS integration methods must be shown as different means to accomplish the acquisition goal, and these must be aligned with their respective organisational integration methods. By including these, Figure 5 now shows post-acquisition IS integration as a step in the process of realising the acquisition rationale.

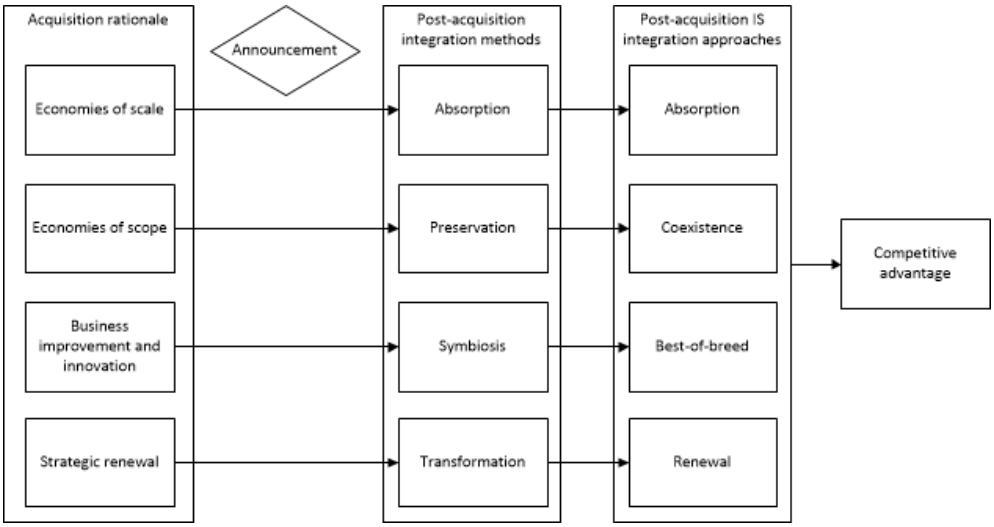

Figure 5 – Inclusion of post-acquisition IS integration in the conceptual model

These two key findings have laid the foundations for future research into post-acquisition IS integration. They also bridge the understanding between the contribution IS makes to a deal and how it is achieved. However, they represent only a small (albeit critical) part of the literature on post-acquisition IS integration. To ground this study in the current state of knowledge and identify research gaps, a literature review was done. This literature review identified 70 articles on post-acquisition IS integration written during the past 30 years and is submitted as a part of this dissertation: Paper #1: A Review of Information System Integration in Mergers & Acquisitions. The next section briefly summarises this paper, bringing attention to the research gaps and the point of departure for this study.

Consolidating the fragmented literature

A significant contribution of this thesis is the literature review, submitted as Paper #1, which reviewed 70 peer-reviewed articles on post-acquisition IS integration. This section summarises the findings and explains the innovative methodology followed to reach them.

To consolidate the IS integration literature, we applied an extended version of the methodology developed by Lacity et al. (2010, 2011, 2017) to consolidate another IT domain, outsourcing. This

analysis identified 248 IS integration variables and their robust relationships and five central themes running through the literature. These five themes constitute the consolidated view and baseline of the state of the art on post-acquisition IS integration. A summary of each theme identified in Paper #1 is presented next, and Table 5 provides an overview of key elements from the research for each. For more details on the themes and how the fragmented IS integration literature was consolidated, please refer to Paper #1.

Theme (A), the M&A context, considers the effects of the domain in which the IS integration occurs. IS integration is a part of the organisational integration and is therefore very much tied to what happens in the surrounding environment. This means that the outcome of the IS integration cannot be considered in isolation, away from the overall M&A context. For example, the terms of the acquisition and business objectives define the objective of the IS integration project. Also, contextual conditions, such as the pace of acquisition or overall M&A attitude, spill over and affect the IS integration project.

Theme (B), relational fit, considers the compatibility of the IS on the IS integration outcomes. It is often presented in a way that demonstrates the limitations the IS fit has over the choice of integration method. In this theme, alignment theory is used to understand the effect of a chosen integration method on the realisation of strategic goals. Interestingly, the long-held belief that alignment is critical for IS integration success has recently been challenged, with one study reporting eight out of 22 misaligned acquisitions as successful (Baker and Niederman 2014). Clearly, more research is needed to understand the effect of relational fit.

Theme	Robust Explanatory Variables		Theoretical Perspectives	Key Papers
A. M&A context	• Quality of IS integration planning • Top management support • M&A motivation • Integration objectives	• Organisational M&A planning • IS Integration objectives • IS Integration method	• Coordination theory • Task dependency theory	• Freitag et al. 2010 • Garcia-Canal et al. 2013 • Glazar-Stavnicky 2016 • Jain and Ramesh 2015
B. Relational fit	• M&A motivation • Organisational integration objectives • IS Integration objectives • Application and IT compatibility	• IS configuration • Integration alignment • IS Integration method	• Alignment theory • Configuration theory	• Baker and Niederman 2014 • Brunetto 2006 • Buck-Lew et al. 1992 • Chang et al. 2014 • Hsu and Chen 2006 • Johnston and Yetton 1996 • Mehta and Hirschheim 2007 • Toppenberg et al. 2015 • Wijnhoven et al. 2006
C. The human side	• Changes in IS workforce size • IT communication • IS employee morale • User training and support • Changes in IS policies and procedures • Decreases in IS staff compensation • IT leadership in integration project	• IS–business collaboration in planning • Communication of M&A activities to IS • Political considerations • Collaboration dynamics • Power and politics • IS Integration method	• Power and politics • Change management • Resistance • Human resource management	• Kim et al. 2005 • Kovela and Skok 2012 • Linder 1989 • Stylianou et al. 1996 • Vieru and Rivard 2014a • Williams et al. 2015
D. Preconditions for IS integration	• IT investment in the target • Level of data sharing pre-M&A • IT flexibility • IT standardisation	• IS Integration objectives • Use of external resources • Enterprise architecture capability • IS Integration method	• Resource-based view • Capability-based view • Knowledge-based view	• Benitez-Amado and Ray 2012 • Brown et al. 2003 • Henningsson 2015 • Kim et al. 2005 • Stylianou et al. 1996 • Tafti 2009 • Toppenberg et al. 2015 • Yetton et al. 2013
E. Time pressure	• Risk management • Discovery • IS Integration proactivity	• Time pressure • IS Integration method	• Organisational response • Attention-based view • Path dependency theory • Temporal scales	• Eckert et al. 2012 • Johnston and Yetton 1996 • Mehta and Hirschheim 2007

Table 5 – The five themes of IS integration research

Theme (C), the human side, reveals how HR- related concepts, such as workforce size, training, and employee morale, impact the success of IS integration. Key explanatory variables of this theme include politics, leadership, and the importance of communication. This theme reveals an important human dimension: how human behaviour impacts and is impacted by IS integration. Culture, one of the most significant challenges in post-acquisition integration, also features in this theme. This theme gives a good understanding of what leads an IS integration project to drift from initial plans and of the importance of some good human elements; however, research falls short of detailing how to ensure that these occur.

Theme (D), preconditions for IS integration, discusses the effect the IT department's pre-acquisition IS configuration has on the outcomes of IS integration. This includes the IT infrastructure, IT capabilities, and relationships between IS and the business. The opportunity of an organisation to choose one integration method or another is greatly influenced by the IS preconditions. Dominating this research theme is the resource-based theory of acquisitions and its extension into the capability- and knowledge-based theories. Research can study these preconditions further by finding relations between specific capabilities and integration types or comparing the needs of single acquisitions versus the needs of those undertaken by serial acquirers.

Theme (E), time pressure, highlights the effect time has on the integration project. There are many external factors which contribute to the effect of time pressure, which impacts the speed at which the integration must be completed. These include pressure from the market to realise anticipated benefits and legal pressure to report and control for risk (Johnston and Yetton 1996; Mehta and Hirschheim 2007). When time pressure is high, an acquiring company can be forced to choose an integration approach that is fast, which may not be the most optimal. Sub-optimal decisions made under high time pressure can have a lasting effect on integrations, especially in multiple

acquisitions. IT infrastructure is path-dependent, and a poor choice of integration can significantly limit integration opportunities for subsequent acquisitions.

As this project focusses on proactively building the IS integration capability, my point of departure from the five themes is predominantly Theme D, preconditions for IS integration success. The next section presents the current understanding on the preconditions for successful IS integration.

Preconditions for successful IS integration

Preconditions for successful IS integration were one of the five themes identified running through the IS integration literature. These preconditions enable, or in some instances inhibit, the IT department to choose the appropriate integration approach and successfully execute it. Three dimensions of preconditions were identified: capabilities (Henningsson 2015; Kim et al. 2005), IT infrastructure (Benitez et al. 2018; Tafti 2009), and relationships between IT and business (Brown et al. 2003; Stylianou et al. 1996).

An exemplar case demonstrating the need for preconditions for successful IS integration is that of Danisco (Yetton et al. 2013). A history of acquisition integrations into an inflexible or standardised IT platform resulted in a messy IT environment which inhibited the company's ability to continue its growth by acquisition strategy. Learning from this experience, Danisco put its acquisition programme on hold while it invested considerable time and resources in establishing IT's reputation within the business, building a flexible IT platform, and creating a dedicated team for executing IS integration. This development programme created the necessary preconditions which enabled Danisco's IT to successfully integrate many future acquisitions.

Predominantly, the resource-based view, as well as its extension into the capability- and knowledge-based views, has been the theoretical framing through which preconditions were

studied. Adopting this view, studies have begun to identify key IT resources that are required as preconditions for successful IS integration. These include a flexible IT infrastructure and the three IS integration capabilities of diagnosis, planning, and implementation. However, these findings present only a rudimentary understanding of the challenge of establishing the necessary IT preconditions, a point highlighted by the research gaps acknowledged by the literature review. The scope of preconditions for successful IS integration is not known, nor is how the preconditions are built or the learning processes firms use to establish them.

This research gap is particularly salient in the context of first-time or one-off acquirers, who must develop these preconditions proactively during a preparation phase. To further the understanding of preconditions for successful IS integration, in the specific context of first-time acquirers, I adopt the recognised theory of the resource-based view and its specific extension into dynamic capabilities. By using this theory, I extend the existing literature on preconditions for IS integration success into understanding a new challenge: proactive preparation. The following sub-chapter explains the resource-based view and its extension into dynamic capabilities within the context of post-acquisition IS integration.

Overall Theoretical Perspectives

As has been emphasised throughout this chapter, an expectation of an acquisition is to contribute to the firm's competitive advantage. IT contributes to this through the deployment of specific IT resources and IS integration capabilities, which are developed during a preparation period. It is this preparation period that is the focus of this dissertation, specifically to describe what is developed and explain how. As my research focusses on a new aspect of the post-acquisition IS integration challenge, I elect to ground my research in the well-established theoretical stream of the resource-based view and its specific extension into dynamic capabilities. I apply the resource-based view to gain an understanding of the IT resources that must be developed proactively prior

to an acquisition. Building on that, I apply the dynamic capabilities framework to understand how these are developed proactively, during the preparation period. Previous research into post-acquisition IS integration has favoured using the resource-based view. This study continues this stream by extending the resource-based understanding of post-acquisition IS integration by focussing it on the period of proactive preparation. This section presents each of these theories and continues the development of the conceptual model to include this proactive preparation.

The resource-based view

The resource-based view and its related perspectives (the capability- and knowledge-based views) dominated Theme D, preconditions for IS integration, in Paper #1. This section contributes to this understanding. First, I discuss the resource-based view and its role in understanding IT strategy and acquisitions. From there I present how the resource-based view can be used to investigate what resources and capabilities must be developed during the preparation phase to contribute to the post-acquisition IS integration capability.

The resource-based view of the firm has been used extensively throughout the strategic management literature to explain how firms use resources to achieve a competitive advantage (Barney 2001; Peteraf 1993; Schoenecker and Cooper 1998). It states that when a firm possesses resources that are valuable, rare, difficult to imitate, and non-substitutable, it can differentiate itself from other companies, especially in terms of pricing, and therefore enjoy long-term success (Barney 1991; Grant 1991).

A long unresolved question throughout the literature is what constitutes a *resource* (Barney 1991, 2001; Bharadwaj 2000; Grant 1991; Sanchez et al. 1996; Wade and Hulland 2004). Despite differences in how best to define resources, a consistent theme emerges from the literature. There is general agreement that there are two *types* of resources to consider when applying the resource-based view (Barney 1991; Grant 1991; Wade and Hulland 2004). There are the *things* (commonly

referred to as assets or resources) that are used by the company within their *capabilities*, the processes of creating something valuable with the said things. The use of the terms *resources* and *capabilities* within this manuscript aligns with this classification.

To provide a richer description of the resources being developed by IT departments, I adopt the definition of one of the leading resource-based view authors. Barney (1991) adds depth to this view of resources and capabilities by defining a subset of resources. He categorises them as physical, human, or organisational. In line with the earlier definition, he distinguishes capabilities as organisational processes, though he acknowledges that they can also be resources.

The resource-based view has a long tradition of use with the IS literature. However, there is contention as to whether IT in itself can lead to a sustained competitive advantage. According to the resource-based view, resources must be valuable, rare, inimitable, and non-substitutable to deliver a competitive advantage, and generally IT resources do not have those characteristics. This is due to the largely transferable nature of IT: once one company attains it, it is not too long before other organisations also have it.

However, studies have shown that while the specific resources themselves might not deliver competitive advantage, their arrangement and use through capabilities can. When IT resources are used as input to unique company capabilities, they can give the company a competitive advantage. Examples of unique capabilities are general management capabilities that connect across the company, and unique company knowledge built up by long-term employees (Mithas et al. 2011). Another capability which can contribute to competitive advantage is successful post-acquisition integration.

The resource-based view in acquisitions

The resource-based view explains how ownership of specific resources and capabilities within the firm creates the possibility for competitive advantage. Often, these resources and capabilities are developed over a long period of time and are based on the accumulation of unique knowledge built over many years of experience. An acquisition presents an opportunity whereby a firm can buy the unique resources possessed by another firm. Acquisitions provide an opportunity for firms to reconfigure their resource pool by adding, redeploying, recombining, or divesting (Bodner and Capron 2018; Karim and Capron 2016). Aligning this transaction with the resource-based view, this presents an opportunity by which one organisation can source valuable, rare, difficult to imitate, and non-substitutable resources from another firm. Combining the resource pools of the two firms increases the heterogeneity of the acquiring firm's resource makeup.

The resource-based view explains how an acquisition can position an acquiring firm in a superior resource position to its competitors. Figure 6 provides a graphical representation of the resource mix before and after Company A acquires Company B. After the acquisition and post-acquisition resource integration, Company A has an extended resource pool, increasing its competitive advantage.

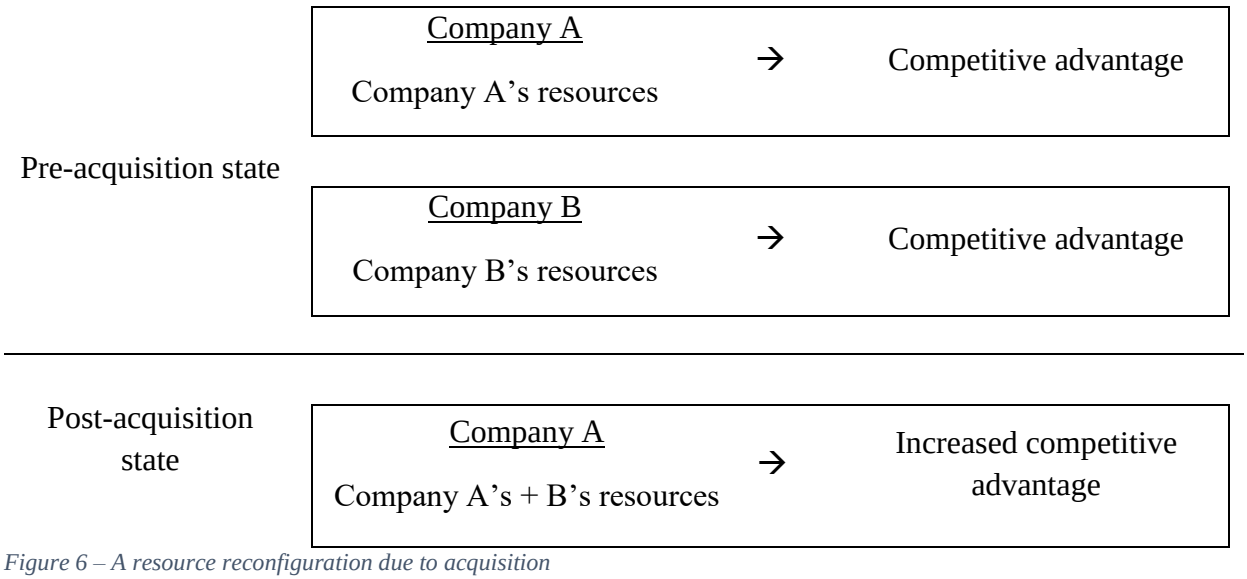

Figure 6 – A resource reconfiguration due to acquisition

Except in the case of acquisitions made by holding companies, firms must undergo some degree of integration to realise the benefits of the acquisition. From a resource-based view this integration process transforms the resource pool of the acquiring firm. When a company acquires to pursue economies of scale, competitive advantage can be realised as the newly formed firm does more with fewer resources, reducing the firm's operating costs (Walter 2004). Alternatively, when a firm acquires to realise economies of scope, the acquirer benefits through an enhancement of existing resources through the introduction and recombination of assets and knowledge from the other firm (Walter 2004). Additionally, the contribution of one firm's resources to the other can create new or enhanced products. The combination can lead to product enhancement, increasing the product's uniqueness within the market.

The new resource configuration, combining existing and newly acquired resources, can be a source of competitive advantage for firms. However, to achieve this the firm must possess the resources necessary to execute post-acquisition integration. As stated earlier, IT supports this process through post-acquisition IS integration. This process is enabled due to the specific IT resource makeup of the acquiring firm, a resource makeup that was developed proactively during a preparation phase. Understanding these specific IT resources is necessary to understand how an acquirer can realise competitive advantage brought about by post-acquisition integration. Applying the resource-based view to this capability will reveal the specific value-creating IT resources.

In the case of non-acquiring firms, the IS integration capability and its enabling IT resources are developed proactively during the preparation phase. The resource-based view is unable to explain how this is done as it takes a static view of the firm. Instead, the dynamic capabilities framework is adopted to analyse the longitudinal capability building process.

Dynamic capabilities

The dynamic capabilities framework recognises the evolutionary environment in which a firm operates, and proposes that the rapid development of new resources and capabilities is what creates competitive advantage (Eisenhardt and Martin 2000; Wang and Ahmed 2007). Dynamic capabilities are defined as "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (Teece et al. 1997, p. 517). The framework is considered complementary to, or an extension of, the resource-based view, in that it resolves the limitations caused by the latter's static view of the firm (Helfat and Peteraf 2009; Wang and Ahmed 2007). Dynamic capabilities are the precursor processes through which firms alter their existing resource base, creating new strategic opportunities and competitive advantage (Eisenhardt and Martin 2000; Grant 1996; Pisano 1994).

Dynamic capabilities can be disaggregated into three sequentially executed capacities: sensing, seizing, and reconfiguration (Helfat and Peteraf 2009; Teece 2007). The first capability, sensing, looks out for strategic opportunities or threats within the market. Once one is identified, the firm must have the capacity to seize on it—that is, to take steps to address it. The final step is reconfiguration, which is the response of the firm to integrate, reconfigure, gain, or release resources or capabilities to align with the market situation (Eisenhardt and Martin 2000). When applied correctly, dynamic capabilities produce a new resource base with which to compete in the market, and an increase in firm performance and competitive advantage (Eisenhardt and Martin 2000; Helfat and Peteraf 2009; Teece 2007; Teece et al. 1997). As a process, the logical flow of dynamic capabilities is presented in Figure 7.

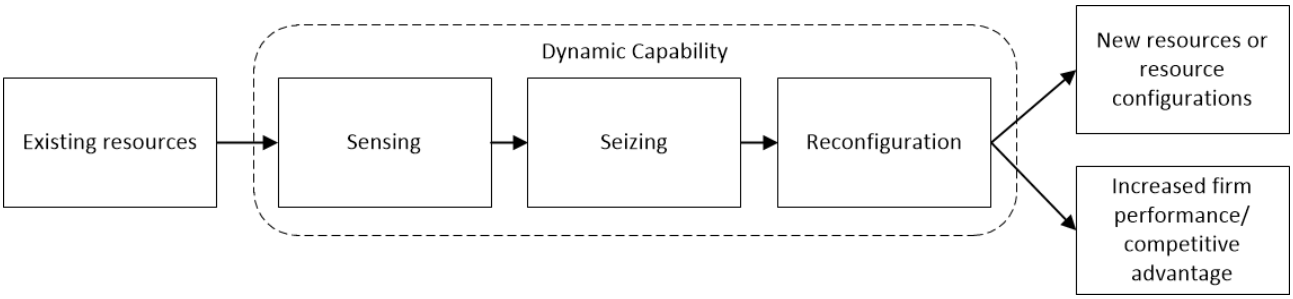

Figure 7 – Process flow of dynamic capabilities. Adapted from (Teece 2007)

High-level strategic processes, such as product development, alliancing, and strategic decision-making, have been presented as dynamic capabilities (Eisenhardt and Martin 2000; Pavlou and El Sawy 2006; Teece 2007). Similarly, the end-to-end process of acquiring and integrating firms has also been described as a dynamic capability (Eisenhardt and Martin 2000; Helfat et al. 2009; Zollo and Winter 2002). This includes the identification of potential targets as well as the integration process.

In the context of IS research, dynamic capabilities have been used extensively to further the resource-centric understanding of firm performance and competitive advantage (see, for example, Chen et al. 2008; Pavlou and El Sawy 2006; Ravichandran et al. 2005; Sher and Lee 2004). However, in the context of post-acquisition IS integration, there has been little application of this theory.

The literature review submitted as Paper #1 found only 1 out of 70 articles applied dynamic capabilities as a theoretical frame of study. Consequently, the review recommended future research explore post-acquisition IS integration capabilities (Henningsson et al. 2018). This adds to a similar call for action made by Hedman and Sarker (2015). As researchers seek to understand how success is achieved in an ever evolving environment like acquisitions, a theoretical framework which considers the dynamic nature of the challenge is well positioned to make a meaningful contribution (Henningsson and Carlsson 2011; Wang and Ahmed 2007).

Since the publication of Paper #1, Benitez et al. (2018) have published an article in *MIS Quarterly* on post-acquisition IS integration where they regard the post-acquisition IS integration capability as a dynamic capability. They present the dynamic capability as the firm's ability to integrate the two separate IT components (including the infrastructure, people, and business processes) of the two firms (Benitez et al. 2018; Tanriverdi and Uysal 2015; Yetton et al. 2013). Their paper finds IT flexibility as an enabling feature of the IS integration dynamic capability, contributing to the organisation's ability to seize acquisition opportunities (Benitez et al. 2018). That study reveals the potential for using dynamic capabilities to understand the post-acquisition IS integration challenge and calls for similar research. Continuing along this research stream, this dissertation adopts the view that the post-acquisition IS integration process is a dynamic capability of the firm and applies the theory to explain the preparatory process associated with this.

The Resource-Based View of Post-Acquisition IS Integration

From the literature review submitted as Paper #1, Theme D presented preconditions which contribute to successful post-acquisition IS integration. Studies have found having the right IT resources and capabilities in place for post-acquisition IS integration is a precondition for success. Without these in place prior to an acquisition, the IT department is unable to effectively execute an integration. The case study of Danisco demonstrates this first-hand. It shows that the company had to invest considerable effort in developing its IT to have the resources and capabilities for IS integration (Yetton et al. 2013). The case also shows it takes a significant amount of time to build the IT resources and capabilities considered preconditions for successful integration. The capability building process must be started years before an acquisition is announced to allow enough time for development. Based on this, "IS acquisition preparation" is included as an input to post-acquisition integration in the conceptual model.

Research into post-acquisition IS integration has identified some IT resources and capabilities that make up these preconditions. The stream of research identifies three high-level capabilities—diagnosis, planning, and implementation—that compose the IS integration capability (Henningsson and Øhrgaard 2016). It is understood that the three capabilities are deployed in a sequential (although at times overlapping) process through the post-acquisition IS integration process. First the IT department must diagnose the integration approach, correctly selecting the integration method that aligns with the organisational integration approach and will realise the acquisition rationale (Johnston and Yetton 1996; Wijnhoven et al. 2006). Once it is correctly selected, the IT department must plan for the integration. After the deal is closed and the target is legally purchased, IT must implement the chosen integration method as per its plan. These are the capabilities the IT department must apply during post-acquisition integration; however, as they occur sequentially, they can also be considered phases of the integration process. Figure 8 shows an updated version of the conceptual model including the IS acquisition preparation period, and the integration phases as part of the integration dynamic capability.

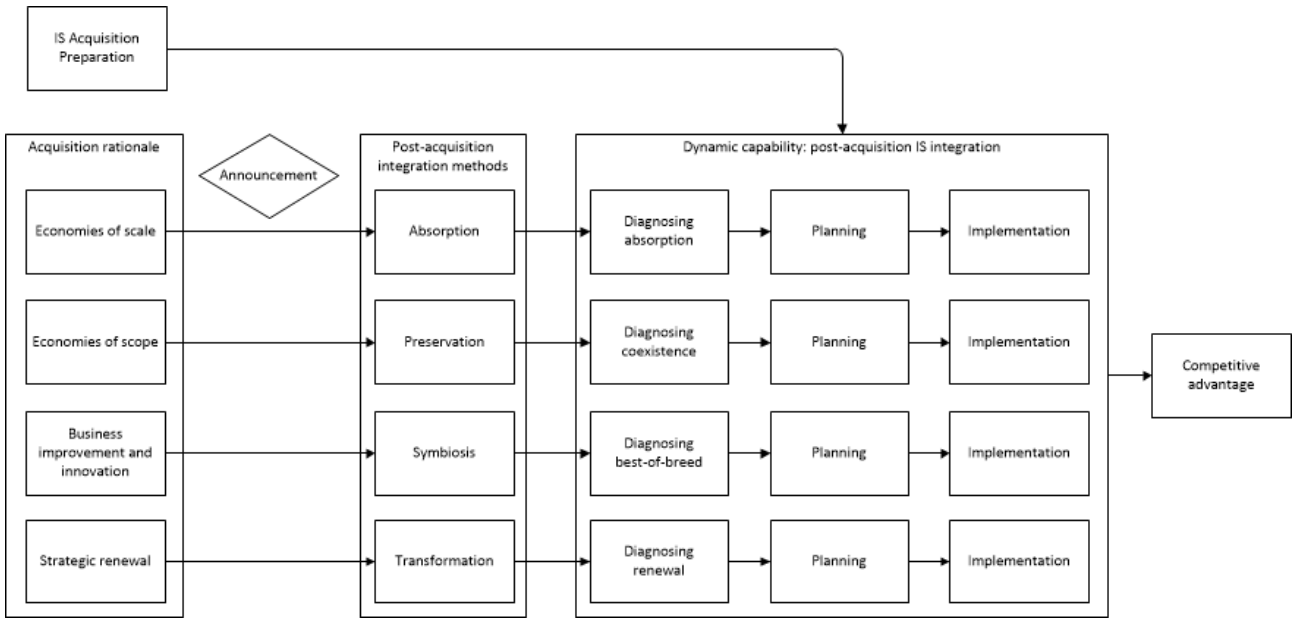

Figure 8 – Introducing IS integration capabilities to the conceptual model

Beyond discussing these three high-level integration capabilities, research has made small, initial inroads into identifying other resources and capabilities leveraged for successful post-acquisition IS integration. One identified resource underpinning the IS integration capabilities is flexible IT infrastructure (Benitez et al. 2018; Yetton et al. 2013). Flexibility is the ability of the organisation's IT to react to changes—in this case, those brought about by acquisitions (Benitez et al. 2018; Sambamurthy et al. 2003; Tallon and Pinsonneault 2011). Yetton et al. (2013) present flexibility as a resource characteristic of the IT infrastructure, allowing it to accommodate multiple integration approaches. Benitez et al. (2018) found a flexible IT infrastructure helps an organisation seize acquisition opportunities and control the integration process. These studies reveal how possessing the IT resource of a flexible IT infrastructure ahead of an acquisition enables successful post-acquisition IS integration. However, they also reveal that the IT resource of a flexible IT landscape takes a significant amount of time to build.

Research has also identified the need for specific human resources to enable post-acquisition IS integration. Human resource involvement in this process can be grouped into three dimensions: those executing the post-acquisition IS integration, those operating the IS, and those using the IS systems (Alaranta and Martela 2012; Linder 1989; Vieru and Rivard 2014). This thesis is interested in the first group, those responsible for carrying out the post-acquisition IS integration. There is a need for a dedicated IT team to oversee the acquisition process from due diligence to complete integration (Yetton et al. 2013). This is due to the highly tacit knowledge needed for acquisitions and ensures companies build on existing acquisition knowledge. It is highly unlikely that such a team will exist in non-acquiring firms, and therefore, another significant investment in assembling and training one is required. As the team will be responsible for the full acquisition process, it is an IT resource input to the three previously mentioned IS integration capabilities.

As a precursor to this PhD project, I carried out a review of the IS integration literature to identify known IT resources used in post-acquisition IS integration. A review protocol was set up following the guidance of Randolph (2009) to ensure the review process would lead to the desired research objectives. This review protocol, including the overall methodology, article selection, and coding, is described in Appendix 1 – IT Resources: Literature . The outcome of the review was the identification of 13 resources recognised within the post-acquisition IS integration literature. These resources, and example papers they were identified from, are consolidated in Table 6. To extend understanding of the resources, I applied Barney's (1991) resource taxonomy to the resources to categorise them as physical, human, or organisational.

Reviewing this list of IT resources, we can begin to see some implicit themes or resource types running through them. Although these types are not discussed in the literature, this extensive list makes them clearer. For example, temporary agents and a dedicated IT integration team are both resources aimed at developing the central human resource team needed to take appropriate action for the integration. These resolve a human resource deficiency and together bring specific human capabilities to the IT department. Similarly, knowledge of own IT, enterprise architecture and capability maps, and flexible IT infrastructure are resources aimed at managing the IS infrastructure component. To date, no research has looked to identify resource types running through the literature. This could be a useful contribution as more IT resources are identified.

IT Resource	Source Literature	Resource Category
Temporary agents	Henningsson and Øhrgaard 2016; Sumi and Tsuruoka 2002	Human
Engaged senior management and CIO	Giacomazzi et al. 1997; Mehta and Hirschheim 2007	Human
Dedicated IT integration team	Mehta and Hirschheim 2004; Robbins and Stylianou 1999	Human
Boundary spanners	Jain and Ramesh 2015	Organisational
Early IT involvement	Henningsson and Kettinger 2016b; Yetton et al. 2013	Organisational
Centralised planning authority	Alaranta and Henningsson 2008; Busquets 2015	Organisational
Knowledge of own IT	Baker and Niederman 2014	Physical
A prioritised integration plan	Harrell and Higgins 2002; Wijnhoven et al. 2006	Physical
Risk management framework	Henningsson and Kettinger 2016b	Physical
Communication plan	Baker and Niederman 2014; Robbins and Stylianou 1999	Physical
Enterprise architecture and capability mapping	Busquets 2015; Toppenberg et al. 2015	Physical
Flexible IT infrastructure	Benitez et al. 2018; Yetton et al. 2013	Physical
Prepared training material	Chang et al. 2014; Hough et al. 2007	Physical

Table 6 – Known IT resources for post-acquisition IS integration

Apart from not fully understanding what needs to be built, research has not addressed how firms build post-acquisition IS integration capability. A takeaway from the discussion on the preconditions is that they are generally not found in a non-acquiring company. Additionally, as they take years to build, the process of building them must begin well in advance of an acquisition announcement. This capability building process requires the firm to first identify the need to build the capability and then develop new (or repurpose existing) resources and capabilities to create post-acquisition IS integration capability. The result of this is a reconfigured resource pool and a new capability, which when combined can contribute to achieving competitive advantage through

acquisitions. Understanding how this is done is critical for non-acquiring firms. The review conducted for Paper #1 identified some methods firms have applied for building their IS integration capabilities.

One method is through dedicated investments (Tafti 2009; Yetton et al. 2013). This is notable for IT infrastructures, especially for creating flexible ones. Investment in the existing IT landscape, specifically to build enough scale to absorb new data or APIs to interact with other systems, is a means to create flexibility. Investment by acquiring firms in their IT for acquisition is shown to have a positive effect on IS integration outcomes (Tafti 2009). Similarly, creating a dedicated acquisition team in the IT department requires a substantial investment.

Investment in the IT department to build IS integration capabilities is necessary; however, it does not guide firms on how to close the capability gap. To understand what to invest in and why requires an understanding of the post-acquisition IS integration challenge. Making this more difficult is the problem that preparation and capability building is a process specific to the individual IS integration approaches. For example, absorption requires specific IT skills and resources different from those needed for renewal integration. One technique for managing this knowledge gap is to source skills from temporary external agents—that is, consultants. Henningsson and Øhrgaard (2016) found consultants could contribute to the IS integration capability development process in two ways. First, as supplementary resources, they could be used to increase capabilities already present in the company. Alternatively, as complementary resources, they bring new skills to the IT organisation. In this case, the consultants would contribute the knowledge necessary to develop the company's specific IS integration capabilities.

In all the research explaining how IT departments build their IS integration capability, no technique has received more attention than learning by doing. A significant proportion of research reports findings on successful serial acquirers and how they have honed their techniques over tens

of integrations. Toppenberg (2015) presents the phenomenal IS integration capability supported by enterprise architecture within Cisco. Cisco is recognised as one of the most successful serial acquirers in the world, becoming so through a long acquisition programme spanning the last 25 years[4]. Its IS integration capability has been honed through tens of successive integrations as well as some unsuccessful acquisitions. Santander learned through a painful experience that its IT setup was actually inhibiting its growth through acquisition strategy (Busquets 2015; Parada et al. 2009). Thus, the company adopted an IT system from one of its acquisitions as a core banking system, which was later rolled out to newly acquired firms. CEMEX's growth from a small Mexican cement producer to a global giant was enabled by its learned ability to acquire and integrate into a single, common IT standard throughout the firm (Kanter et al. 2007). Similarly, Danisco learned through both successful and unsuccessful integrations a best practice to follow in absorption and coexistence IS integrations (Yetton et al. 2013). The literature on IS integration is rich in examples of firms learning best practices from doing, often accentuated by early mistakes.

Compiling the experiences of many cases, researchers have sought to understand how companies build their integration capability through serial acquisition programmes (Henningsson 2015; Zollo and Singh 2004; Zollo and Winter 2002). Henningsson's (2015) study of IS integration capabilities in serial acquirers reports they develop their capabilities over many acquisitions by learning from previous ones. Serial acquirers revise their integration approach based on past experience, thereby improving their IS integration capability. Failed acquisitions offer valuable learning opportunities, which can improve later acquisition performance by more than their immediate negative effects (Finkelstein and Haleblian 2002; Haleblian and Finkelstein 1999). Research shows this act of internalising and learning from past acquisitions increases the likelihood of success in later

[4] https://www.cisco.com/c/en/us/about/corporate-strategy-office/acquisitions/acquisitions-list-years.html

integrations (Henningsson 2015; Zollo and Singh 2004; Zollo and Winter 2002). However, this only remains true when executing the same integration type. Companies struggle to successfully integrate when applying the same techniques to different integration approaches. This supports claims that the integration approaches are substantially different from each other, requiring different IT resources and capabilities.

Research has shown that IT departments require specific IS integration capabilities to be deployed in acquisitions. At a high level this consists of three sub-capabilities: diagnosing, planning, and implementing. In addition to these, specific IT resources enable IT departments to carry out post-acquisition IS integration. Studies have shown that these resources and capabilities are not present in non-acquiring firms, yet they are necessary preconditions for post-acquisition IS integration. To build them requires a capability building process carried out over years based on knowledge not found within a non-acquiring firm. While research has provided some help to understand how IT departments have done this, this is largely based on the reactive learning cycles of serial acquirers.

This summary emphasises the importance of the IT preparation phase yet also shows how little attention has been paid to the case of first-time acquirers. For these companies, the IT department must go through a process to build the IS integration capability and its enabling IT resources. The output of this process is twofold. First, the companies have a reconfigured IT resource base, including the IS integration capability. Second, the capability provides a competitive advantage through the successful integration of acquired companies. Understanding how this process unfolds and the new resource configuration is the core question being asked by this thesis. To understand these, I apply the resource-based view and its specific extension into dynamic capabilities.

Positioning Post-Acquisition IS Integration Resources and Capabilities

In agreement with previous research, this dissertation adopts the view that acquisitions and their subsequent integration are dynamic capabilities (Eisenhardt and Martin 2000; Helfat et al. 2009; Zollo and Winter 2002). It also agrees that acquisition IS integration is a dynamic capability (Benitez-Amado and Ray 2012; Benitez et al. 2018). However, the execution of integration is not the explicit focus of this dissertation. Instead, the research focusses on the preparation period, the time during which the acquirer must proactively build its IS integration capability by reconfiguring its IT resource base before announcing the acquisition. Specifically, this dissertation seeks to understand this in the context of companies that are preparing for their first acquisition and do not already have post-acquisition IS integration capability.

I take the position that this preparation period is also a dynamic capability. This process requires the IT department to build their firm specific IS integration capability. This starts with the IT department sensing an acquisition is likely and then seizing the opportunity to prepare. After that the IT department must reconfigure existing (and create new) IT resources to be used within the acquisition.

The outcome of this process is twofold. First, post-development, the IT department possesses a newly reconfigured resource pool; this is a different resource configuration from the one it had prior to the preparation. Second, it acquires the IS integration capability, which can be deployed to realise firm-level competitive advantage. This occurs as the IT department can now carry out post-acquisition IS integration successfully, contributing to the realisation of the acquisition rationale.

Returning to the conceptual acquisition integration model developed throughout this chapter, I expand the preparation phase as a dynamic capability, showing the process of transforming existing IT resources into both a new resource configuration and a competitive advantage for the

firm. This is included in the updated conceptual model shown in Figure 9. This preparation dynamic capability is the object of study for this research project, which seeks an understanding of both how an IT department builds the IS integration capability through the preparation dynamic capability and what the new resource configuration consists of. These goals are articulated through the two sub–research questions presented in Chapter 1.

To answer these sub–research questions, I conducted a study of Maersk as it proactively built its IS integration capability. Maersk's IT department did not possess the IS integration capability. However, the department sensed that acquisitions would likely form part of the organisation's strategy in the future, and therefore proactively began building its capability. Studying them provided unique insights into the dynamic capability of proactive IS capability building. Details of this study are presented in the following chapters.

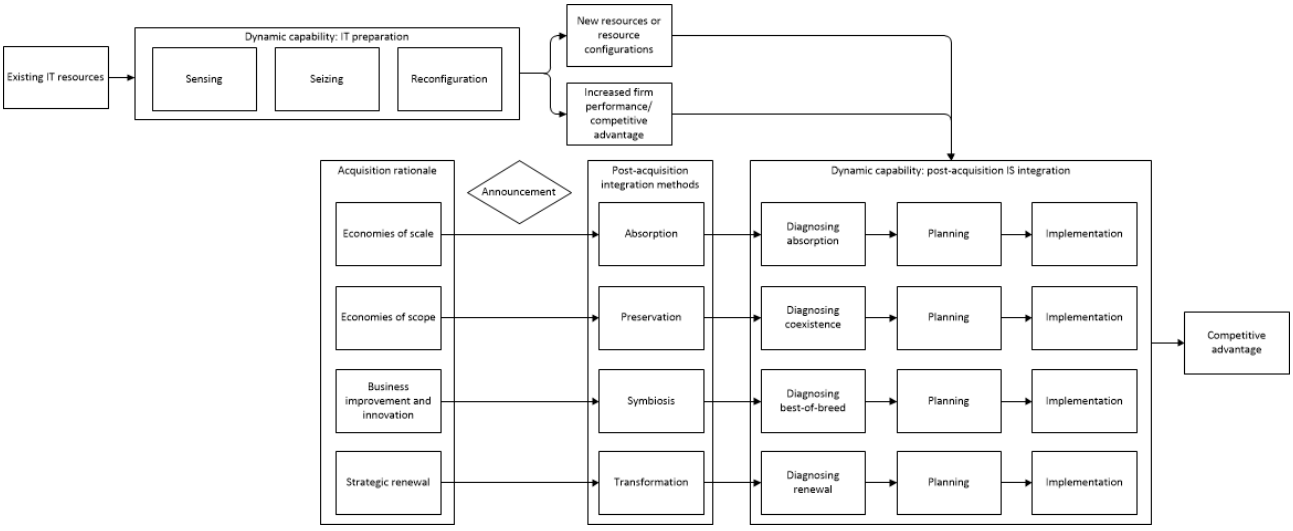

Figure 9 – Conceptual model of acquisition integration

Chapter Summary

This chapter presents the theoretical foundation and justification for this research. It defines the acquisition process, demonstrating how competitive advantage is gained from acquisitions through post-acquisition integration. It presents an alignment explanation, showing the relationship between firm integration methods and IS integration approaches. Through a literature review, presented as Paper #1, a research gap is identified, that of the proactive preparation process of first-time acquirers. This is informed by the limitations of knowledge of preconditions to IS integration success, especially of IT resources and capabilities.

Motivated by this, this study adopts the resource-based view and its extension into dynamic capabilities to analyse the proactive preparation process. In line with the definition of dynamic capabilities, this proactive preparation period can be considered a dynamic capability. This study seeks to develop a description and explanation of this that contributes to knowledge of IT preconditions to IS integration success.

Throughout the chapter, a conceptual model is developed to visually present the process to the reader and to emphasise the object of study. This culminates in the presentation of the conceptual model as Figure 9, which shows the proactive IS capability building phase as an input to post-acquisition IS integration. After developing a grounded understanding of the subject and the problem, this paper presents in the next chapter an overview of the methodology followed to conduct the research.

Chapter 3: Methodology

This chapter details my methodological approach to the PhD project. The chapter begins by presenting my chosen research paradigm, post-positivism, and then my overarching research approach, engaged scholarship. From there I detail two methods applied to separate parts of this project. First, I describe the literature review method adopted and then extended in writing Paper #1. Then I detail the case study methodology I selected for researching my practitioner partner, justifying the choice of approach and object of study. After addressing concerns related to validity and reliability, I present my various data sources and techniques for collecting, before finishing with the presentation of my data analysis processes. Overall the chapter presents how I went about carrying out the research project and how I did so in a meaningful and controlled way, so as to attain the desired insights to develop descriptive and explanatory theories.

Philosophy of Science

The choice of philosophical perspective, or research paradigm, is essential for researchers as it defines the way the researcher views the world, and influences choices made during the study as well as the interpretation of findings (Johnson and Clark 2006; Rowland 1995; Saunders et al. 2009). A research paradigm is a set of beliefs that defines the founding principles of the world and the interaction between its entities (Guba and Lincoln 1994). In this section I will present the philosophical stance adopted by this study and discuss approaches used to ensure its appropriate application.

Different paradigms will have different perspectives over three interrelated dimensions of research (Guba and Lincoln 1994; Rowland 1995; Shanks 2002):

1. Ontology: concerns the nature of reality and therefore what can be known about it
2. Epistemology: concerns the relation between the researcher and the object of investigation

3. Methodology: concerns the strategy that can be employed for answering the research question

This project adopts the stance that the proactive preparation of the case company occurred within an objective reality, and therefore seeks facts to understand this development. It aims to create a description and explanation of how the company built its IS integration capability and what was made in the process. This identification of *the way things are* is in contrast to identifying the meanings people assign to a phenomenon (Guba and Lincoln 1994; Orlikowski and Baroudi 1991). The post-positivist paradigm is well suited for studying such a phenomenon, especially in the context of a real-world setting.

It is generally accepted that as humans, our scientific knowledge of the world cannot be known to be true (Suppe 1977). Post-positivism adopts the critical realist ontology, which acknowledges the existence of a real world but recognises that humans' ability to interpret it is limited (Guba and Lincoln 1994; Van de Ven 2007). I adopt this stance in my research and apply an overall methodology, engaged scholarship, which is effective for studying complex social phenomena through this ontological view (Van de Ven 2007).

Epistemologically, the post-positivist paradigm accepts that researchers cannot be completely separate from their studies, but objectivity remains the goal (Guba and Lincoln 1994). The responsibility for assessing a project's objectiveness falls to the author to demonstrate the work's "fit" to previous studies, and to the critical community to evaluate. To maintain a high degree of objectivity, measures should be taken to minimise the influence of the researcher on the study as much as possible, thus limiting threats to validity (Guba & Lincoln 1994).

In the case of this industrial PhD project, complete separation was not possible. It was the intention of the research project to closely interact with the object of study. However, given the intention

of merely developing descriptive and explanatory theories, there was limited influence of the research on the object of study.

I employed a structured engaged scholarship approach to research which formalised the roles of the researcher and organisation to ensure a high degree of objectivity. This was done through a collaborative design process between the researcher and the case company and is described in full detail in the following section. Fit to previous studies was managed by both building upon existing knowledge on post-acquisition IS integration and grounding new knowledge in well-respected theoretical perspectives (such as the resource-based view). These were assessed by the community through paper drafts, practitioner and academic workshop presentations, and published peer-reviewed articles. Finally, possible threats to validity were controlled for during the study by drawing on case-based research techniques. These techniques, as well as the associated threats to validity, are discussed later.

While the post-positivist research paradigm encourages experimental and hypothesis testing methods, it also allows for qualitative approaches conducted in a natural research setting (Guba and Lincoln 1994; Saunders et al. 2009). However, it demands a high level of structure and the triangulation of data. The agreement entered into by the researcher and the case company to set up the research opportunity made a longitudinal qualitative study a preferred choice. Therefore I adopted the role of a professional peer (Guba and Lincoln 1994) within a case company to closely study a complex real-world phenomenon within the natural setting. Additionally, I followed a structured research approach inspired by the case study methodology (Yin 2009) and collected data from multiple sources for triangulation. I describe these controls later in this chapter.

Driven by a desire to develop descriptive and explanatory theories, I adopt a post-positivist research paradigm. Under this approach I apply a critical realist ontology and follow structured qualitative methods to ensure the required high degree of objectiveness between myself and the

object of study is maintained. Having described my philosophical stance, I next describe my overall approach to research, engaged scholarship, which is well aligned with this research paradigm.

Overarching Approach to Research: Engaged Scholarship

This PhD project was undertaken as an industrial research partnership between the researcher, from the Copenhagen Business School, and Maersk, formalised through the Danish government's industrial PhD programme. As an IS scholar in a professional school, it was my aim for this study to advance both scientific and practical IS knowledge. As an industrial partner, Maersk was looking to academia for assistance as it faced a complex problem within its organisation. Engaged scholarship is a research approach suitable for achieving these goals. Andrew Van de Ven (2007, p. 9) describes engaged scholarship as "a participative form of research for obtaining the different perspectives of key stakeholders (researchers, users, clients, sponsors, and practitioners) in studying complex problems". This study brings the aforementioned stakeholders together in a learning partnership with the aim of studying the complex problem of preparing for post-acquisition IS integration. It was the explicit goal of those involved to produce research that would describe and explain the phenomenon so that Maersk understood better what was required and the academic understanding of post-acquisition IS integration would be extended. To achieve this shared goal, together the research parties adopted engaged scholarship as the overarching approach to research.

Engaged scholarship can take on different forms driven by the type of learning partnership agreed upon and the type of knowledge being sought by the partners. Van de Ven (2007) presents four forms of engaged scholarship driven by

a) The research purpose: whether the purpose is to provide description and explanation of a phenomenon or to have some degree of control over it,

b) The research perspective: whether the researcher adopts a position predominantly inside or outside the organisation

The four alternative forms of engaged scholarship are shown in Figure 10. The decision on which form of engaged scholarship to pursue was reached after consultation and discussion with senior management at Maersk. We discussed the two dimensions through the lens of what we expected from the research and of pragmatic limitations to such a project.

First, there was general agreement that as an industrial PhD fellow, I was to be afforded a high degree of internal access to the company and the problem. I became a member of the IT M&A team, working with them to proactively build their IS integration capability. I sat with the team in the same office, joined regular meetings, and worked with them on the same problems they were working on. This arrangement and level of access meant I could adopt an *attached inside research perspective*. Therefore, it would be suitable to take on a research purpose that aimed to either describe or explain a phenomenon by co-producing knowledge, or design or control a phenomenon through explicit action or intervention in Maersk's preparations (Van de Ven 2007).

		Research Question/Purpose	
		To Describe/Explain	To Design/Control
Research Perspective	Extension Detached Outside	Basic Science with Stakeholder Advice 1	Policy/Design Science Evaluation Research for Professional Practice 3
	Intension Attached Inside	2 Co-Producing Knowledge with Collaborators	4 Action/Intervention Research for a Client

Figure 10 – Alternative forms of engaged scholarship (Van de Ven 2007, p. 27)

Intervening with direct action would have required prescribing recommendations for Maersk to apply to its proactive preparation period and then evaluating those recommendations after a post-acquisition IS integration. As described in the literature review, there is still an incomplete understanding of how firms proactively build their IS integration capability. Additionally, as mentioned already, acquisitions inherently come with a high risk of failure. Considering these limitations, a research project that intervened in the preparations with prescribed action was deemed both impractical, due to the limited knowledge, and too high-risk. Therefore, an engaged scholarship project based on action or intervention research was deemed inappropriate.

This presented a great opportunity for an engaged scholarship project with a goal to explain or describe. This area was under-researched, so a significant contribution could be made by co-producing and communicating a theory for describing and explaining (Gregor 2006). Both parties had an interest in an explanation on how to proactively prepare for post-acquisition IS integration. An agreement was reached between the parties that they would enter a learning partnership with the goal of co-producing this form of knowledge. Theories of describing and explaining are well suited to be formulated as substantive (also known as mid-range) theories (Gregor 2006). In this case, the aim was to answer questions pertaining to "*how things develop and change over time"* (Van de Ven 2007, p. 22) This style of research question lends itself to being presented as a process model. Combining these two considerations forms the overarching engaged scholarship research design (Van de Ven 2007). It would work to develop a process model that presented descriptive or explanatory theories of proactive preparation for post-acquisition IS integration. This concept was agreed to by all industrial PhD partners and recognised as having the potential to make a great contribution to the understanding of this challenge for all involved.

From the outset, the goal of this dissertation has been to provide academic and practical contributions. I purposely chose to undertake an *industrial* PhD due to the opportunities it affords

through close partnerships with practice and real-world problems. Together with my industrial PhD partner, Maersk, I developed an overarching research approach drawing on the principles of engaged scholarship. The aim of the project was to build substantive descriptive and explanatory theories, which could be achieved due to the internalisation within Maersk afforded to the project. To study the phenomenon of post-acquisition IS integration in the context of Maersk, the engaged scholarship project followed a research design that started with an extensive literature review and then proceeded with a learning partnership inspired by the case study methodology. These two approaches are described in the following sections.

Literature Review Method

This section describes the methodology applied to the literature review completed for this PhD study, which is submitted as Paper #1. Although the method is described in rich detail within the paper itself, I include it in this dissertation because the paper makes a methodological contribution in addition to the review literature. The result of applying our enhanced method was the defragmentation of the literature on post-acquisition IS integration, consolidated into five research themes. This contributed a point of departure for researchers into this field and an improved methodology for other researchers to apply when consolidating other fragmented IS fields. This section describes this method.

As part of following an engaged scholarship approach, it is important that the formulated problem be built upon an understanding of what is already known. Performing a literature review will reveal the state of the art of the phenomenon and ensure the study is making a relevant contribution (Van de Ven 2007). To begin this project, I looked to build an understanding of the state of the existing literature on post-acquisition IS integration.

An initial review revealed a fragmented literature base, spanning nearly 30 years, with limited consolidation across findings. A review paper was identified from several years earlier

(Toppenberg and Henningsson 2013). That paper reviewed the literature from a theoretical perspective. So although it clearly explained how people had studied post-acquisition IS integration, it did not sufficiently explain *what* had been studied. In this way, the literature on the subject was still very fragmented across many authors and years. On top of this, many new papers had been published since the review was completed.

My need for understanding the current state of literature combined with the problem of a fragmented research field presented an ideal opportunity to compose a high-quality review. As such, my research partners and I set out to aggregate, organise, and structure the empirical findings in the post-acquisition IS integration literature. This would create a base from which cumulative knowledge could be developed, including my engaged scholarship project.

To consolidate the existing research a three-step review protocol was followed:

1. Locate and select
2. Code
3. Aggregate

A detailed description of each step is presented in Table 7.

The review applied the standardised review methodology developed by Lacity et al. (2010, 2011, 2017). This had been previously used to consolidate another fragmented IS discipline, outsourcing. This was an appropriate choice of review methodology for this case. Since there was no dominant theoretical framework within the literature, we needed an empirical (Lacity et al. 2017) rather than a theoretical (Leidner and Kayworth 2006) approach.

Our literature search identified 70 articles on post-acquisition IS integration spanning 30 years of research. Within these, following Lacity et al.'s (2010, 2011, 2017) approach, our analysis identified 53 dependent variables and 195 independent variables. This analysis accumulated the

results across all studies of post-acquisition IS integration to establish facts and create what is known as a descriptive review. Additionally, we identified robust relationships between the known variables, coding their effect on post-acquisition IS integration outcomes. This was the descriptive outcome expected when following Lacity et al.'s (2010) review methodology.

Although by completing the review as per Lacity et al.'s (2010) method we made a contribution to defragmenting the literature, we were not satisfied with our results as a knowledge base for others to build on. Therefore, we extended Lacity et al.'s (2010) review method by performing an additional round of analysis on the data. We inductively analysed the results to identify dominant themes running through the literature. From this extended analysis, we aggregated the findings under five organised themes.

Each theme presented contained the following information:

- A rich description of the theme
- The full list of variables consolidated under it and their robust relationships
- The theme’s core constructs within a rich case description
- Recommendations for future research

The advancement of Lacity et al.'s (2010) method by consolidating the findings into research themes led to a fuller yet more succinct understanding of the now defragmented research field.

Step	Description	Outcome
1. Locate and select	To find key papers to review, we drew on our knowledge of post-acquisition IS integration to select databases containing key journals and conference papers. We followed the advice of Boell and Cecez-Kecmanovic (2015), Okoli and Schabram (2010) and Webster and Watson (2002) to design a rigorous literature review protocol. We used initial search terms such as *information systems*, *IS*, *integration*, *acquisition*, *merger*, and *M&A*, expanding the list as we became familiar with other terminology (Boell and Cecez-Kecmanovic 2015). This search identified 563 publications, which we verified as relevant by examining titles and abstracts and, when in doubt, by reading the papers in full. In doing so we identified 504 papers for inclusion. To account for any limitations to the database search, we conducted backward and forward searches based on references (Webster and Watson 2002). This uncovered seven additional articles and three unpublished PhD theses.	We identified 70 articles published between 1989 and 2016. The complete list can be found as an appendix in Paper #1.
2. Code	The coding process adopted the protocols for open coding, axial coding, and constant comparison (specified in grounded theory methodology) (Strauss and Corbin 1990)to develop a list of master codes and descriptions. Creating the list was a five-step iterative process that required coding individual papers multiple times. Step 1. Two authors coded 20 randomly selected articles, listing the dependent and independent variables from each article. The two authors met to discuss their coding and created a consolidated list of "master variables" and "master variable descriptions." Step 2. The same authors independently coded another random set of 20 articles, following the same process as Step 1 while also mapping variables onto the master lists. They then met to compare and discuss any differences in the two sets of codes. Step 3. The remaining 30 articles were coded by the two authors, who added new variables and descriptions to the master list. Once the list was complete, the two authors reviewed the previously coded articles and, where necessary, recorded them based on the extended master list. Step 4. One author did a final review of each article to check the coding was consistent with the final master list. This standardised the variables across the articles in a final master list (available as Appendix B in Paper #1). Step 5. We then documented the independent and dependent variables and the relationships between them, obtaining 619 relationships from the 70 articles. We coded the significance of the relationships, as per Lacity's methodology.	We found 619 relationships involving the effects of 195 independent variables on 53 dependent variables and obtained an understanding of the significance of each relationship. For reference, the full list of relationships between the variables is presented in Appendix D of Paper #1.
3. Aggregate	The aggregation process involves two steps. In Step 1, we follow Lacity et al. (2010)to identify the robust findings reported in the M&A IS integration literature. Robust findings are relationships that are replicated at least five times in the literature. Then, in Step 2, we extend Lacity et al.'s approach to organise and structure the robust relationships into five themes: the IS integration context, relational fit, the human side, preconditions, and time pressures.	Five research themes of IS integration literature: the IS integration context, relational fit, the human side, preconditions, and time pressures

Table 7 – Three-step review protocol (Henningsson et al. 2018)

The purpose of this review was to understand the current state of the literature, initially aimed at providing a point of departure for the engaged scholarship project. It achieved this by aggregating, organising, and structuring the empirical findings of the past 30 years of research into post-acquisition IS integration, included in this dissertation as Paper #1. The final five themes and their rich descriptions provide a basis for future research, including this dissertation. As presented in Chapter 2, this study's point of departure is the preconditions required for successful post-acquisition IS integration. Our ability to deliver such a high-quality paper was largely due to the methodological contribution we made by extending Lacity et al.'s (2010) methodology. Our extension can be adopted by other researchers to build a fuller and more succinct understanding of other fragmented research domains.

This section describes the review methodology we adopted to identify a relevant point of departure for my engaged scholarship study. Seeking to understand the preconditions for successful post-acquisition IS integration, especially how they are built for a first acquisition, I elected to conduct a single-case study of Maersk's proactive preparation. The following section presents the method for this part of my research.

Single-Case Study Method

Following the engaged scholarship approach allowed the intimate study of a real-life, complex phenomenon. To gain critical insight into the proactive preparation process, I opted to carry out a single-case study. In this section I justify the choice of case study, particularly the single-case study variant. In addition to justifying the single-case study method, I explain why Maersk was the appropriate case study setting or case company through which to study this topic.

The case study methodology

A case study is an empirical inquiry to investigate a phenomenon in a real-life context and is particularly useful when examining "how" questions (Yin 2009). This study aimed to develop a

rich description and explanation of how firms proactively prepare their IT departments for acquisition integration. The study was to be conducted within a real-life setting as Maersk was building its post-acquisition IS integration capability in anticipation of an acquisition. The similarity between the intended research subject and the goals of a case study made this a suitable approach.

Additional guidance on when to use the case study method can be found in fellow IS scholars' research. After reviewing uses of the case study method in IS research, Benbasat et al. (1987) suggest researchers ask four questions of their project to judge the appropriateness of its use.

To evaluate whether a case study would be appropriate in this project, I asked the four questions of this industrial PhD project. The four questions and the assessment of this project against them are presented in Table 8. This process of consideration affirmed that the case study was an appropriate method to follow to research Maersk's proactive preparation.

Furthermore, (Benbasat et al. 1987, p. 378) acknowledge that the case study is well suited for studying IS implementations because *"the process of implementation takes place over time, is a complex process involving multiple actors, and is influenced by events that happen unexpectedly."* These characteristics also fit post-acquisition IS integration as it too is a complex process that takes a long time, involving many actors and influenced by external unexpected events. (This is well understood by looking at the five themes derived from Paper #1.) These parallels reinforce the notion that this case is suitable to be studied via the case study approach.

Question	Assessment
Can the phenomenon of interest be studied outside its natural setting?	The proactive capability building process cannot be studied outside its natural setting. To develop descriptions and explanations of how a firm builds the IS integration capability, the research must be done within an IT department actively preparing for acquisitions.
Must the study focus on contemporary events?	It is important that this study focus on an IT department that has undergone or is undergoing preparation for post-acquisition integration. Importantly, as IT is ever evolving and becoming increasingly pervasive within the firm, a recent study will produce more meaningful and relevant answers to the research questions than a study based on firm activity far in the past.
Is control or manipulation of subjects or events necessary?	No control or manipulation of the object of study is required. As described when justifying the choice of engaged scholarship approach, this project elected to co-produce knowledge rather than take a heavy interventionalist approach.
Does the phenomenon of interest enjoy an established theoretical base?	As was derived from the peer-reviewed literature review submitted as Paper #1, the research subject does not enjoy a consistent theoretical base. Some theories, such as the resource-based view, have been used more often than others; however, theoretical consistency throughout the research is lacking. Furthermore, the dimension of this study, the proactive capability building for first-time acquirers, has received no attention.

Table 8 – Appropriateness of case study approach (questions from Benbasat et al. 1987*)*

When electing to undertake a case study, a researcher can choose to conduct either a single-case or a multiple-case study. The industrial PhD partnership naturally lends itself to a single-case over a multiple-case study. After all, it is by definition an agreement between one company and the researcher. However, this does not mean the single-case study is appropriate for all industrial PhD projects. Yin (2009) cites five possible rationales for justifying the suitability of single-case study over other methods:

1. A critical case in testing a well-formulated theory
2. An extreme or unique case
3. A representative or typical case

4. A revelatory case
5. A longitudinal case

The review of the existing literature stressed the need to possess IS integration capability in advance of an acquisition (Tanriverdi and Uysal 2011; Yetton et al. 2013). However, no studies have investigated how companies undertake this capability building process proactively, in advance of their first acquisition. Research that does discuss building IS integration capability is derived from the experiences of companies that have reactively learned this capability. A large portion of the literature focusses exclusively on the reactive learning of serial acquirers, those who continuously acquire more than three companies every three years (Henningsson 2015; Kengelbach et al. 2011). A reason for this could be that IT is rarely involved in the decision- and deal-making process and often finds out about acquisitions after a deal is announced (Buck-Lew et al. 1992; Curtis and Chanmugam 2005; McKiernan and Merali 1995; Stylianou et al. 1996; Wübben 2007).

The situation being studied through this engaged scholarship partnership focusses on the missing pieces from this research puzzle. First, it is an investigation into the proactive IS capability building process of a firm preparing in advance of its first acquisition. In this sense it is very different from the status quo on research into this matter. Instead of studying the reactive learning process serial acquirers go through, it studies the proactive process in advance of a first acquisition. Second, as I show in the case description in Chapter 4, Maersk IT was involved in the pre-acquisition process. Interestingly, the reason it was involved is that IT took the initiative to begin proactive capability building. Because of these points, Maersk IT represents a unique case, therefore making a single-case study an appropriate method to apply.

This section assesses conducting the industrial PhD project as a case study against recommendations by Benbasat et al. (1987) and Yin (2009). Doing so confirms the case study

approach as a suitable method to investigate this phenomenon. Furthermore, assessing the characteristics of the case has proved it to be a unique case and therefore fit for studying as a single case. These choices guided the engaged scholarship approach to researching Maersk's capability development. Before going further into this approach though, it is necessary to assess whether Maersk is a suitable candidate for a case study. The next section carries out this assessment.

Selection of the right case company

This project studies Maersk, the world's largest container shipping company as it prepared for and executed its first acquisition, in over a decade. This was finalised, after nearly two years of preparation by its IT department, in December 2017, when Maersk acquired Hamburg Süd (Wagner 2017). This is an interesting case to study as Maersk is a massive global multi-business organisation operating 24 hours a day, 7 days a week. This is not a small business with a small IT footprint. So the learnings that come from this case are going to be interesting and useful to others. However, it was more than just the company's size and complexity which could potentially contribute interesting results. Other critical factors and characteristics of the company and its situation gave good reason for selecting it to study the specific research questions. In this section I present four reasons justifying the choice of Maersk as a suitable case company for this research project.

First, despite its long history and a highly skilled IT organisation, Maersk did not readily possess the post-acquisition IS integration capability. Maersk had executed acquisitions in the past. However, its most recent had been over a decade prior to the start of this study. Due to that length of time, no post-acquisition IS integration processes or knowledge bases remained. Therefore, Maersk had to build this capability from scratch to utilise in any future acquisitions.

The second reason Maersk was an ideal case to study was that they were preparing in advance. The literature on post-acquisition IS integration has shown that IT must begin building the capability well in advance of an acquisition being announced (Tanriverdi and Uysal 2011; Yetton et al. 2013). This was being done at Maersk. The proactive preparation was an IT initiative, begun before acquisitions were discussed as a strategic initiative of the organisation. This gave a unique case to study: a firm following what is known to be necessary, an effort which a study can review and evaluate.

A third reason justifying Maersk's selection was that no corporate-level acquisition strategy had been defined. It was hypothesised by IT that an acquisition would occur in the future, and the team was proactively building its integration capability. However, there was no clear direction of either what type of company would be acquired or how many acquisitions would be integrated. This meant that as part of the preparation process, Maersk IT had to deal with the uncertainty of preparing for an unknown event. This presented a unique case where Maersk IT had to take measures to balance building IT resources to enable all integration approaches against doing nothing. Facing this uncertainty greatly influenced the proactive preparation process, making it a captivating case to research.

The final reason for selecting Maersk as a case company was driven by pragmatism. This is especially relevant in the context of acquisitions, which are by nature secretive programmes. The fact that Maersk was available and willing to engage in a learning partnership prior to publicly announcing that it was preparing for acquisitions was a vital enabler. The fortuitous chance to undertake such a study could be branded opportunistic research (Miles and Huberman 1994). While an opportunity to study on its own does not justify a case selection, it is nevertheless important to acknowledge. Without the opportunity afforded to the researcher by Maersk, there would be no research partnership.

It is vital, when doing robust research, to be explicit in designing the study so that it appropriately answers the research questions. I elected to conduct engaged scholarship to study a contemporary phenomenon in its natural setting. This objective made the case study method a suitable tool with which to conduct research. The specific research questions, grounded in the findings of a robust literature review, guided me towards conducting a study of a unique case, and therefore a single-case study was appropriate. Finally, the specific case of Maersk was chosen for the four reasons outlined in this section. The conditions guided the selection of the single-case study method as the approach to research within my engaged scholarship learning partnership. To ensure the quality of this case study, I next explore issues related to reliability and validity to control for any concerns.

Reliability and Validity Concerns

The quality of the case study is critical to conducting rigorous research. Concerns over reliability and validity are legitimate threats to the credibility of all science. In this section I assess these concerns against my study and present methods applied in my industrial PhD project to cope with them.

To manage reliability and validity concerns, many authors and books across disciplines discuss four tests to judge the quality of research, including case research (Maruyama and Ryan 2014; Yin 2009). In designing and executing my project I paid attention to identifying and overcoming concerns over reliability and validity. Table 9 provides an overview of how I addressed the four tests of quality research design. For richer explanations of the specific tests, refer to research method books, such as Yin's (2009) and Maruyama and Ryan's (2014).

Test	Application in This Study
Construct validity	To resolve issues of construct validity, it is first important to define the specific concept and to identify measures that match the concept (Yin 2009). The specific concept being studied is the proactive preparation of the IT department for an acquisition. This concept was derived from a robust literature review (see Paper #1). The measure used is the resource-based view and its extension into dynamic capabilities. However, I also make use of several other theoretical lenses to measure the concept (refer to the individual peer-reviewed papers for further details). Additionally, it is recommended to use multiple sources of evidence and have case study reports reviewed by key informants (Yin 2009). As described in the section Data Collection, many sources of evidence were used. This included 96 interviews with a variety of stakeholders, and many alternative data sources (these are presented in detail in the Alternative data sources section). Additionally, papers were shared and with key informants during the research project to ensure they accurately represented the chain of events.
Internal validity	I applied pattern matching techniques in several of the papers, which are useful for overcoming internal validity concerns in descriptive case studies (Yin 2009). Additionally, two of my papers adopted a more explanatory approach (Paper #2 and Paper #5) and as a result used another analytic technique known as explanation building. Explanation building is the process of analysing the case and building an explanation about it and is another technique useful for overcoming internal validity concerns.
External validity	External validity deals with whether the study's findings are generalisable. Single-case studies are inherently different from single experiments as they work towards analytical generalisation, not statistical generalisation (Shanks 2002; Yin 2009). For this to be possible, it is important to use theory in single-case studies as this becomes the tool with which to translate between cases (Yin 2009). I have applied theory throughout the papers I have written, and used an overarching theory, the resource-based view, to investigate the overarching problem. Taking this approach this paper makes an initial contribution towards analytical generalisability. Future studies of firms proactively building capabilities can build on this.
Reliability	The final concern for quality of the research design is reliability, which is concerned with carrying out the study in such a way that another researcher could conduct the same study and arrive at the same conclusions (Yin 2009). During the research project, I maintained a case study database containing all information I had collected and memos detailing metadata and thoughts at the time of collection. Additionally, for each part of the overall project, I created a case study protocol detailing up front the objective and approach for each study. Being disciplined in this way and retaining the logical rationale behind both what I was about to do and why I did something would enable another researcher to conduct the same study, thereby enhancing the reliability of the study.

Table 9 – Tactics to overcome research quality concerns

Data Collection

During this study I spent three years working closely with Maersk and its IT M&A team. Through this engaged scholarship partnership, I was afforded virtually unrestricted access to events and people at Maersk. To increase the reliability of case studies, it is important to collect data from multiple sources (Benbasat et al. 1987; Yin 2009). The willingness and openness of Maersk meant that during these three years, I could collect a vast amount of primary and secondary data, from a variety of sources.

By far, the greatest contribution came from primary data collected from the 96 interviews conducted with key stakeholders. The full list of interviewees can be seen in Appendix 2. Due to their major contribution, I describe my method for the interviews first. Following that, I briefly discuss other data collected throughout this project. An overview of all collected data is presented in Table 10.

Data Source	Description
In-depth interviews	96 in-depth semi-structured interviews with Maersk employees. Refer to Appendix 2 – Interviews for the full list.
Expert interviews and discussions	Six experts were interviewed and engaged with who shared their expertise on acquisitions. Refer to Appendix 3 – Expert for the full list and details.
Industry interactions	I had the opportunity to interact with many experts during industry events. The opportunity to discuss my work at length and their experiences inevitably influenced my research. These interactions happened in • An M&A integration conference - June 2016, San Francisco • A certification course on M&A integration - February 2018, Dallas
Personal notes	Throughout the length of the PhD, I was a prolific note taker, recording (both digitally and manually) accounts of my encounters. These were useful when I was required to recall events from the past or to inform further discussion with interviewees.
Participation in meetings	I participated in, and observed, hundreds of meetings while working on this PhD. I do not list them all as they are too numerous and the subjects too varying. However, there were several recurring ones worth acknowledging. • *Daily call* – From April 2016 to December 2017, every day from 14:45 to 15:30 the IT M&A team met on a conference call to discuss the progress of the team. I participated in this recurring call and in doing so gained especially close access to the ongoing efforts of the team. • *Monthly strategy meetings* – Between February and June 2016, I participated in the monthly strategy team meetings. These were discussions between IT and the strategy/deal team (those looking for an acquisition target) to give updates on what IT was doing and seek any guidance on likely targets or required action. • *Weekly Hamburg Süd alignment meeting* – Soon after the integration planning began in June 2017, a weekly alignment call between Maersk and Hamburg Süd IT was added to the calendar. This provided an opportunity for the IT teams to align. • *Weekly M&A IT team meeting* – Replacing the daily call once integration planning began was a weekly IT M&A team call. This gave the IT M&A team the opportunity to discuss events and share progress with each other and to receive updates from management.
IT M&A team workshops	During those three years, I was a part of team off-sites. During these we received detailed planning about expected upcoming work for the IT M&A team as well as provided input on what the team considered critical preparation steps, which influenced the next activities.
Internal communications	These included • Emails • Broadcast messages, such as SharePoint and Yammer posts • Townhalls • Newsletters from senior management

Maersk's historical documentation	Some accounts of past acquisitions carried out by Maersk were available. These were studied and included • The book *Creating Global Opportunities: Maersk Line in Containerisation 1973-2013*, which contains recollections of Maersk's past acquisitions (Jephson and Morgen 2014) • A variety of historical news articles (see, for example, Wright's (2006, 2009) recollection of the acquisition of P&O Nedlloyd) • Remaining internal documentation on past acquisitions
Industry documentation	Up-to-date news on the industry and Maersk's role in it. This included • Daily subscriptions to industry news providers: ShippingWatch, Lloyd's List, Splash 24/7, and gCaptain • Reports from shipping experts, both historical and forward-looking • Reviews of shipping and global trade, as carried out by the UN As well as news and information on the latest advice and trends in M&A.
Newly created documentation	Documentation created by IT and the IT M&A team as part of the preparation activities. This includes those identified as physical resources in Paper #3 and: • Analysis reports • Summaries • Project plans • Reviews • Emails
Practitioner action	My time as an engaged scholar provided me the opportunity to work on the preparation and integration. As such I was exposed to hands-on, real work, which served as data sources for this study. Notably, this included being the IT M&A team member responsible for HR IT integration.

Table 10 – Data sources

Interviews

The primary source of empirical data for this case study was the 96 in-depth semi-structured interviews. These were with key employees involved in Maersk's preparation for and eventual execution of the post-acquisition IS integration of Hamburg Süd. The list of interviewees also includes Hamburg Süd's senior IT leadership. For the full list of interviewees, refer to Appendix 2.

Semi-structured interviews were purposely selected as the primary source of data collection. This is because they follow a structured and repetitive approach yet allow the interviewer freedom

when exploring an under-researched topic (Saunders 2011; Yin 2009). Application of the post-positivist research paradigm called for structure and repetition in the data collection; this is possible through following interview protocols. However, as the literature contains no description of how an IT department proactively builds IS integration capability, I needed a tool that allowed me to follow up new interesting areas not anticipated by the interview plan.

All 96 interviews were meticulously prepared for. First an overarching purpose for the interview was identified. This was quite generic and representative of what was going on in the preparation process at the time. The aim of defining this was to begin creating a high-level description of proactive capability building. Table 11 presents a count of the interviews, grouped by the seven defined overarching purposes.

After identifying an overarching purpose for the interview, I developed a semi-structured interview protocol to follow when enquiring about the subject. This consisted of open questions to be put to the interviewees. They were open questions so as to garner a rich response from the interviewee. As the interviews proceeded and new information was received, the interview protocol underwent minor revisions to reflect the researcher's developing understanding of the topic.

Finally, I identified interview candidates following a two-step process. First, I relied on my knowledge of Maersk, gained from being an engaged scholar, to identify suitable interview candidates. The second step leveraged the knowledge of the interviewees to ensure I spoke to the right people for the overarching purpose. To do this, after completing an interview, I asked the interviewee for advice on who else to interview based on their knowledge of the topic. I took this advice and expanded my interview subject list. Using this to identify interview subjects ensured all key stakeholders were interviewed, resulting in a fuller understanding of the topic.

Overarching Purpose	Description	Interviews
Learning from Maersk's past	Build an understanding of the history of M&A at Maersk, with a focus on the most recent merger, P&O Nedlloyd in 2006.	9
Proactively building IT resources and the IS integration capability	Understand the work that was being done to prepare IT for an acquisition. This was centred within the IT M&A team, based on their experiences and development.	14
Validating readiness with drills	Focus on the specific drills undertaken by Maersk Line and how those validated its readiness for executing IS integration.	7
Due diligence	Interview key IT stakeholders who participated in the recently completed due diligence of Hamburg Süd.	16
Planning for Hamburg Süd	Record the period of planning for Day One as Maersk and Hamburg Süd begin to discuss what the combined company may look like.	28
Day One and integration	After the acquisition transaction is completed, this interview round tracks the work that was forecasted and planned for during the planning phase.	6
Post-integration	Reflect on the completion of the initial rounds of integration and assess how the preparation enabled the outcome.	16

Table 11 – Interviews by interview stages

Over the length of the study I carried out 96 one-on-one interviews either in person or over the phone / on Skype. Interviews were recorded and transcribed, so the transcriptions could be

digitally analysed in NVivo[5]. The transcriptions were done either by me or by a third party. In either case the transcriptions were reviewed against the recording to ensure accuracy.

This series of interviews created a rich record of the proactive work being done by Maersk and of the integration of Hamburg Süd. Drawing on these I conducted both deductive and inductive studies to understand how Maersk IT built its IS integration capabilities. While interviews were the primary source of data used within the study, they were not the only source. Additionally, documentation recording key events as well as information from unlimited access to the team building the IS integration capability was collated. These other sources of knowledge contributed to the overall understanding of the broad phenomenon of post-acquisition IS integration capabilities and of the specific case of Maersk. The next section describes these.

Alternative data sources

In addition to the primary data collected via interviews, I kept records from many alternative sources of data that provided a richer understanding of the complex phenomenon. I group these alternative sources of data together because they mostly helped to understand the context of the study. They provided a deeper understanding of acquisitions, post-acquisition integration, the shipping industry, Maersk, and the IT M&A team. These alternative data sources provide contrasting views of the macro and micro contexts in the duration of the study. The full list of data sources is presented in Table 10.

First, at the macro level, these alternative data sources provided me a fuller understanding of the challenges of post-acquisition integration and of the contextual situation of the shipping industry. This understanding came from a variety of sources. In the early days of this PhD project I spent time talking to experts in acquisition integration to understand how it was done in other

[5] https://www.qsrinternational.com/nvivo/

companies. I held six discussions with six experts, which I summarise in Appendix 3 – Expert interviews and discussions I also attended a conference on post-acquisition integration to understand the phenomenon in depth. Understanding the problem by engaging with those who know it and experience it is an important step when formulating the engaged scholarship problem (Van de Ven 2007). These discussions helped me to better understand the phenomenon and ensure the study was relevant. Later in the project, I enrolled on a course on acquisition integration, where I learned more about the practice and was able to speak with many acquisition experts. At this stage though, I was able to have a richer conversation with the experts and offer insights and learning back to them. From these experiences I built an understanding of what acquisitions were like and what issues were common, which was especially helpful when formulating the problem.

There were also data sources that helped me to understand the macro context of the shipping industry. Understanding how business is done in this industry and the external, market forces in play provides a foundation from which to consider a likely acquisition rationale. As described in Chapter 2, the acquisition rationale influences IS integration, so identifying the potential rationale helps one to understand what to prepare for. To understand the shipping industry and its modern-day challenges, I referred to a range of new and archival documentation. This was sourced from various places, including introductory documentation on Maersk's company portal, news articles from daily shipping industry newsletters, academic papers on the industry, and industrial reports from governments and the UN.

Additionally, there were many alternative data sources that contributed to my micro understanding of the specific case and its development. As a part of the IT M&A team, I was able to record much of what the team was doing. As a team, we had regular communication in the form of meetings, group emails, daily team calls, and offsite team workshops. Records of these events enhanced my rich data reservoir. These records were made in a variety of ways. I kept regular personal notes of

events, meetings, workshops, and calls, recorded in a combination of digital and handwritten notebooks. Furthermore, digital announcements were kept as either PDF files or emails, and IT resources developed as physical assets were recorded and retained. These were all added to a digital documentation library I maintained throughout my industrial PhD.

This section presents the rich data sources I collected from throughout my three-year study of Maersk. Interviews with key stakeholders involved in the preparation and execution of the post-acquisition IS integration of Hamburg Süd were the primary empirical data source. However, supporting that was a range of alternative data sources that were used to understand the macro and micro contexts of the study and guide additional data collection. Once collected, the data was analysed using both inductive and deductive methods. This is discussed in the following section.

Data Analysis

The data collected through the case study of Maersk was analysed methodically and purposefully. I used a combination of deductive and inductive methods to build rich descriptions and explanations of the proactive capability building done at Maersk. I analysed the collected data on four occasions to address the different research questions asked in Papers #2, #3, #4, and #5. These four peer-reviewed research papers are presented in Chapter 5. Although each paper addressed its own research question, collectively their individual analyses contributed to the findings of the overall engaged scholarship research approach. Table 12 presents an overview of the analytical methods applied in each peer-reviewed paper and their outcomes. These papers are discussed in more detail in Chapter 5, and their individual findings are aggregated to the findings of this engaged scholarship research project in Chapter 6. This section presents the two analytical approaches followed to reach these outcomes. First, the deductive approach to analysis is presented, followed by the inductive approach.

Paper	Analytic Method	Paper Outcomes
Paper #2: "The Paradox of Post-Acquisition IS Integration Preparation"	Inductive analysis	Identification of the paradoxical forces influencing the proactive preparation of the IT department, and of the coping strategies applied to deal with this uncertainty
Paper #3: "Building IT Resources for Post-Acquisition IS Integration in Novice Acquirers"	Deductive analysis	Identification of 29 IT resources built proactively for post-acquisition IS integration
	Inductive analysis	Derivation of five IT resource types running through the identified 29 IT resources
Paper #4: "Developing Acquisition IS Integration Capabilities: The Learning Processes of Novice Acquirers"	Deductive analysis	Assessment of the effectiveness of four learning processes for proactive preparation of IS integration capability
Paper #5: "Validating Acquisition IS Integration Readiness with Drills"	Inductive analysis	Detailed descriptions of two drills of post-acquisition integration and key learnings on how to effectively design these

Table 12 – Approach to data analysis

Deductive analytical approach

In this section I present the deductive analytical approach I followed in my research papers. First, I explain what is meant by a deductive analytical approach, then I present the deductive approach to each case. Finally, I detail the analytic process of deduction I applied and how that led to my paper's findings.

A deductive analytical approach is concerned with testing hypotheses and theories developed from previous studies in new contexts (Saunders et al. 2009). In doing so it takes existing knowledge and uses it to guide or test research in a new setting. Two of my submitted articles, Papers #3 and #4, adopted a deductive approach to their analysis. They applied theoretical lenses that had previously been used to study acquisition integrations. However, my studies applied these theories to understand a new context, the proactive IS capability building process. In doing so, the research extended the understanding of post-acquisition IS integration by applying a previously used theory to a new setting. This section briefly explains each paper's deductive approach; for a richer description, please refer to the individual papers.

Paper #3 used the resource-based view and Barney's (1991) resources framework consisting of three resource types (human, physical, and organisational) to deductively analyse the case data collected. By deductively applying Barney's resource framework to the case study, the analysis revealed the IT resources Maersk had built during its proactive preparation period. The outcome of this deductive analysis was the identification of 29 resources, categorised as human, physical, or organisational.

Similarly, Paper #4 applied recognised theories of organisational learning to the new context of proactive IS capability building. Specifically, it adopted the deductive approach used by Bingham and Davis (2012) to study organisations undertaking their first internationalisation projects, which included acquisitions. They analysed their cases against four learning processes: trial and error, experimental, improvisational, and vicarious. The selection of these four learning processes was based on their recognised importance and prevalence within literature (Bingham and Davis 2012). Deductively analysing this case with these learning theories explained how Maersk was proactively learning IS integration capability.

The deductive analysis of the case followed a similar albeit completely independent process for each of Papers #3 and #4. Driven by the shared ambition to co-produce descriptive and explanatory knowledge, a problem was formulated between the researcher and the industrial partner. This was based on the events occurring at the time in the company and on a common desire to understand the case better. To provide structure to the research, where possible a deductive theory was then chosen as an analytical tool. This selection was based on an assessment of what could contribute a meaningful answer to the research question. Once this was selected, the interview transcripts were analysed.

I analysed the transcripts using the constant comparison method, borrowed from grounded theory (Charmaz 2006; Glaser and Strauss 1967). This is a preferred tool for analysis in engaged scholarship studies, as recommended by Van de Ven (2007). I applied the incident-to-incident variation of the constant comparison method (Charmaz 2006; Corbin and Strauss 2008). The incident-to-incident approach is a variation of the original word-by-word or line-by-line approach to grounded theory (Charmaz 2006; Glaser and Strauss 1967). It takes a wider view of the transcribed data to look for an idea or concept within a block of text rather than coding each word or physical line. This is often recognised as a preferable approach to the traditional approaches (Charmaz 2006; Corbin and Strauss 2008).

Adopting this analytic approach, I reviewed the interview transcripts to identify descriptive incidents. As an incident was identified, it was compared to the theoretical concepts to see if it described either a resource (Barney 1991) (for Paper #3) or a learning process (Bingham and Davis 2012) (for Paper #4). Where it did, it was coded as such. Additionally, it was compared to existing coded incidents to see whether it matched one. If it did, the incident was coded the same rather than as a new, duplicate code. This process of constant comparison continued throughout the coding process. Once all interviews had been coded once, they were recoded to ensure

consistency and that all codes had been compared to all transcriptions. The outcomes of the coding processes are detailed in the individual papers.

This section describes the deductive approach used to analyse the collected research data to produce descriptions and explanations of Maersk's proactive capability building. This work and the findings were presented in two research papers, Paper #3 and Paper #4. The next section describes another analytical approach I applied to study the data, inductive analysis.

Inductive analytical approach

With the aim of also extending the research on post-acquisition IS integration into new areas, I also conducted inductive analysis of the data collected. This section provides a brief explanation of inductive analysis, then describes how it was used in three of my research papers, Papers #2, #3, and #5.

Inductive research is concerned with gathering data on a phenomenon and using that data for theory building (Saunders et al. 2009). It acts in almost the opposite way to deduction, starting with data and organising that to identify theoretical findings. In this case I sought theories that described and explained how a firm proactively learns the capability for post-acquisition IS integration. Three of the submitted papers applied inductive analysis to the data, Papers #2, #3, and #5. This section briefly explains the inductive approach applied in these papers. For a fuller description, please refer to the individual papers.

Each research paper followed the engaged scholarship problem formulation process to identify a relevant topic to both the researcher and the case company. In several cases, this relevant topic was not supported by existing theory; therefore, an inductive approach to analysis was selected. This process followed the same incident-to-incident variation of the constant comparison method borrowed from grounded theory (Charmaz 2006; Corbin and Strauss 2008; Glaser and Strauss

1967). However, instead of searching for incidents which matched existing theoretical constructs, I searched for all incidents within the text and coded them. In each case of analysis, attention was paid to identifying incidents related to the formulated problem.

As an example, in the case of Paper #2, which is focussed on the paradox of preparation, attention was focussed on incidents related to (a) preparatory activities and (b) foreseen IS integration challenges.

As a new incident was identified, it was compared to other pre-existing codes to see if it matched. If it did, it was coded the same; if it was a new incident, then a new code was created. This was done for each transcription, and transcriptions were reviewed twice to ensure consistency in coding.

This section describes the inductive approach followed by three of my research papers. For a richer explanation of the inductive analytical process followed by each paper, please refer to them in Appendix 5.

Chapter Summary

This chapter provides a rich explanation of the overarching approach to this industrial PhD project. This project adopts a post-positivist research paradigm grounded in a critical realist ontology. Techniques to control for an objective epistemology are explained, as is the rationale for adopting qualitative methods.

Through a consultative agreement process with Maersk, a learning partnership was established under an overarching research approach of engaged scholarship. This is a suitable approach for working closely with real-world problems and the right approach for generating useful practical knowledge that extends scientific knowledge on a matter.

The rest of the chapter explains the methods for carrying out this research, first recounting the extension we developed to Lacity et al.'s (2010, 2011, 2017) review methodology and then describing in detail the choice and application of the case study. The chapter finishes by presenting the data collection and analysis processes.

Drawing on the rich data collected via one-on-one interviews throughout the research project, I next present the overarching case study of Maersk. Chapter 4 tells the story of the proactive preparation through the words of those actively involved.

Chapter 4: The Case of M&A IT at Maersk

During the three years of this study, I was employed as an industrial PhD fellow at Maersk. In this capacity I enjoyed extraordinary access to Maersk IT as it built the IS integration capability within the organisation. This chapter is dedicated to telling the team's story. As much as possible I use the words of those involved in the proactive IS capability development programme to explain what they were doing and why they were doing it. The quotes from those involved are sourced from the 96 interviews, as described in the previous chapter. The full list of interviews can be found in Appendix 2 – Interviews.

The core of the story is the Maersk IT M&A team—it is their story. They were the group responsible for building the capability within Maersk IT. They are the personification of the post-acquisition IS integration capability. However, the story of capability development predates the team's existence, beginning before they were tasked with preparing for an acquisition.

This story is told through five phases as shown in Figure 11. The initial four phases are characterised by the degree of uncertainty of two dimensions of post-acquisition IS integration: the acquired target and the integration approach. The uncertainty of these dimensions demonstrates a paradoxical challenge of preparing in advance of an acquisition. The IS integration capability must be built in advance, yet the specific contextual application of the capability is unknown. This paradox of having to prepare in advance yet not knowing what to prepare for shaped the years of capability building.

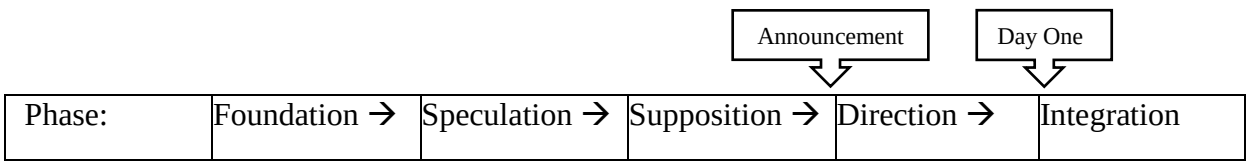

Figure 11 – Five phases of Maersk's story

The retelling of this case through the first four phases highlights this paradox as well as the coping mechanisms Maersk deployed. The final phase began after Day One and Maersk acquired Hamburg Süd. After Day One, legal restrictions imposed by the two firms as separate entities were no longer in place, and all planning and integration activities could proceed. This fifth phase covers the period from Day One through the planned integration. To the end of this story, I append a final section recalling reflections from key participants after the integration was complete.

December 1, 2017

"More to follow, but it's Hamburg Sud."

That was it, a single line in an email from the IT M&A team leader, the timing of which coincided with the following announcement to the Danish stock exchange:

> *Maersk Line A/S (Maersk Line) and the Oetker Group have reached an agreement for Maersk Line to acquire the German container shipping line Hamburg Südamerikanische Dampfschifffahrts-Gesellschaft KG (Hamburg Süd). The acquisition is subject to final agreement and regulatory approvals.*
>
> (Maersk 2016)

A detailed due diligence phase was to begin immediately to answer outstanding questions so as to reach the final agreement. For the IT M&A team receiving this email, this statement, marked the end of nearly two years of preparation and speculation about who and when Maersk would acquire. From the moment the announcement was made, their work shifted from preparing for the unknown to planning for a real acquisition. The year 2017 was going to be a very busy year for this team. However, this was something they had been preparing for. Over several previous phases of proactive IS capability building, Maersk IT had established a strong post-acquisition IS

integration capability. This started even before acquisitions were being discussed during the foundation phase.

Foundation

The foundation phase describes the time before acquisitions were on the agenda for Maersk. Even before they were being discussed as a possible strategic initiative, the Maersk IT department was laying the foundation for its IS integration capability. During the foundation phase, Maersk built IT resources which contributed to post-acquisition IS integration capability even though they were not specifically built for that purpose. Figure 12 provides a visualisation of where this phase fit into the overall capability building process, and lists some of the IT resources built during this phase.

In 2012, Maersk hired a new CIO. When he started, Maersk had a massive application landscape. Depending on who was asked and their preferred metric for determining what an "application" was, there were between 500 and 7000 applications.

			Announcement	Day One	
Phase:	Foundation →	Speculation →	Supposition →	Direction →	Integration
Example IT resources developed during phase	• Rationalised IT estate • Recorded IT landscape				

Figure 12 – Example IT resources proactively built during foundation phase

In addition to not having a clear understanding of the application landscape, it was complex, making it difficult to support and expensive to run. Considering this situation, two actions were undertaken by Maersk at this time. These were to rationalise the IT estate and record the application landscape. Although not specifically done to prepare for acquisitions, these two initiatives would later be reflected on as foundational work, upon which the IS integration capability was built.

The origin really started with a lot of the work about understanding the landscape and rationalising the landscape… and there were a couple of reasons for doing that. One, it makes support easier, two it gets costs down, but 3 it simplifies your processes so if you acquire you can bring someone it.

CIO

With this direction and mandate the next two and a half years were spent achieving this goal. As a result, by the time 2015 came and acquisitions began to be discussed, the overall application landscape was significantly simplified, down to 1200.

Alongside rationalising the IT estate, Maersk IT also documented their understanding of their IT application landscape. Specifically, the knowledge was codified in business application landscape maps. Having this understanding, especially of the core systems, would prove highly beneficial in controlling integrations. Even though they were not designed or built for acquisitions, key IT resources were created, which would later be used to control and guide acquisition integration work.

What we did was document the 120 core applications that ran the business, and what I used that for was sort of a prop to say, we're shrinking the

landscape, so we got rid of many hundreds of other applications that we didn't need. These 120 are the core. Head of EA & M&A

Another IT initiative undertaken prior to any consideration towards acquisition integration was the carve-out of a liner brand, Sealand. This was a company which had been acquired more than 15 years earlier, and a project was undertaken to relaunch it as a separate brand from the parent Maersk. Within IT, there was a team assembled to carry out this carve-out project, known locally as the Sealand team. Although it was not an acquisition, there were many similarities between what the Sealand team was doing and the skill set needed for carrying out post-acquisition IS integration. The projects were significant transformations of a "separate" entity requiring large data and process conversions. Additionally, the work spanned the entire Maersk organisational structure, including the commercial, operations, HR, finance, and other departments. Unlike other projects, which are usually focussed on a particular process or function of the company, the Sealand team worked with the entire company and across the full shipping value chain.

The leaders had experience doing, just coincidentally, the Sealand and the Seago acquisitions. So as we talked about it with their manager and he said why don't we use them, they don't know acquisitions but they do know conversions. Head of EA & M&A

The team that I had myself- I mean, other than maybe working through some acquisitions, I wouldn't call us M&A experts. But the skillset was probably closer than anybody else in Maersk Line I.T. in that by doing the Sealand implementation, they were used to looking at the overall process and not just a particular vertical, not just looking at commercial or finance. So they had a better overview. Head of IT M&A Integration

Unbeknownst to the team at the time, the skills they were honing would be very useful during the integration.

> *So the original team was built for the team that had done the Sealand carveout. So a lot of the artefacts that we used to carve them out we were able to reuse for this. So that I think- some of that was just directly carried over into the integration. The knowledge of how to do an end to end carveout, typically IT people have knowledge about a certain area but not the end to end business process whereas the team that worked on Sealand had to know the end to end business process. So that knowledge of knowing the end to end business process helped again because we were doing a similar kind of thing with Hamburg Sud. Head of IT M&A Integration*

The foundation phase is characterised by the execution of activities which were not undertaken for acquisitions, yet some of the IT artefacts, skills, experiences, and resources developed during this phase contributed to the IS integration capability developed later. This period gave Maersk IT a solid footing on which to start building the capability.

Speculation

The next phase, speculation, began in early 2015 when the IT department, led by its CIO, determined that acquisitions would likely become part of the conglomerate's growth strategy. Typifying this time was the uncertainty of what would be acquired and what integration approach would be followed. Without clear direction in this area, the IT organisation was forced to speculate on likely acquisition targets and the likely integration approach. Figure 13 provides a visualisation of where this phase fit into the overall capability building process and examples of the IT resources built during this phase.

			Announcement	Day One	
Phase:	Foundation →	Speculation →	Supposition →	Direction →	Integration
Example IT resources developed during phase	• Rationalised IT estate • Recorded IT landscape	• IT M&A team • IT M&A playbook			

Figure 13 – Example IT resources proactively built during speculation phase

Maersk had been through a turnaround period and was both profitable and the lowest-cost carrier in the market. It had ambitions to grow, but organic growth was not coming fast enough to increase the company's revenue.

> *The problem with Maersk is that even though they've had quite a turnaround, they could see that while the bottom line was improving, there was no change to the top line, and it was clear that revenue was something they needed. One if the best ways to do this is with an acquisition. Head of EA & M&A*

The IT leadership's foresight to identify acquisitions as a means for growth led to the initiation of activities to create the acquisition IS integration capability within Maersk IT. The starting point for this was identifying a senior leader within IT who would be responsible for heading an IT M&A team. This leader was selected due to his past experiences in M&A outside of Maersk. He was charged with setting up a team which would be responsible for preparing the IT department for acquisitions.

> *He was put into place to begin with… he'd been in an IT organisation that had grown that capability. So it was "Hey, go figure out how to do this in this context". CIO*

After being assigned the task, the experienced M&A leader set up the IT M&A team by staffing

it with those finishing the Sealand project. As previously described, their skills were deemed similar and useful in an integration, especially as they knew the extensive business and application landscape.

However, the team lacked experience in M&A. So to develop their understanding, the team began researching acquisitions to understand what this new type of project meant. This proved very challenging at first as the team was lost without expertise. Although the senior leader gave direction, the day-to-day understanding of what getting ready for acquisitions meant was confusing.

> *Not having any M&A expertise on the team, these guys spent a lot of time just figuring stuff out, how to do this, what does this mean, combing external sources, due diligence checklists. So people would go and look and "Okay, if I do some Google searches, I can actually find a due-diligence checklist for I.T., and let's use that to build." Head of IT M&A Integration*

> *So whatever work we did at that time, the playbook table of contents, that was purely our efforts, reading online, doing research, trying to find out by ourselves as much as possible. Technical Analyst*

To overcome the missing expertise, the senior leader brought in an acquisition expert to help educate this team as they formed. Although very experienced in acquisitions, she was looking for different challenges in her career and did not want to join a standing IT M&A team.

> *We talked to her and she shared her thinking and I think she was the first one with real M&A experience. So she introduced us to the terminology and to the way of thinking, due diligence, planning and execution as such. Project Manager*

In addition to looking for learnings external to Maersk, one of the first activities initiated by the IT M&A team was a lessons learned review of Maersk's past acquisitions. Maersk had previously acquired several companies, although the most recent was over 10 years earlier. Due to the length of time since the last integration, the knowledge and processes covering how to do an acquisition IS integration had not been retained. Nevertheless, the team met with employees who had been through the past acquisitions to learn lessons from them.

> *We also started looking backwards and finding ways of getting lessons learned from previous finding out what integrations or carve outs had there been that we could actually get some learnings from. Also getting all of those people that were involved because throughout time not a lot of people remain in the organisation. Project Manager*

Leveraging the experience of the appointed senior leader, their own experiences, and those of people before them, the IT M&A team was tasked with developing a repeatable process for integrating acquired companies.

Importantly, at this time, it was unclear what exactly would be acquired. It was debated that it would likely be a shipping line. However, it was also speculated it could be a complementary business, such as a port terminal or a 3PL[6] provider, or a digital business capable of transforming the way Maersk operated. There were no direct statement on what would be acquired and no direction on which integration approach to be ready to execute.

While it was unclear who or what would be acquired, it was speculated that it would be a container carrier. Building on that concept though was an understanding that large, especially state-owned,

[6] Third-party logistics

container carriers would not be for sale. Therefore, the primary scenario being considered was that Maersk would run multiple simultaneous acquisitions of small container carriers.

> *The original assumption was that we would be a repeat M&A, so a serial offender if you will. And they would be smaller acquisitions, but we would do 3 or 4. Our approach was buy a company and bring it into our process. Buy another one, bring it in. And we thought we'd have to cope with two in a given year. CIO*

However, this was all based on speculation. Due to this uncertainty the team had to strike a balance between preparing for all scenarios and preparing for those deemed more likely.

> *We couldn't focus on every different kind of scenario. So when we talked to the strategy guys, they said-- at one point it was, "Okay, maybe we'll have a complementary business"; and then it was, "Well, maybe we'll look at some of the smaller niche carriers"; "All right, now we're looking at the bigger guys." So, based on the guidance from the strategy team, they said we're most likely to buy another shipping line, so to make our work a little more focused we've just taken that approach. But it is entirely possible that we could find out tomorrow we're buying someone does a certain types of business we don't do, and we're going to have to regroup a little bit to get ready for that. Head of IT M&A Integration*

When it came to the IS integration approach, the team speculated they would be acquiring several smaller shipping lines and absorbing their IT onto the Maersk IT platform. Two reasons for favouring this approach were that Maersk was the lowest-cost carrier, so it was already operating cheaper than others in the same industry, and that, being the largest, Maersk was likely already

doing any process being done by another line.

As the team began to form an idea of a favoured approach to integrating a speculated target, they developed an early resource to help shape the development of the IS integration capability—a set of seven guiding principles. These principles stipulated the approach IT would take in an integration. One principle endorsed their preferred approach to consolidating onto the Maersk IT platform. This effectively ruled out a best-of-breed approach. This principle was founded on experience from past acquisitions and on the recognition that as Maersk was the lowest-cost carrier, moving to its systems and processes would represent a cost saving.

We said in the principles that we are going to move to our system. Head of EA & M&A

Make the assumption that if we are the lowest cost carrier, we are bringing people into our process. CIO

During the early months of building the IS integration capability, the team reached out to consultants to see whether they could use their knowledge of both M&A and Maersk IT to leapfrog the early learning period. It was decided to bring in one of Maersk's main vendors as experts to help advance the development of a repeatable process. They decided they would leverage their expertise to evaluate the IT landscape's scalability, prepare for a data migration process, and begin writing a playbook based on the absorption of smaller carriers.

The playbook was to be an internal document which IT would follow in case of an acquisition, spelling out what would happen, identifying tasks, and stating responsibilities. The consultants were brought in to provide a starting point and initial guidance on best practices and design; however, Maersk IT was to provide the content.

They were definitely hired to give the right look and feel of the playbook. To give it a structure. To share some knowledge and expertise on how a playbook should be labelled from chapter to chapter, and what the chronological flow is. And the branding stuff. It was definitely our intention from the start that it will be Maersk Line IT playbook generated or populated by the Maersk Line IT people. Project Manager

Due to the speculated absorption approach, data migration was advised by the consultants as a core process to successfully integrating an acquired company. As such, coming up with a data migration approach was one of the early activities undertaken by the IT M&A team. Alongside that was the need to ensure Maersk's IT systems could scale to handle the increase in data. They looked to the consultants with their holistic knowledge of the Maersk IT landscape to help with this task.

So we went through an exercise there to bring them in. The vendor has a lot of our landscape under their scope, so we thought that they would be able to be helpful in helping us look with particular focus on the data migration and scalability and things like that. Head of IT M&A Integration

A data migration plan was developed. To verify the effectiveness of the plan, an opportunity to test it through an actual data migration execution was identified. It was decided that the small Brazilian firm Mercosul, a subsidiary of Maersk, would be mock-acquired following the expected absorption approach. The team would follow their plans to absorb Mercosul onto the Maersk IT landscape. Maersk consulting partner was also to help with this.

The vendor was brought in to do research and analysis on Maersk IT and to see if we were capable of doing an M&A. In the event of doing the research,

they were also supposed to map Mercosul's processes and application landscape to Maersk's and see how they can be successfully merged. Project Manager

Unfortunately, the use of the consultants in this instance was widely deemed unsuccessful. They delivered the shell of the playbook as expected, but the other tasks were not satisfactorily completed. The IT M&A team found the consultants lacked enough expertise and knowledge, especially of Maersk and Maersk's IT systems, to complete tasks and add value. However, these consultants did not bring the expected knowledge and spent a long time simply trying to understand the context they were working in. This resulted in the team having to guide and handhold them. Eventually this proved too much, and they stopped giving the consultants work and simply did it themselves.

Mostly they were brand new consultants to Maersk; they had never consulted at Maersk before. And I think this was the start of the problem. Project Manager

We spent a lot of time coaching them along. They did not really operate independently, so we had to sort of-- We would tell them "Tell us if these systems are scalable for throwing on another 25%." And they'd say "Well, we need more documentation, and we don't know who to talk to." And we had to do a lot of handholding with them. At the end of the day, our team probably spent more time helping them than they could have just done the tasks themselves. Head of IT M&A Integration

Despite the challenges with the consultants, the team pushed forward with the preparations and developing IS integration capability within Maersk IT. The mock acquisition of Mercosul

proceeded through several phases, producing useful learnings. One such learning was the evaluation of the usefulness of the Business Application Landscape maps (built during the foundation phase) for comparing the IT landscape of Mercosul against that of Maersk. By using this tool to compare landscapes, they were able to, quite quickly, identify the migration path towards absorption of the IT landscape.

> *I thought it would be an interesting intellectual exercise to say "if you go to Mercosul, and use the [Business Application Landscape document] as a blueprint, how do what they have map to what we have?". And I thought it worked beautifully… they came back after 2 weeks and were able to lay out essentially a Mercosul version of that. and I thought it was really good because what it did was it gave us a common overview. Head of EA & M&A*

> *Mercosul was actually a good exercise. We got through the whole process of looking at their business capabilities, comparing that to our mapping on top of our applications and their applications, identifying the gaps. Head of IT M&A Integration*

As 2015 continued, the outlook for the liner shipping industry began to diminish. Oversupply saturated the market, and prices rapidly decreased. As such spending was wound back, which included putting an end to the Mercosul integration before it could be fully executed. However, the drill was deemed a beneficial exercise. In addition to validating the usefulness of artefacts built during the foundation phase, the team also discovered a limitation to their planned integration approach. While comparing the business application landscapes, it was discovered that Mercosul ran processes which would not work on Maersk's IT systems. These processes could not be absorbed onto Maersk's IT. Instead their supporting systems had to be maintained. In identifying

this, the team acknowledged that future acquisitions may also yield processes which cannot be absorbed, and therefore they must be capable of executing a coexistence IS integration approach.

> *Although every once in a while they may find that a company we acquires does something that we don't. Which was true in Mercosul. They actually do things we don't do. There's no match. And so I think it was a good exercise the whole way round. Head of EA & M&A*

Around the time of winding up the Mercosul project, management were pushing to extend the IT M&A team. At the same time, the team's temporary acquisition expert was starting a new position within Maersk. It was vital her experience be replaced, so an acquisition expert was hired from outside Maersk into a team leader role. Upon joining the team, he invested a significant amount of time in two key initiatives. The first was to educate himself on both Maersk and the shipping industry.

> *So the first thing was that the first few weeks it was a case of understanding, for me trying to understand the shipping industry, because I was new to it.*
>
> *Senior IT Manager*

The other initiative was to teach and mentor the team in acquisitions. He shared his first-hand experience with the team, advising them on how events would play out, who the key people would be, where decisions would be anchored, and what would be expected of them.

> *The first two months I was lucky to have our team leader who was brought in from the outside who had about 22 to 25 different IT mergers under his belt. So really the first two months was really spent in earnest trying to figure out what is M&A, what is the IT angle, trying to make sure that I was comfortable*

with not only the verbiage but also the philosophy, with the strategy, with the entire M&A sphere so to speak. Senior IT Manager

The other activity was to create standardised terminology throughout the team that referred to concepts in acquisitions. Learning the foundations of acquisitions and creating an agreed terminology gave the team a common starting point for their further acquisition preparation.

It was about determining the wording for elements such as the processes or phases, and making sure everyone understood what they meant. For example, making sure that when I spoke about due diligence to another IT team or another business team, everybody spoke in the same manner, and they understood due diligence in the same way. Senior IT Manager

This foundational understanding of acquisition set the groundwork for the team to write the IT M&A playbook. The team leader's first deliverable was to complete the playbook, and two new team members were hired under him to help complete this task. The two new recruits came from within Maersk, bringing with them experience from Maersk's commercial area and from Maersk IT. The new hires added a global dimension to the team as they were based in Ireland and the US, joining the IT M&A team already working out of Denmark.

Then we added a project manager, who had a lot of acquisition experience, different types of acquisitions that he would do at other companies and then we had a couple of people in North Carolina who we thought were pretty good and talented to work on the playbook. Head of EA & M&A

As described earlier, an initial playbook structure had been designed by the consultants. Upon taking over responsibility for the playbook, the team leader set out to redesign it. This represented a shift away from the generic structure first proposed by the consultants towards something

designed to be read by Maersk's IT personnel. It was envisioned to be an easy read, something people in Maersk IT would find interesting. It addressed two main goals of being an educational overview of the agreed acquisition terminology and process, and being informative of how Maersk IT speculated they would carry out an integration.

> *We started work on a playbook; something where somebody could go, when they are assigned to an acquisition and look to see, understand, what the phases meant. And if they are from IT understand – if I am a network engineer or if I am a security expert or if I am a business analyst – what I need to do, what I need to be aware of, what I need to start thinking about... The idea was to create something an IT professional would pick up, and is going to be a fairly easy read, and is going to be something they can use as a tool to help them in their efforts during an integration. Senior IT Manager*

To achieve this, there were two sections to the playbook. The first half was largely foundational content explaining acquisitions. It was there to educate the reader on what an acquisition is and the broad events that would occur. The terminology previously agreed within the IT M&A team was explained further in the playbook, and this was used as the basis for discussion with the rest of IT.

The second section of the playbook was primarily authored by the different parts of the IT organisation (for example, networking, onsite support, and application management). Each team contributed content describing what they would do in case of an integration. The IT M&A team used the terminology and the speculated integration approach to guide the contributors to come up with their plans.

The playbook was the first big piece, and the first thing we really had to finish. And getting all the different people, contributors, and Maersk Line I.T. to write their bits, and then we'd have to edit that and put that in the playbook. So reaching out to all of them I think took several months, to get all of that information into one spot, to get the people to come back to us with their parts. Some people just didn't have the time. So, yeah, the playbook's got basically two big sections. So it's got the overview section, if you will, and acquisitions, and the second half is the individual department chapters. Head of IT M&A Integration

Although it was speculated that Maersk would acquire another shipping line, what Maersk would do with it was becoming less clear. The clear decision to acquire and absorb its processes onto Maersk IT had been challenged based on the learnings from the Mercosul drill. So the playbook was written to cover many varied scenarios, describing a range of integrations.

The one thing that didn't help us was we're trying to write a playbook that's going to cover multiple scenarios. So we don't know if Maersk Line is going to buy another company and leave them stand alone, are they going to fully integrate them, are they going to partially integrate them, are they going to sell off all the vessels, do we need to worry about vessel IT, do we not need to worry about it. I think that was more a difficulty than anything else, trying to make it all encompassing without getting either too detailed within the various different scenarios or without it getting too high level. Senior IT Manager

Work on the playbook took many months to get right and complete. It was finished in May 2016 and shared with Maersk IT so they could become familiar with the plans for acquisition IS integration.

While one part of the IT M&A team was focussing on the playbook, the Copenhagen-based team was working on a tool to communicate their work on preparing for acquisitions, and the task faced in acquisition IS integration. This became known as the storyboard and was a presentation towards various levels of management, including senior IT, Maersk's CFO, and Maersk's legal and strategy teams. The point of this was to show what they had done and that the IT M&A team had a plan for what they would do in an acquisition.

> *Part of the idea of the storyboard is to educate people as to 2 things. One is, "here's what we need to do, to do an acquisition, and two is, how we will do it." Head of EA & M&A*

The IT M&A team spent a lot of time working on this, and many would question whether it was a productive use of time.

> *I don't think it's a valuable contribution. From a communication perspective maybe it is, but from the actual readiness perspective it's not. So I can't say that spending time on polishing the slides has been too productive. What is good though is as we did it we sharpened our own understanding and we polished quite a lot of the terminology by doing that. Project Manager*

Their CIO acknowledged this sentiment but also revealed the true value of such a tool. It showed IT knew what they were talking about, earned them partner status in the context of acquisitions, and earned them the coveted *seat at the table*.

> *Well I'm not sure it gave anything to the team in IT, other than a headache. What it gave to me was the seat at the table. Well it gave to, not to me, but to IT, was the seat at the table. Yes, there was the two-hour storyboard session, but that was the appetizer, its all the subsequent meetings following that*

where, the IT M&A leaders were really able to bring value to the conversation. CIO

As winter fell upon Copenhagen, the container shipping company was in dire straits. Oversupply within the container market, brought about by an influx of newer larger vessels not matched by anticipated demand for shipping services, meant a price war was in full swing, and freight rates were at an all-time low. Maersk Line was about to post a fourth-quarter loss of US$165 million[7]. The price war was affecting all shipping companies; however, due to the work Maersk had done over the preceding years, it was not feeling the pinch as badly as other companies.

If you're the lowest cost carrier, take this latest price war, we've lost money, everyone's lost money. But we're losing proportionally less, because we are more profitable than the competition. CIO

On 7th December 2015, an event occurred that ignited excitement in the IT M&A team. News broke that CMA CGM, at that time the third largest container shipping company, had made a successful bid to acquire Singapore's Neptune Orient Line (NOL)[8]. This was interesting for two reasons. First, NOL was the 13th largest shipping company and had previously been considered a non-acquirable carrier due to its national heritage to Singapore. The fact that it had been sold changed the thinking of the IT M&A team; it changed the game. The assumption that they would have to acquire a series of smaller carriers to gain the desired growth was challenged. They now considered that acquiring a large carrier, a top 20 carrier, was a real possibility. The second reason this news was interesting was that Maersk was named as another bidder. This confirmed to the team that Maersk was actively pursuing acquisitions.

[7] http://investor.maersk.com/static-files/e8af2ce6-bf4c-4471-8106-aa040912dc43
[8] https://www.cma-cgm.com/news/1011/cma-cgm-to-acquire-nol-reinforcing-its-position-in-global-shipping

A final activity purposely initiated in the speculation phase was to build relationships outside of the IT M&A team. Specifically, the IT M&A team pursued relationships with three different groups.

Firstly, leveraging *seat at the tabled* earned through the storyboard, the IT M&A team pursued a relationship with the deal team within the strategy function of Maersk. These were the lawyers and strategists identifying potential acquisition targets. Building a relationship early with them gave the IT M&A team time to share what they had been working on and build a level of credibility so that when potential targets began to be discussed, the IT M&A team would be invited to the conversation to provide input.

Secondly, the team began to engage with the wider Maersk business. They wanted to work closely with them to share their learnings, learn from the acquisition experience of others, and align on the development of acquisition integration plans.

> *The other thing we've been doing is communicating. Trying to communicate and build relationships with, not just the IT organisation as a whole, but also the strategy team, the deal team – whatever you want to call them. Also the likes of HR, finance, legal, we're trying to get into that world. Just to let them know that this is what we've been doing, this is how we're going to approach the acquisition, or integration effort. Senior IT Manager*

The final relationship building initiative was within IT itself. The IT M&A team was a new team and would be heavily dependent on the rest of the IT organisation both to design solutions and to execute integration activities when an acquisition arose. They worked closely with this broad organisation, building relationships with leaders and teams, to educate them on acquisitions and

to gather input for the playbook. However, it was often considered that while the playbook content is important, the relationship is more important.

> *A key tactic is not to push people too much to get the information. Just take it easy and start networking because networking is essential once an acquisition is in progress. It's more important that you know where to go and you've met them a few times and they know who you are. Project Manager*

As the relationships were developed throughout Maersk and Maersk IT, a comprehensive stakeholder matrix was being recorded. It was anticipated this would be a vital tool once an integration began for quickly identifying who were key people whom the IT M&A team had a relationship with.

> *The stakeholder matrix we developed over the past year or two, albeit changing from time to time, has really helped us in terms of being able to quickly identify and bring in the IT experts that we need to have these deeper discussions around requirements. Senior IT Manager*

At the start of 2016, the senior IT leader, who had been tasked with overseeing the development of the IT M&A team, left Maersk. A new senior IT leader with decades of experience within Maersk in both business and IT was chosen to replace him. This skill set was important because they needed someone leading the team who understood the business rationale behind an acquisition, how an integration would affect the business, and how those changes would be supported by IT.

> *He has probably the best knowledge of shipping out of all of us in the leadership team. See you could probably tell me a few things about how it*

really works in a terminal, and you could probably spoof me a fair bit. You can't with him. CIO

By the end of this phase, the team had established themselves and their reputation within Maersk and Maersk IT and had a broad plan for action when an acquisition hit. This was all based on speculation that Maersk would likely buy a shipping line and that they would absorb as much of the carrier's IT as possible. Notably, this speculation evolved during the period. As critical new information came in, they adapted their plans. Notably, there was a shift away from planning for full absorption based on an appreciation that they will likely be unable to support all processes run by an acquired company. Also, there was a shift from acquiring many small carriers to potentially acquiring large ones. Despite this speculation, their actions ensured they were not closing off other alternative acquisition scenarios. The team had developed a strong understanding of acquisitions and adopted an agreed terminology and approach, which covered a range of integration scenarios. Furthermore, they had learned, through real-life testing of their plans, the limitations of a pure absorption approach.

Supposition

As 2016 continued, evidence was mounting that Maersk would acquire something. Maersk executive management were stating publicly that Maersk was looking to acquire, and acquisition readiness became part of IT's strategic goals. The year 2016 was a turbulent time for the industry as a whole. There was ongoing consolidation of the container shipping industry, with several large M&A executed by the largest shipping lines. Another external force was shaking up the industry: low freight rates were impacting the profitability of container lines. In 2016, this problem significantly affected two Korean carriers, with HMM undergoing a major restructuring to survive and Hanjin (at the time the seventh largest carrier in the world) closing down after a spectacular

bankruptcy[9]. One maritime magazine used the headline "Four Weddings and a Funeral"[10] on an article detailing the ongoing events in the container shipping sector. Each time an event like this occurred meant there was one less carrier Maersk could acquire. These factors gave the IT M&A team grounds to suppose that a likely acquisition candidate was a large shipping line, and as the landscape changed, the list of likely targets was getting smaller. What was still unclear was how an acquired line would be integrated. For this, studying consolidation in market did not help, as there was a mix of integration approaches being executed. The team was developing plans guided by following an absorption, but ensured they were not excluding other integration approaches. As the supposition phase unfolded, it became clearer that absorption was not necessarily the best approach in all cases. Figure 14 provides a visualisation of where this phase fits into the overall capability building process and examples of the IT resources built during this phase.

Another shift in the way the team was organised occurred in early 2016 as the Copenhagen-based team leader left the team to pursue other challenges in Maersk. At this time, the team leader with acquisition experience who had originally been tasked with the creation of the playbook took over the whole team. One of his main efforts in developing the team from that point forward was to give them their own pieces of work they were to be responsible for. He mentored them to have confidence in engaging with people through IT and the business on acquisition readiness initiatives of their own. He considered this a vital skill for carrying out integration efforts during an acquisition.

[9] http://www.seatrade-maritime.com/news/asia/the-end-of-hanjin-shipping-officially-declared-bankrupt.html
[10] https://lloydslist.maritimeintelligence.informa.com/LL110005/Four-weddings-and-a-funeral

			Announcement	Day One	
Phase:	Foundation →	Speculation →	Supposition →	Direction →	Integration
Example IT resources developed during phase	• Rationalised IT estate • Recorded IT landscape	• IT M&A team • IT M&A playbook	• Critical path / core applications • IT M&A roadshow		

Figure 14 – Example IT resources proactively built during supposition phase

> *What I've done is have them all lead certain efforts, they have supporters and support in the team to help them, but each individual is responsible for the output and meeting deadlines and all that stuff. The reason for that is when it comes to an integration effort, the team, whatever their title, they're going to be leaders of efforts and initiatives, they are going to have tasks to deliver, they're going to have milestones to hit, they are going to have things that are hugely important to the overall integration program. So by getting them to start to lead efforts now and for the past 6 or 9 months, it is going to stand them in good stead to be able to stand up and be comfortable and confident that they can do the work. Senior IT Manager*

In the first half of 2016, the IT leadership set a target that IT systems should be capable of scaling 25% in case of an acquisition. Having such a large requirement bestowed upon all IT reinforced thinking that an acquisition would be of a large shipping line and that it would be primarily absorbed onto Maersk's IT platform. The first step to achieve this requirement was to identify the most important applications, the ones critical to supporting the business. So the IT M&A team began a programme to identify which were the most critical applications and to understand their relationship to others. This was termed the "critical path" and represented those applications which were vital to the continued operation of Maersk.

We have thousands of applications in Maersk Line, we can't go to check whether every single one of them is ready for a volume increase in either transactions or people so, we had to identify what would be deemed as critical path of our core applications. And we ask, if we were to buy somebody who would increase our load by 25% say, could the applications manage, could the infrastructure cope with that? Senior IT Manager

Once the critical path was identified, the IT M&A team executed a programme to understand their ability to scale—that is, to question whether the applications' software and hardware allowed for the anticipated increase in usage.

We need to answer the question; "Can we add a company that's 20%-30% the size of what we are right now?" IT is responsible for making this assessment and for executing on this. Head of EA & M&A

The result of this programme was a comprehensive understanding of which applications were already capable of absorbing the anticipated additional load and which required investment to be capable. Importantly, the IT M&A team stopped short of investing in additional capacity. Without an actual acquisition in hand and without certainty that an absorption approach would be undertaken, it was deemed sufficient to have identified a plan for upgrading the critical applications. In the event an acquisition was announced, IT was now capable of launching projects to scale the critical applications.

While scalability was being assessed, the relationship with the strategy team was flourishing. They were inspecting potential targets and were engaging the IT M&A team leadership for IT input to potential acquisitions and integration scenarios. At some point, they requested that IT be capable of scaling 25% immediately upon an acquisition and capable of scaling a further 25% within a

year. These were additional, tangible targets the IT M&A team could focus on, and supported the supposition that an absorption approach would be followed. Around summer of 2016 one of these deals began to look promising.

At this time, some of the IT M&A leadership were brought in under a non-disclosure agreement to discuss the deal, providing IT input. As the business rationale for acquiring this company was investigated, assumptions that an absorption approach would be the primary approach were challenged. The guiding principle that first and foremost the goal was to consolidate onto Maersk's IT platform needed to be reassessed. However, as the deals were still very secretive and more importantly not concluded yet, there was no direction to steer away from what was logically supposed.

> *We got involved in this around the early summer, last year which was 3 months after I took on the team, where the deal team reached out to get more insights on the different options that would be considered in case of the acquisition. We were feeding in both scenarios to, and getting input from, the deal team in terms of what could potentially materialise. Head of Mergers & Acquisitions, IT*

While scalability was being assessed, the IT M&A team was working on other initiatives. Despite the supposition that an absorption would be undertaken, many of the initiatives were purposely integration approach agnostic.

The first of these was continuing and refining work related to preparing for due diligence. A checklist had been created early on based on early learnings of the team. During this period this was revised and improved to become a prioritised checklist. Additionally, a due diligence process was outlined, and a report template was created.

I've expanded on the existing due diligence work and added it to the Due Diligence section of the IT Playbook. The Playbook provides a high-level overview of the different team's IT engages with and outlines many of the tasks the M&A IT team is responsible for during a merger and/or acquisition. In addition to the Playbook, a Due Diligence slide deck was created that provided links to templates, guidelines and policies. Business Analyst

In addition to what could be considered a traditional due diligence kit, the IT M&A team also developed a digital due diligence approach. The purpose of this was to be able to quickly identify digital assets within an acquired company and secure them. This focussed on new technologies which are sometimes considered IT yet not under the control of IT—for example, DNS names, IoT, and social media.

Due diligence; look at the applications, look at the infrastructure, look at the organisation. It was fine, it was fine 10 years ago, it was fine 5 years ago probably. Nowadays it's changed a bit - it's still important to look at the infrastructure, look at the apps, that's where your synergy and in your business are - but what about social media? What about domain names? Who has those domain names? Is it Jeff who bought it on his credit card, or is managed by a central team, or an IP company? The scope expands and expands: ecommerce, social media, public facing staff, key properties… The challenge is new media, as you might call it 'digital space'. People can do nefarious things and during the time of change, these things are more open and possibly less monitored than they could be. Project Manager

As an acquisition continued to appear more likely, the IT M&A team needed to validate the playbook and the IT organisation's approach to integration by testing them with a drill. Over a

period of many weeks, a fictitious shipping company was created using real-world data from likely acquisition targets. The IT M&A team used their relationship with the strategy team to build the fictitious company and aligned with them on likely integration parameters, such as deadlines. This was then presented to the IT managers in a secret workshop to simulate the level of discretion usually afforded to acquisitions. In this workshop the managers were asked if their integration plans and their IT systems could accommodate integrating the fictitious company by a specific date. Considering there was still no acquisition and therefore no acquisition integration approach, this drill sought to validate a supposed scenario. They wanted to validate if the IT infrastructure could create the desired level of connectivity in the light of a 25% increase on Day One. Good discussions were had on that day, and everyone thought it was a real workshop for a real acquisition. Out of the workshop came validation that the preparations were sound, as well as new information and learnings to feed into their integration plans. Similar to the mock acquisition done a year earlier, this drill provided valuable experience in how an acquisition would go.

> *The idea was to create a believable integration scenario that we could take to our group infrastructure people and put in front of them and say here it is. This is a potential incoming thing that we've been asked to look at, these are the goals that we've been asked to hit in 9 months, can we do it?* Project Manager

> *So we went through what we wanted to deliver, and we started working through the scenario. Everybody agreed that it could be done, and then we drew a time line of what are the dependencies, what needs to start when, to be delivered for Day One. We said "we've got 9 months to do this work, so let's work back from 9 months, this is what we need to deliver. When do we need to start that work?". So some of it needs to start 8 months from Day One, other*

work doesn't need to start from 3 months. We worked all that out. I think what it did for us, that session, that workshop, confirmed that what we wanted to do we could do. Senior IT Manager

As the year went on, the close relationship with the strategy team kept the IT M&A team leadership abreast of the likelihood of an acquisition. Based on this insight, towards the end of the year, the IT M&A team began to increase in size. This started with bringing in an IT M&A specialist to fill a void of missing IT technical knowledge. This hire also brought experience from past acquisitions. Sharing this knowledge and experience with the team helped guide their development. Later, a project coordinator was hired to provide support to the team.

The other thing that was a concern at the time was I didn't feel we had enough IT knowledge within the IT M&A team. You need a level of business knowledge and industry knowledge, and that's fantastic and we couldn't do without those people. But I felt that we were a little light in terms of real IT technical knowledge and ability. Senior IT Manager

A useful resource developed and used at this time was an onboarding kit. This was used to quickly educate new recruits and induct them into the acquisition mindset. It contained a multitude of documents including the playbook, an introduction to Maersk IT, and other IT M&A team-specific content. The goal was to bring newcomers up to speed as quickly as possible by introducing them to the unique approaches and terminology used by this team.

When we were first building the team we would do these onboarding sessions just to explain what M&A was and what our role in this acquisition was. That was just some very high-level stuff which came from the playbook, and

walking them throughout main goals, what we're trying to achieve. Project Manager

As 2016 came to an end, the IT M&A team felt competent and ready to take on an acquisition. At the same time, an acquisition appeared more likely. There was more talk of Maersk's ambition to acquire from the Maersk CEO as part of their new transport and logistics strategy. Based on this, the team felt it the right time to begin educating the IT organisation on acquisitions so they could begin to consider how something of this magnitude would impact them. As such, the team developed a roadshow presentation to present at different IT locations and to different departments or groups. A generic "IT integration in acquisitions" roadshow was developed, and presentations were scheduled.

Then everything changed.

At 10:06 on 1 December 2016 an email was sent from the head of IT M&A to all of IT. It read:

Email Subject: `Lightning has struck - Acquisition of Hamburg Süd`

Email content:

```
Dear all,

We have made a public announcement to the stock exchange this morning:

A.P. Møller - Maersk A/S — Maersk Line A/S to acquire Hamburg Süd[11]
```

Finally, after nearly two years of preparation, the IT M&A team was about to start its first acquisition as a team.

[11] https://www.maersk.com/news/2018/06/29/maersk-line-to-acquire-hamburg-sud

The roadshow, which had been built as a generic presentation, underwent a revision to include what was known of the acquisition of Hamburg Süd at the time. Some edits included adding the company, its locations and fleet size, and the business rationale as stated at that time. Over the following days the IT M&A team presented to the various parts of IT, all now actively listening to what was being told.

> *We were really limited as to what we could tell with them. I think the roadshows were a way for us to set the dialog to let people know as much as we could about what Hamburg Sud was, what they looked like, how things were going, what the anticipation was. I think that communicating that to the overall IT audience again it kind of helps level set the expectations it helps convey a sense of openness from the M&A team. Senior IT Manager*

In a way, the roadshow was an extension of the relationship building that had been going on all through the preparation period. However, now there was a very tangible, real objective behind it.

> *I think all that prep work we did, all the- even the roadshows around going to the rest of the IT organisations and saying here we are the M&A team when an acquisition hits this is our role, this is where we see you playing a part in this. That turned out to be hugely beneficial so that when it actually did hit, the rest of the IT organisation knew that it was us. They knew the names, they knew the people in their facilities who were the M&A people and they knew that they did not need to do anything until such time as they were engaged by one of those people. Senior IT Manager*

Due diligence began in December 2016, and the IT M&A team was actively involved. The due diligence questions prepared over the previous months were sent to Hamburg Süd, and responses

were posted to an online data room. Members of the team scoured this site for documents related to IT and farmed the information out to team members with specific areas of responsibility. The goal was to build a holistic understanding of the IT and how it supported the business Hamburg Süd operated.

> *We asked our predefined series of questions and we got back a lot more than we'd expected, they were extremely cordial and open about what they could be open about. Obviously they were also very proud of their projects, which is understandable. Business Application Landscape Manager*

During this time, the preparation work done by the IT M&A team was paying off. The playbook was followed, and the due diligence questions, templates, and reports were used. When specific subject matter experts from IT were needed, they were quickly identified from the prepared stakeholder matrix. Having these resources in place meant the team was able to start due diligence straight away and did not have to figure the process out. Considering the short amount of time available for due diligence, having these resources prepared was vital.

> *The templates we produced were useful, one of the business analysts came out with the due diligence report format. We would have wasted a lot of time on arguing about formats otherwise but it was just fill in the blanks and it sounds stupid but I'm sure everybody has been through it what sections do we need, what should we put in there, how do we format it, what font should we use, should it be the official one, what picture do we put on the front, how long should it be? Yeah when you can just pull that off the shelf and go copy/paste, copy/paste you can move quickly. Project Manager*

Some of the team who had been through the Mercosul drill earlier in the preparation felt the experience of going through that helped them to be ready for analysing the incoming due diligence data.

I think it went well that again there was some experience in doing this from before, mapping this and putting it into some structure that gives us an understanding of what we're looking at. I think putting it into some structure helped make it successful. Project Manager

Additionally, the relationship built with the strategy team throughout the preparation period was deemed beneficial. The IT M&A team had built a level of credibility with them, which allowed them to work more closely together.

Our recommendations- so where I'm seeing the benefit is they're not questioning us, our abilities or anything like that so they're treating us as serious partners so they're not dictating to us. They're just saying look I need you to do this and then what we give them they're pretty much just accepting or at least they may question a few things…

The reason it has is because we have a relationship with these guys, they understand our competencies, where they're at, they're not worried about over managing us. When we give recommendations they're taken seriously and so far we seem to have good credibility with them. I think that's because they all knew who we were and who we've been dealing with. Head of IT M&A Integration

The supposition phase finished with the clarification of both the acquisition target and the integration method. As a result of the due diligence process, Maersk identified that the value of

buying Hamburg Süd was in the difference they offered from Maersk. They offered superior customer service through processes supported by their own IT systems. Confirming this through the due diligence process invalidated the earlier assumption of the IT M&A team that they would absorb an acquired shipping container liner onto Maersk's IT. Instead this finding would guide them to follow primarily a coexistence approach, whereby systems which supported the customer value proposition of Hamburg Süd were left in place.

> *I think the repeatable process design that we had worked on had made it very clear that the desired IT acquisition approach was lift and shift to bring everything onto our estate and simply figure out how quickly we could get the acquired estate decommissioned. The due diligence process started uncovering data that showed that we were not acquiring a discount brand. On the contrary we were acquiring brand and the ownership structure of post closure we would be sitting with a brand that in the eyes of the customers is perceived as superior to Maersk Line and Maersk Line would be looked at as a discount brand. Head of Mergers & Acquisitions, IT*

Maersk made a formal offer to acquire Hamburg Süd on 14th March 2017[12], which was sent to the board of directors for approval. The offer was based on a business case that Hamburg Süd's customer base would be retained. This would be achieved by adopting a light integration approach, ensuring Hamburg Süd continued operating their business in the way it had so successfully been. This was what had made them an attractive acquisition target, and the integration was to support this.

[12] http://investor.maersk.com/news-releases/news-release-details/maersk-line-acquire-hamburg-sud-sale-and-purchase-agreement

Direction

The final preparation phase was direction. After completing due diligence and making an offer to acquire Hamburg Süd, the deal's closure required approval from the boards of both companies and 32 regulatory jurisdictions around the world. It was expected that the regulatory approvals would take six months to complete; November 1 was marked as the anticipated Day One. Until all approvals were received, Maersk could not acquire Hamburg Süd, and the two firms remained competitors. They were not allowed to share commercially sensitive information nor act as one company. However, they could begin making plans for what would happen after the deal was closed. This period was the preparation period for the integration, and IT was heavily involved. Figure 15 provides a visualisation of where this phase fit into the overall capability building process and examples of the IT resources built during this phase.

As due diligence was completed, a coordination and integration team (CIT) was set up as a formal management team to oversee the integration. A head of integration was appointed, and leaders were appointed to oversee the integration of individual functional areas. These eight "workstreams" were Commercial, HR, Operations, Fleet, Finance, Communications, Procurement, and IT. This was mirrored on the Hamburg Süd side. The manager who had overseen the development of the IT M&A team was appointed CIT lead for IT.

			Announcement ↓	Day One ↓	
Phase:	Foundation →	Speculation →	Supposition →	Direction →	Integration
Example IT resources developed during phase	• Rationalised IT estate • Recorded IT landscape	• IT M&A team • IT M&A playbook	• Critical path / core applications • IT M&A roadshow	• Integration with central integration function • Temporary agents used to expand team	

Figure 15 – Example IT resources proactively built during direction phase

With this group in place, the rationale justifying the purchase of Hamburg Süd was further clarified and articulated and in turn the integration method was stipulated. Hamburg Süd would undergo what was termed a "light touch" integration, meaning most of the company would remain separate with little, if any, integration. This was different from what the IT M&A team had been considering during its preparation and represented a scaled-back integration from the anticipated full absorption. The driver for taking this approach was to retain Hamburg Süd customers by ensuring their experience was not adversely affected. This was articulated as a key KPI for the integration team.

> *The value drive in the acquisition is customer value retention. The price that we were willing to pay is based on us being able to retain the customers and the value. If we'd had a different strategy of saying we will go in and we will standardise them to the Maersk operating model and will take an X% loss of customers and we'll bake that into the business case and it's still a smart deal the conversation could have been different. But the driver of the acquisition was the value growth and retaining the customer base. Head of Mergers & Acquisitions, IT*

However, there were also significant synergies being sought from the deal, especially in the operational areas of the companies. For these areas, the organisations had to find the best way to achieve the synergy targets. For some, this would mean moving to one set of processes and therefore to one IT system.

> *I think what I thought when they said standalone I thought it was going to be fully standalone and what we're seeing is actually there are some groups that are not- or are light touch. There are some groups fleet in particular, that it's not light at all it's actually quite heavy. So I think I thought light touch was*

going to apply across the board but now we're seeing some areas where it's heavy touch. So there's probably more of them than I thought. Head of IT M&A Integration

Aligning the business expectations and rationale for the deal with the actions taken by the workstreams would be the responsibility of the CIT and its members.

With the deepest integration occurring within the operational part, one more member was recruited to the IT M&A team. This person came from the operations area and had been working within this part of the business for over a decade. He brought with him a wealth of knowledge of how things were done in that part of the business, and actively shared that with the IT M&A team.

Knowing it was going to be an operations lead integration, we've hired somebody with internal Maersk operations knowledge. That has been hugely important for helping us to be able to decipher and understand what that business unit wants. They're talking in a language which is not English, it's very business speak and for an IT- it's almost like a non-IT person listening to IT people speak about really complex IT stuff. Senior IT Manager

After the CIT was formed, they spent time identifying what the integration rationale meant for their workstreams and in turn which integration projects they would need to carry out.

Then I was asked to look into what kind of work streams would it make sense to set up here in the operation execution scope, we sort of came up with four. We are now at 4.5, maybe 5 but I think that's one of the interesting bits is that of course you set up work streams based on how your own organisation looks. Our organisation looks in a way that you buy, sell and repair containers in

one department, you move empty containers in another department.

Integration Lead, OpsEx

Each workstream required IT to enact changes to realise their anticipated outcomes. To contribute solutions to these, the IT M&A team followed a process of partnering a team member with each workstream lead. Where possible a team member was selected for the role based on previous experience or knowledge of the area. Once assigned, they became the responsible one within the IT M&A team for the workstream. Together with the workstream leads, they would identify business requirements, which in turn became IT deliverables. These were then prioritised as a Day One, Day 30, Day 60, or Day 90+ deliverable. During this period, the IT M&A team members relied on their business analysis skills as well as on their skills in leading initiatives which had been developed during the preparation.

Our team is running around meeting with all the different work stream leads trying to capture those requirements. Some are further along than others because just they haven't had a chance to talk to their Hamburg Sud counterparts yet. But it's going, it's a work in progress. I think we have probably 115 user stories captured so far but a lot of them are probably high level, they still need to be fleshed out a bit more. Head of IT M&A Integration

At this time, the IT M&A team was too understaffed to be able to continue supporting the individual workstreams. So new staff were brought in to temporarily expand the IT M&A team during the planning and integration. A strict recruitment process was followed to ensure the right people were brought into the group. It was important that the new team members did not need to go through a lengthy onboarding process and that they could start working immediately. Therefore, the first criterion was that the temporary team members must be sourced from within Maersk. Although they would not have the acquisition knowledge the IT M&A team had built

over the preceding two years, they would bring with them a strong knowledge of Maersk and its IT and business landscapes.

> *So there's 8 work streams and only five of us so we need more people just to help sit in all the meetings, capture all the requirements. Each person on the team is handling 2-3 work streams right now and all those work streams have sub work streams, there's 30 something odd sub work streams. So just trying to keep up with all these people and just get their requirements because we need a few more bodies to do it. Head of IT M&A Integration*

A second dimension to the hiring process was having knowledge specific to the workstream they were being recruited to work on.

> *We're not just accepting anybody, we're specifically going out so if you take the HR workstream for example we've specifically gone out and looked for a BA or a PM who worked in the HR IT environment before or currently still does. Someone who is knowledgeable in that area and has been successful in that one. It's the same for all the other work streams so whether it's operations or commercial or fleet management or finance we actually are getting or we're demanding and accepting nothing other than people who have worked or currently work in those specific areas. They have the deep rooted knowledge in those application spaces and understand what the impact might be if we make a change in certain applications. They also have the network of contacts for the upstream and downstream impact. Senior IT Manager*

Once these people were identified, they were brought into the IT M&A team and onboarded using the onboarding kit developed as part of the preparations. These recruits knew their domain and knew Maersk, but coming into the acquisition context was new to them. Having the onboarding kit, especially the playbook with its explanation of what happens in an acquisition, immensely helped to quickly prepare these resources for their new roles.

> *So it was all new, so really that first month or so it was just reading as much literature as I could. The thing that I read multiple times was the playbook. So that was my baseline or starting point for what the M&A team as a whole was expected to deliver. Project Manager*

As specific deliverables became more defined in terms of the desired business effect, the IT M&A team brought in more IT specialists to help design the future IT solutions. This was a process mirrored on Hamburg Süd's side.

> *It started to take shape when we were split across the workstreams and each of the workstream received a person from our team. One was brought in to talk to the whole vessel IT stuff and there's where it started to get shaped. Those experts from specific areas they were able to ask specific questions and push this business thinking towards shaping what the actual requirement is. Project Manager*

It was not always smooth sailing in determining the requirements. As the companies began to find out more about each other and the way they operated, changes had to be made to the defined business requirements. This was more relevant in the workstreams where closer integration was expected. This impacted IT and its ability to align and develop solutions. As plans changed, they required a flexible mindset and continual dialogue with IT.

I think whenever we start talking with fleet I think they were a little bit back and forth on their decision-making a couple times. They weren't sure what they were going to go with up until probably June I would say, maybe even later. First, they were looking at basically bringing everything under DOC compliance which basically it's what the paperwork and the shipbuilding and all that comes under, the ownership under one roof. Then they were looking at letting the team basically run its own show until our own vessel modernisation project was mature enough to roll it out. That was the initial thought, that changed several times over they started talking about doing a blended model at one point. Then they ended up deciding on the Maersk way several months ago. That being said ironically it sounds like there is becoming some appetite now to keep a few of the applications that their vendor has in place in the overall suite of things but again that's to be determined. Again they haven't even decided which ones they like, which ones they want to keep. Again that blurs the lines a bit but for the most part this is going to be lift shift, shut down, we're operating under the Maersk model. Senior IT Manager

As planning continued and designs were developed, workshops were held within each workstream to further enhance the plans for integration. Deeper detail was explored to move from theoretical designs to technical solutions.

Additionally, with access to real Hamburg Süd data, the IT M&A team was able to begin using the learnings from the preparation to begin planning. Of great use were the learnings from the drill conducted late in 2016. This had been based on a fictitious company, with real data from a range of potential acquisition targets. Now the team knew specific details about Hamburg Süd, such as the number and locations of offices, the number of vessels, the number of containers and more.

With this real information, they were able to update their plans to identify how they would attack Day One connectivity solutions.

> *The output from the fire drill exercise was probably a good example of where we were able to take that, plug numbers in and actually come out with some stuff. We were able to use that to build on the day one scenarios that we saw in the offsite last week. Head of IT M&A Integration*

As the year went on, the IT M&A team, its CIT counterparts, and colleagues from Hamburg Süd worked closely together to design plans for integration which would be actioned from Day One. In early October, 29 of the 32 regulatory approvals had been received; however, it was now highly unlikely the final 3 would be received in time for the expected Day One date of November 1. So the decision was made to delay Day One until December 1. This gave the project teams some extra time to develop their plans and create more robust and reliable solutions.

Fortunately, on 28th November 2017 the final regulatory approval was given, and Day One was confirmed to be December 1. On 1 December 2017, after almost three years of preparation, development, and planning, the IT M&A team witnessed the closure of their first acquisition as a team: Maersk acquired Hamburg Süd.

This milestone date marked the end of the direction phase and the overall preparation period. From December 1 there was no longer any uncertainty or ambiguity. They were one company, there were no restrictions on what could be said to each other or planned, and the integration goal was clear. It was now time to execute on the Day One (and beyond) integration plans and deliver a successful post-acquisition IS integration.

Day One - Integration

From Day One the plans the IT M&A team and its counterparts had been working on throughout 2017 began to be enacted. They had prioritised the post-acquisition integration deliverables as Day One, Day 30, Day 60, or Day 90+ and were working towards these deadlines. As it was a light-touch integration, Day One deliverables were mostly centred around system access (especially for financial systems) and internetwork connectivity. War rooms were set up in key IT locations, including Hamburg Süd's headquarters, to support Day One rollout and provide fast response to any incidents. Starting that day, the IT M&A team set up a 24-hour watch with close support from the IT service desks to be capable of responding to any issues.

> *The whole war room situation worked, I think it worked quite well and did what it was supposed to do. Without us having been- without us putting a war room in effect the business would have been hit. Senior IT Manager*

The IT deliverables stipulated for Day One were delivered, and overall it was deemed a success. Where new services had been requested or integrations were to be in place, these had been completed. Overall, users of both companies' IS enjoyed a smooth Day One experience. Behind the scenes though, there was a lot of last-minute effort going on to bring things online.

> *No. I think from the business perspective they saw nothing but good, there was no impacts to the business if and when there were issues with users we were able to resolve those quickly. So as far as the business was concerned we had all our processes in place, we knew what we were doing. Behind the scenes in reality there was a lot of- it's almost like the analogy of the swan, the swan looks graceful above water, underneath the legs are paddling like mad to try and move it anywhere. We had a lot of people having to do a lot of different*

things and a lot of last-minute rushing around and phone calls and stuff to be able to enable that issue to be resolved as quickly as it needed to be resolved. Senior IT Manager

By 5 pm on Day One, the once separate companies' IT departments held a virtual toast to celebrate the work done together over the last half year and the joining of the firms. However, the work didn't finish there; most of the work to integrate the firms' IT lay ahead.

We were able to continue all the planning that we did throughout the summer up to day one and as soon as day one was over within a week or so of- once hyper care was over within two weeks the team then were able to go back and focus on all those day 30, 60, 90 deliverables. Senior IT Manager

An issue that appeared shortly after Day One was the realisation that the two IT service desks were not sufficiently coordinated. While preparations and agreements had been put in place for Hypercare and 24/7 support, the scope of the support had not been fully understood and as such was not resourced adequately.

We did the right things, I just think internally within IT we as an M&A team didn't maybe engage fully with the people we should have in the rest of the IT organisation or maybe we didn't engage with all of the right people. We made assumptions that the people that we were talking with were the right people. Now in fairness they didn't lead us to any other conclusion than that they were the right people but in retrospect it turns out that well this guy you needed to talk to him but he was only really owned a part of the support process there's like four other support teams that you needed to engage with. So in our naivety and our lack of understanding of that support organisation we took it

ok we have a support guy, it turns out we needed four support guys and not one. Senior IT Manager

Over the next 90 days the IT M&A team and their colleagues in Maersk IT and Hamburg Süd IT worked diligently to deliver the IT solutions set out as per the business requirements defined during 2017.

By the time March came to a close the majority had been delivered. The sales organisations, while remaining separate, had visibility to each other's activities. Procurement activities had been consolidated into a single unit. Hamburg Süd's fleet of ships were in the process of being reflagged as Maersk vessels running Maersk's version of the ship management software. The people of the combined organisation were visible and accessible to all through integrated organisational charts and calendaring and email systems. The integration was well on track and in fact many of the workstreams had been shut down as having delivered their integration objectives.

So ironically fleet management is the exception to the rule there's no light touch involved, it is a complete internal realignment. So Oetker Company, Columbus Ship Management Group which handles all basically IT work, vessel chartering, sea fares etc, they're being rolled into Maersk… So on the fleet side again it's 100 percent integration, there's no light touch involved with it… It's basically a full takeover we're going to run one IT platform, one support platform across the board. So for them it's a big change. Senior IT Manager

At this time, all efforts were focussed on the last outstanding deliverable, a massive project called the Joint Equipment Pool (JEP). The objective was to consolidate the gigantic, separate container fleets of the two firms into one single pool. This was one of the critical synergy opportunities to

come from the acquisition. It was their desire to have either brand be able to "sell" any container, irrespective of whether it was branded "Maersk" or "Hamburg Süd." It meant consolidating the full inventory of containers into one system and was by far the largest piece of integration work the IT M&A team had to deliver.

> *The requirement given to us for the operations workstream the big piece was joining the container pool and the combination of the Hamburg Sud and Maersk Line fleets into one platform to register moves. Project Manager*

Identifying a solution to this problem took many months and underwent several iterations. In the end, the final IT solution to this problem did not align with a single IS integration approach. It was a hybrid of three. It had elements of

- Absorption, in that all the containers were to be consolidated into one IT system;
- Coexistence, in that both brands' existing systems would continue to manage containers attached to their book (as was done previously); and
- Renewal, in that a new IT solution had to be developed to manage the data flow representing the containers between the two systems.

> *I would say Joint Equipment Pool is even- it's not a full integration in the sense that we- I mean it's worse than full integration. We're not only bringing all the equipment into our system and we needed our systems to cope, but we also had to take care of building new interfaces. So it's basically double complexity, you would need to take care about all the mappings, as they are separate systems talking to each other. level. Then you still have everything in there so you still need that the system handles the additional data.. Project Manager*

Originally scheduled to go live April 1, the project was delayed a month to allow time for development to ensure it was done correctly.

In the week preceding the launch of the JEP, the IT M&A team were despatched to key operations centres around the globe to facilitate a 24/7 Hypercare supporting the launch. Over the weekend of May 19th 2018, the JEP went live, and Maersk's container management system became the master record holder of all containers.

> *So on May 20th we went live with the joint equipment pool, it was able to been by end users of the Hamburg Sud and Maersk Line sides, the business processes were able to be executed. We began at that point our Hypercare phase with a large number of people around the globe, yourself included Peter. We were at that point hoping to exit Hypercare in about three weeks' time. Project Manager*

On Monday, May 21, the two brands began selling from and managing a single pool of shipping containers. While it was successfully launched, there were significant teething problems. Due to the complex rules within the container tracking system, a large spike in the number of errors occurred.

This required heightened attention from IT and equipment management specialists to diagnose and correct. Hypercare was extended for several months to manage the solution towards a stable operation.

> *The unknown of course was what would our new JEP world look like, what kind of problems would arise that we maybe didn't think of from a technical standpoint or the business didn't consider from a process standpoint? So therefore, the Hypercare period has significantly extended. Project Manager*

Despite the large error count and the longer-than-expected Hypercare period, overall the JEP was working and was deemed a success. Both brands could sell and use all containers. Furthermore, shipments continued to move, despite the errors being raised by the system.

From Day One, when Maersk acquired Hamburg Süd, the IT M&A team worked diligently to carry out their pre-acquisition plans. The effort put into building their IS integration capability and the underpinning IT resources meant they were in a strong position to be able to execute these plans. This was seen from the successful integration of the acquired company's IT following the mixed coexistence/absorption approach.

Reflection

By September 2018, the IT integration workstreams had all been closed off, and the CIT disbanded. The IT M&A team were focussing their attention on facilitating the ongoing integration of Hamburg Süd IT, specifically looking for opportunities to create advantages for the combined company, such as IT cost reduction, increased usability, and enhanced collaboration.

With the formal integration complete, the team had reached a period they knew as Functional Integration Complete. This was a term coined early in their development and referenced in the playbook as the end of the integration.

Reflecting on the whole acquisition of Hamburg Süd it was deemed a success. It was certainly easier in some areas and more challenging in others, but overall it achieved the business rationale the purchase was based on.

> *The decision base was getting synergies and retaining business, and that we've done. We have more than reached our synergy targets, and we have retained more volume than we had in the decision base. So, we are ahead of*

decision base both in volume retention and cost synergies. Head of Coordination & Integration Team

From an IT perspective the integration was a success. The IT M&A leadership were very satisfied with the result, with many commenting that it had gone better than expected. While all delivered on what was requested, there were some workstreams that were more challenging than others.

After all was done, the IT M&A team and their Hamburg Süd colleagues would reflect on what had gone well and what could be done better the next time around.

It was clear that the preparation done in the years leading up to the integration was vital to the success of the team.

Having the right tools on hand to use put them in a position to begin executing as needed and not spend time figuring out or deciding what to do at each phase of integration.

Just having the information ready at hand. So when we say due diligence what do we want to know? It would have taken us weeks to try and figure out well what do we want to know, what are our top 10 questions? That would have taken weeks to prepare, we already had that ready to go. So that in itself was a huge time saver just to have our checklist ready. Head of IT M&A Integration

Skilling the team with the right personnel with the right skill set meant the team could apply the right expertise in the right situations.

The preparation of just bringing in the right people. Someone who has actually been through acquisitions before will know, for example, that software licenses seem like a done thing but actually software license can be a

huge problem. So the regular IT person might not think that's an issue but someone who has done enough acquisitions. So getting the right skillsets in house early so people who have done IT but from an M&A perspective has been helpful. Then just having the information ready at hand. Head of IT M&A Integration

Having built the team with an understanding of acquisitions and the integration process and developing them to be capable of carrying out various tasks and roles and of owning their own workloads meant they could manage the integration.

For us we were able to go in having prepared for the previous 12-18 months in readiness for an acquisition wherever it was going to be, whenever it was going to be. We were able to go in with a playbook, with a set of- we went in with a confidence and we were able to articulate how we felt things would pan out and how things should be managed. Senior IT Manager

The time spent onboarding IT and preparing them for the acquisition and IT integration through educational programmes such as the roadshow, working on the playbook, and sharing lessons learned ensured a high degree of engagement from the right people.

I think all that prep work we did, the roadshows around going to the rest of the IT organisations and saying here we are the M&A team when an acquisition hits this is our role, this is where we see you playing a part in this. That turned out to be hugely beneficial so that when it actually did hit the rest of the IT organisation knew that it was us. They knew the names, they knew the people in their facilities who were the M&A people and they knew that

they did not need to do anything until such time as they were engaged by one of those people. Senior IT Manager

The drills executed by Maersk in the lead-up were singled out as excellent opportunities to learn what it would be like in an acquisition. The experience of going through a mock acquisition gave them valuable lessons which were useful for the real integration.

I would say my requirement gathering from Mercosul. Basically, it gave us an idea of how you even approach this when you have two organisations, when you need to get users talking to each other and agreeing with the future business processes. The concept we tried on this Mercosul thing it was- it actually kept your requirements on a high level. Then you use the capability model to map those to the applications. Otherwise no one knows everything. If you read the requirement on the face of it, you don't even know - ok where do I go with that, where does it even sit, whom do I need to talk to a lot more? In order to map those we used capability model. Project Manager

Physical templates, plans, and lists saved a great deal of time. Instead of having to figure out what information was needed or who the key people were, this knowledge was already available, ready to be used.

If we're taking that (stakeholder matrix) as an example absolutely it was helpful, of course a big piece of this as a virtual team is you dealing with people in multiple locations and multiple job roles. Especially for a new person like myself not understanding who does what was a huge challenge at the beginning. Project Manager

Some areas were identified where things could be done better next time.

The use of external resources, in the form of consultants, always left the team disappointed with the results. Consistently this was due to the lack of contextual knowledge they brought to the project. They would need to understand details on the company or the project, but without these they were not contributing as much as needed.

> *I think us having to use an outside resource who was very knowledgeable, but their level of ownership is different than someone who is internal at Maersk. I don't know if that's the case or not, that's maybe just an assumption. Knowledgeable people but in terms of engagement with us there were sometimes where it was like pulling teeth and we were having to dig for information and dig for next steps and things like that. Project Manager*

One that came up was a weakness in a particular business area. The team employed an operations specialist late in the preparation period, just before starting the Hamburg Süd planning phase. Upon reflection, this skill set would have been helpful had it been available during the preparation. Parts of the organisation were given less attention simply because the team did not know about them. Bringing this core skill set into the preparation earlier would have been beneficial.

> *When we were going through due diligence, writing the playbook and focusing the efforts we think might be needed the operations side, specifically the vessel IT side of the house we didn't delve into really deeply. We focused more on the business as a whole and we probably didn't spend as much time on the vessel tech and the operations tech as we probably could have. Senior IT Manager*

Chapter Summary

This chapter tells the story of Maersk IT and their approach to preparing for and executing acquisitions, through the words of the IT M&A team, those responsible for building the post-

acquisition IS integration capability within Maersk IT. The story explains the critical importance of preparation in building the team and their skills and developing IT resources for the use in post-acquisition IS integration. It explains how the team managed the uncertainty of not knowing either the acquisition target or the integration method during the preparation. Specifically, it shows how they guided their preparation towards the integration scenario deemed most likely at the time but made conscious efforts to ensure that other scenarios were also being prepared for. After preparation, the IT M&A team enacted the integration of Hamburg Süd and its IT. This was aligned with business workstreams to deliver projects that created value as per the deal rationale. Through post-acquisition integration, Maersk achieved its integration objectives, retained a higher-than-expected percentage of customers, and achieved cost synergy targets sooner. The completion of the integration has cemented its position as the number-one container carrier in the world[13] and has extended its product offering to a different customer base. This case shows how the correctly applied integration of Hamburg Süd helped Maersk maintain a competitive advantage over its competition. The case also clearly articulates how IT contributed to this goal and how that contribution was enabled because of the preparation of Maersk IT.

From this case, four research papers were written analysing in detail different components contributing to the successful outcome. The following chapter builds on this story by presenting these papers along with a literature review of post-acquisition IS integration.

[13] https://alphaliner.axsmarine.com/PublicTop100/, retrieved 12 September 2018

Chapter 5: Research Publications

This chapter presents the five research papers which, together with this dissertation, make up my PhD thesis. The papers have been peer-reviewed and published either in a journal or at a reputable IS conference. Each paper addresses a specific research question, which was collaboratively developed in partnership with the industrial research partner. However, these individual findings collectively provide rich answers to the two research questions this project aimed to answer. A summary of the papers, including the methods and theories applied, as well as a mapping of their contributions onto the research questions is consolidated into Table 13.

Paper	**Contribution**		**Method**	**Theory**
	RQ1:	RQ2:		
Paper "1: "A Review of Information System Integration in Mergers and Acquisitions"	Delineates the pre-existing knowledge on resources and capabilities needed for post-acquisition IS integration.	Delineates the pre-existing knowledge on how IT departments build the post-acquisition IS integration capability.	Structured literature review	Empirically induced research themes
Paper #2: "The Paradox of Post-Acquisition IS Integration Preparation"	Identifies the heterogeneity of resources and capabilities underpinning IS integration capabilities. Presents the IS integration capability as semi-distinct to acquiring organisations.	Espouses the defining tension of preparing for an unknown challenge and mechanisms by which the acquirer resolves the tension.	In-depth case study	Organisational paradoxes
Paper #3: "Building IT Resources for Post-Acquisition IS Integration in Novice Acquirers"	Develops a resource-based model of the IS integration capability.		In-depth case study	Resource-based view of the firm Empirically induced research themes
Paper #4: "Developing Acquisition IS Integration Capabilities: The Learning Processes of Novice Acquirers"		Demonstrates the relative success of the application and combination of various learning processes while building the IS integration capability.	In-depth case study	Organisational learning sequences
Paper #5: "Validating Acquisition IS Integration Readiness with Drills"		Explains how drills work to artificially verify the IS integration capability and to direct future preparatory work.	In-depth case study	Empirically grounded

Table 13 – Overview of included research publications

Paper #1: A Review of Information System Integration in Mergers & Acquisitions

This paper was published in *Journal of Information Technology* in February 2018. I am a co-author of this paper, along with Stefan Henningsson and Philip Yetton. The paper is a literature review.

> *For three decades, research has investigated the role of information systems integration in mergers and acquisitions (M&As). This research has improved our understanding of the M&A IS challenges and their solutions. However, consolidation and integration across the research is limited. To redress this omission, we review 70 articles published between 1989 and 2016. To do this, we adopt and extend the methodology developed by Lacity and her colleagues to review the empirical evidence in a fragmented IT literature. We code 53 dependent variables and 195 independent variables to identify the robust relationships among them and to model how IS Integration decisions, including the choice of IS integration methods, partially mediate the effects of the independent variables on IS Integration outcomes. Examining the relationships in this model, we identify five quasi-independent thematic domains on which we draw to develop an agenda for future research. Our contribution is the aggregation, organization and structuring of the empirical findings in the M&A IS Integration literature as a basis on which to develop a cumulative knowledge process.* (Henningsson et al. 2018)

Findings

This paper addressed the problem of fragmentation within the IS integration literature by taking the 30 years' worth of research on the matter, reviewing it, and concisely consolidating it into five emerging research themes. To do this, the paper adopted the review methodology used by Lacity and her colleagues to consolidate another fragmented IS field, consultancy (Lacity et al. 2011, 2017). They had had great success in using this method as a tool to consolidate the dependent and independent variables in this field and to understand the robust relationships between them. This same approach was adopted in this paper.

From reviewing the 70 papers on the subject, the review identified 248 variables which influenced the outcome of post-acquisition IS integration. In keeping with Lacity et al.'s (2011, 2017) approach, the number of times a variable was recorded to have significant effect was investigated, which gave a better understanding of the variable influences. However, as it was, this result did not identify any core set of relationships running through the research. This was by design; it was not the intention of Lacity et al.'s (2011, 2017) model to do so. Instead, they focussed on identifying the robust relationships between the variables. However, in the case of this paper and this need for research, we took this methodology a step further by identifying core themes running through the variables with a significant relationship. As an outcome, we identified five themes running through the literature, which grouped the variables into core sets of relationships. The five themes were:

- Theme A: The M&A context
- Theme B: Relational fit
- Theme C: The human side
- Theme D: Preconditions for IS Integration
- Theme E: Time pressures

Contribution to the thesis

This review acted as the starting point for this thesis. Firstly, it built a holistic and deep understanding of the field of post-acquisition IS integration, background research into the topic, and an understanding of the complexity of the challenge. Through developing this understanding, gaps were identified in the literature, which required academic contributions to resolve.

A key gap identified for this thesis was the lack of focus on how first-time acquirers build IS integration capabilities in preparation for their first acquisition. Many papers looked specifically at serial acquirers, looking to understand what they had learned over many acquisitions. However, throughout the texts there was no focus on those who needed to carry out their first acquisition. Understanding that this void existed was a direct result of this paper. It showed another layer to this problem as well, that there was a need for acquirers to prepare for acquisitions, to build their competency and capability before the acquisition began. This need to understand preconditions for successful post-acquisition IS integration was appropriate to investigate in the context of a firm proactively building them in anticipation of an unknown acquisition.

These research gaps contributed insights to ground the research question and sub–research questions stated in the introduction. By understanding what had been studied and the gaps in the literature, I was able to identify the need to develop descriptive and explanatory theories of the proactive capability building process.

The broad and rich findings from this paper lay the groundwork which this dissertation was subsequently built upon. They also heavily inspired the research subjects for the next four papers, contributing to the overarching research questions asked by this dissertation.

Paper #2: The Paradox of Post-Acquisition IS Integration Preparation: Preparing Under Incomplete Information

"The Paradox of Post-Acquisition IS Integration Preparation" was written by Stefan Henningsson and me and accepted to *IEEE CBI 2018*. It was written as a case study of Maersk Line's IT M&A team to understand the challenges of preparing for an unspecified and unknown acquisition and therefore for an undefined integration approach.

> *In this paper, we propose the paradox of preparation as a salient dilemma facing IT organizations in firms anticipating acquisitions or acquisition activity. The paradox of preparation originates in the need to start preparations for post-acquisition IS integration long before the legal combination is concluded, and the contradictory observation that only after the deal is concluded will it be known to the acquirer what they should have prepared for. Based on an in-depth, explorative study of how a large multi-national company prepared for an anticipated and later enacted acquisition with another large multi-national company, we develop a process theory depicting how this paradoxical tension impacts IS integration preparation activities in the period leading up to the acquisition. Initially, preparations are based on assumptions about the future challenge. As assumptions are confirmed or rejected, focus of preparation activities are recurrently revised. To handle uncertainty of assumptions, the firm actively considered the scope of possibilities and the universality of activities to manage the paradox of preparation.* (Wynne and Henningsson 2018)

Findings

Our study showed that Maersk went through four phases of preparation, each inspired by a different direction guiding the preparatory work. We termed the phases pre-acquisition, speculation, supposition, and direction. Making the difference were two conditions: first, an idea of the acquisition target, i.e., the type and size of company that was going to be bought, and second, the intended integration approach. For much of the preparation period, they were working on assumptions or drawing conclusions from some indirect instructions. This period lasted over two years and was characterised by 31 activities the IT department undertook. This study revealed how these activities were chosen, influenced by the phase they were in.

To deal with the uncertainty, the team employed three tactics. The first was the gradual uncovering of requirements (over time the IT M&A team learned more about what they needed to be doing) and how that influenced and enabled their preparation. The second was the recognition of turning points and redirection. These were major preparatory milestones punctuated by a significant shift in the team's understanding of either what would be acquired or how they would integrate them. These moments resulted in a major change in the preparation activities. The final finding was the changing relevance of the preparatory activities. That is, as understanding of what was going to happen and how it would be done unfolded, the importance of some activities increased or decreased. This was in direct response to their understanding of the likely acquisition target and the integration method.

Contribution to the thesis

This paper made two significant contributions to the thesis. The first was its definition of the paradox of preparation, a concept not before presented in the IS integration literature. In doing so it contributed an understanding of the difficulties an IT organisation faces when preparing for an

unknown event. Complementing this contribution are three findings which act as mechanisms the IT organisation can deploy to overcome or manage the tension. Together these two findings provide valuable insight into answering the second sub–research question. They provide detail on the proactive capability building process and on techniques to handle coping with not knowing what to prepare for.

Paper #3: Building IT Resources for Post-Acquisition IS Integration in Novice Acquirers

This paper was written by me and presented at the 22nd Pacific Asia Conference on Information Systems 2018 in Yokohama.

> *Despite much attention and research, mergers and acquisitions generally fail to deliver their anticipated value, and one of the main causes of failure is ineffective post-acquisition IS integration. Research into this problem, has largely over looked the challenges novice acquirers face when developing their post-acquisition IS integration capability. This paper addresses this research gap by analysing a novice acquirer's preparation through a two-and-a-half-year case study informed by 81 in-depth interviews. Applying the resource-based theory of acquisitions, the study identifies five types consisting of 28 resources the novice acquirer developed and applied during the successful IS integration of an acquired company.* (Wynne 2018)

Findings

This paper identified the IT resources that Maersk Line IT did not possess prior to proactively building their IS integration capability. Over the preparation period, they developed these IT resources, which enabled their successful post-acquisition IS integration of Hamburg Süd. A

richer understanding of the resources was created by categorising them as per Barney's (1991) three resource categories. The study developed the results further, inductively analysing them to reveal the following five resource types:

- Organisational engagement
- Information Systems management
- Learning
- Planning
- Team development

These types reveal overarching conceptual descriptions of why the resources were being developed. This also reveals the IT resource and capability deficiencies in firms without IS integration capability. These were overcome through the development of specific IT resources. The academic contribution of the paper is a resource-based model describing proactive IS integration capability building. This extends the current theoretical use of the resource-based theory of acquisitions into this new area.

Contribution to the thesis

This paper makes a significant contribution to this thesis in that it directly addresses the research gap identified by sub–research question 1: *What are the required IT resources?* These were described in detail as rich findings from this case study. Additionally, it also provides insight into how the resources were built and how they in turn influenced the ability of the IT M&A team to develop others. By presenting this discussion, the paper also provides a contribution to the second research question. Overall, the paper has developed a resource-based model of the post-acquisition IS integration proactive capability building process.

Paper #4: Developing Acquisition IS Integration Capabilities: The Learning Processes of Novice Acquirers

This paper was a solo-authored paper written by me and presented at the Australasian Conference of Information Systems in 2016.

> *An under researched, yet critical challenge of Mergers and Acquisitions (M&A), is what to do with the two organisations' information systems (IS) post-acquisition. Commonly referred to as acquisition IS integration, existing theory suggests that to integrate the information systems successfully, an acquiring company must leverage two high level capabilities: diagnosis and integration execution. Through a case study, this paper identifies how a novice acquirer develops these capabilities in anticipation of an acquisition by examining its use of learning processes. The study finds the novice acquirer applies trial and error, experimental, and vicarious learning processes, while actively avoiding improvisational learning. The results of the study contribute to the acquisition IS integration literature specifically by exploring it from a new perspective: the learning processes used by novice acquirers. Furthermore, the findings contribute several important implications for practice.* (Wynne 2016)

Findings

This paper adopts the theoretical perspective of organisational learning to analyse Maersk Line IT as they prepare for an acquisition. As opposed to looking for a holistic theory of IS integration learning, the paper uses discrete learning processes to assess Maersk's preparation through the application of a framework previously applied by Bingham and Davis (2012). This method

followed a deductive approach, taking four important and prevalent learning processes—trial and error, experimental, improvisational, and vicarious—and analysing the events a company has been through to find how these enabled their change.

The study found firms undergoing the proactive IS capability building process and actively elected to apply three of the four learning types while proactively avoiding one, improvisational learning. Through the findings, the benefits and setbacks of each of the four learning types were presented in the context of the case. Furthermore, the paper contributed insights to the types of knowledge (specific and generic) and the way these were threaded through the learning processes to teach the firm. Interesting learnings from the application of some learning processes were also discovered—for example, the identification of limitations to generic knowledge brought into the firm through vicarious knowledge.

Contribution to the thesis

This paper contributes to the overall thesis by building an understanding of how the IT organisation effectively becomes aware of what needs to be done in preparation for an acquisition. As discussed, they do not know what needs to be done, yet the IS capability must be proactively built in advance. This paper explains how the company threaded generic and specific knowledge through learning processes to learn the capability. Each learning process made a different contribution to learning the capability. It was not enough to simply apply one. In understanding this, this paper contributes to the research questions by building a better understanding of how firms proactively close the IS capability gap.

Paper #5: Validating Acquisition IS Integration Readiness with Drills

This paper was written by me and presented at the 23rd Americas Conference on Information Systems 2017 in Boston.

> *To companies, mergers and acquisitions are important strategic tools, yet they often fail to deliver their expected value. Studies have shown the integration of information systems is a significant roadblock to the realisation of acquisition benefits, and for an IT department to be ready to integrate they must begin preparations many months or years in advance. While the need for preparation is well understood, there is limited understanding as to how an IT department can become ready to acquire. This paper begins to address this gap by drawing on drills (usually associated with emergencies), to understand how an IT department can use them to validate their integration plans. The paper presents a case study of two drills used to validate an IT department's readiness to carry out acquisition IS integration, and suggests seven acquisition IS integration drill characteristics others could utilise when designing their own drills.* (Wynne 2017)

Findings

The paper assesses Maersk's use of two drills to validate the readiness of their IT M&A team after they built resources and capabilities in preparation for post-acquisition IS integration. The paper found the drills to be not only successful in validating the work that had been done but also a significant contributor in identifying limitations and areas requiring additional focus and attention. In this way, the drills were a critical tool used by Maersk during their pre-acquisition preparation. In addition to recognising their success and effective contribution, the paper draws out seven characteristics of drills. These characteristics were specific features of the drills that made them successful.

Contribution to the thesis

This paper builds upon Paper #4 by continuing that stream of research into one of the learning processes, experimental learning. It demonstrates how an IT M&A team can both learn how to do acquisitions and validate their preparation work through the application of drills. In addressing this, it builds upon the understanding of how a firm proactively closes the capability gap. The paper contributes to the understating of capability building during preparation by contributing a tool (drills) that artificially verifies post-acquisition IS integration capability and directs further preparatory activities through its findings.

Chapter Summary

Together with this dissertation, the five peer-reviewed papers presented in this chapter make up my PhD thesis. This chapter provided an overview of each of the peer-reviewed papers, outlined their individual findings, and presented their contribution to the overall thesis. Table 13 connected the papers and their findings to the two sub-research questions motivating this study. In the following chapter, these individual findings are consolidated into two sub-findings providing holistic answers to the overarching research questions.

Chapter 6: Findings

Drawing on the individual findings from the five peer-reviewed articles presented in Chapter 5, Chapter 6 presents the findings of this PhD study. The object of study was derived from the findings of Paper #1. Within Paper #1, Theme D identified the requirement for IT preconditions, a subset of unique IT resources and capabilities which enabled the post-acquisition IS integration capability. While literature has identified some of these, Paper #1 found the need for more research to describe and explain how a firm proactively builds the IS integration capability and its enabling IT resources.

Adopting this point of departure, this PhD project defined two sub–research questions to address this research gap and employed an overarching engaged scholarship approach to research to find answers. Individual papers were authored that provided individual findings, contributing to these research questions. These are presented in the previous chapter.

To provide a holistic answer from the PhD research project, this chapter consolidates the findings from the peer-reviewed articles under two sub-findings aligned with the two sub–research questions. Table 14 provides an overview of which findings from the peer-reviewed articles contribute to each of the sub-findings. It groups the findings by the research question they address, then provides a short description of each. The table continues by recognising which research papers the findings are derived from and finishes by directing the reader to where in the theoretical models, put forward in this chapter, the findings are presented.

Research Question	Finding	Description	From Paper:					Presentation
			#1	#2	#3	#4	#5	
Sub–research question 1: *What resources must a non-acquiring IT department develop to effectively deliver post-acquisition IS integration?*	F1a	Identified set of 29 IT resources proactively developed in preparation for a primary acquisition	x		x			Listed in column 1 called *IT Resources* of Table 15
	F1b	Comparison of the 29 IT resources identified in this study against those already found in literature	x		x			Presented as either *Known* or *New* in column 2 of Table 15
	F1c	Categorisation of the 29 resources following Barney's resource taxonomy of either physical, human, or organisational	x		x			Column 3 in Table 15 shows the coding of each resource as either *Physical*, *Human,* or *Organisational*
	F1d	Classification of resources into resource types which describe the post-acquisition IS integration challenge the resources are overcoming	x		x			Column four of Table 15 states coded *Resource Type.*
Sub–research question 2*: How can a first-time acquirer proactively close the IS integration capability gap in the pre-acquisition preparation phase?*	F2a	Found the dynamic capability of proactive preparation undergoes iterations as it builds the IS integration capability		x		x	x	Visualisation of the iteration of the dynamic capability is presented in Figure 16 as a loop coming from the end of the proactive preparation back to the start
	F2b	Presents the paradox of preparation: the challenge that preparation must begin well before the acquisition integration approach is defined		x				The paradox of preparation is encompassed in Figure 16 as preparation can be begun well before the announcement of what is acquired is made.
	F2c	Identification of turning points, the sensing of new information that causes reset of the dynamic capability		x		x	x	Turning points are stated in Figure 16 in three places, each time acting as an input to the sensing capacity of the dynamic capability.
	F2d	Recognition of the reprioritisation of proactive preparation activities as a response to seizing on new information		x	x	x	x	The reprioritisation of activities and the development of IT resources are shown in Figure 16 as having an effect on the opportunity being seized on influencing the resource reconfiguration capacity.
	F2e	Presentation of Maersk's purposeful selection of learning processes which thread generic and specific knowledge of IT, business, and acquisitions to learn the IS integration capability				X	x	Figure 16 shows the influence learning processes act as an input to the dynamic capability of proactive IS capability building. The various types identified in this study are included. Figure 16 also shows the knowledge sources being threaded through the learning processes.
	F2f	The use of drills as a novel means to simulate learning experiences during proactive capability building				x	x	Drills, a type of experimental learning, are shown as an input to the dynamic capability in Figure 16.
	F2g	Describes the transformation and overlap of the final stages of proactive preparation with the application of post-acquisition IS integration capability	x	x	x			By displaying the full longitudinal view of the proactive preparation process pre-inception to post-acquisition, Figure 16 shows the overlap of IS capability building with post-acquisition IS integration. This occurs after the final turning point.

Table 14 – Summary of findings

The first sub-finding answers sub–research question 1, by applying the resource-based view and specifically Barney's (1991) definition of resources to build a holistic understanding of the IT resources of acquirers. This holistic view is drawn from four findings sourced from my peer-reviewed papers. The findings are consolidated into a resource-based model of the proactive acquirer, presented as Table 15.

The second sub-finding draws on the resource-based view's extension into dynamic capabilities to present a substantive dynamic capability model as an answer to sub–research question two. This model details how Maersk proactively built its IS integration capability in advance of an acquisition. It describes how Maersk responded to the uncertainty of which acquisition integration approach was required and how they learned the IS integration capability through threading different types of knowledge through selected learning processes. The dynamic capability of proactive preparation is presented as a substantive capability model in Figure 16.

Sub-Finding 1: IT Resource-Based Model of the Proactive Acquirer

The findings from the peer-reviewed articles consolidated and presented under Sub-finding 1 provide an answer to the overarching sub–research question 1: *What IT resources must a non-acquiring IT department develop to effectively deliver post-acquisition IS integration?* Theme D in Paper #1 identified preconditions for successful IS integration. This included the need for specific IT resources. It was the aim of this research question to provide a rich description of the IT resources needed. Drawing on the theoretical perspective of the resource-based view and specifically Barney's (1991) definition of resources, this sub-finding provides an extensive, detailed description of the IT resources to be proactively built in anticipation of an acquisition. It does so by drawing on four findings derived from the submitted peer-reviewed papers. This section presents these four findings and offers rich descriptions of each. The final holistic resource-based view can be seen consolidated into Table 15.

IT Resources	Known IT Resources	Resource Category	Resource Type
IT M&A roadshow	New	Human	Type A: Organisational Engagement
Relationship with the strategy team	New	Organisational	Type A: Organisational Engagement
Relationships throughout IT	New	Organisational	Type A: Organisational Engagement
Relationships throughout Maersk	New	Organisational	Type A: Organisational Engagement
Management presentations	New	Organisational/Human	Type A: Organisational Engagement
Rationalised IT estate	New	Physical	Type B: IS Infrastructure Management
Recorded IT landscape	Known	Physical	Type B: IS Infrastructure Management
Known application adaptability	Known	Physical	Type B: IS Infrastructure Management
Critical path / core applications	New	Physical	Type B: IS Infrastructure Management
Hired acquisition experience	New	Human	Type C: Learning
Knowledge from other experiences	New	Human	Type C: Learning
Fundamentals of acquisitions	New	Human	Type C: Learning
Agreed terminology	New	Human	Type C: Learning
Data migration plan	Known	Physical	Type D: Planning
Guiding principles	New	Physical	Type D: Planning
IT M&A playbook	Known	Physical	Type D: Planning
Due diligence plan and report	Known	Physical	Type D: Planning
Communications plan	Known	Physical	Type D: Planning
Digital due diligence plan	New	Physical	Type D: Planning
Stakeholder matrix	New	Physical	Type D: Planning
Documented IT deliverables	New	Physical	Type D: Planning
Staff with different specialisations	New	Human	Type E: Team Development
Staff with variable skills	New	Human	Type E: Team Development
Expansion of team with temporary agents	Known	Human	Type E: Team Development
IT M&A team	Known	Human/Organisational	Type E: Team Development
Right-sized permanent team	Known	Organisational	Type E: Team Development
Integration with central integration function	Known	Organisational	Type E: Team Development
Aligned to integration workstreams	Known	Organisational	Type E: Team Development
Formalised onboarding programme	New	Physical	Type E: Team Development

Table 15 – Resources for post-acquisition IS integration

F1a – IT resources for post-acquisition IS integration

Sub–research question 1 asks, *What IT resources must a non-acquiring IT department develop to effectively deliver post-acquisition IS integration?* Past research has shown, this must be done proactively during a capability building period over many years (Yetton et al. 2013). This was confirmed within the case study, as Maersk built its IS integration capability over the two years preceding Day One of the Hamburg Süd acquisition. To identify the IT resources built during this period, the resource-based view was leveraged as a lens to study the development.

Through the engaged scholarship learning partnership established to research Maersk's proactive preparation, I documented the many IT resources developed during that time. Applying Barney's (1991) definition of resources and adopting the lens of the resource-based view, Paper #3 analysed this period of Maersk's IS integration capability building. The outcome of this is the documentation of 29 IT resources, built proactively in preparation for an acquisition. These 29 resources constitute the first finding F1a and are presented in the *IT Resources* column of Table 15.

This list presents a description of what IT resources must be built by a non-acquiring IT department, and therefore a sound answer to sub–research question 1. However, dissatisfied with the depth of this description, I further develop this sub-finding. The following findings build on this preliminary understanding to produce a richer understanding of the IT resources required for post-acquisition IS integration and answer to sub–research question 1.

F1b – Expanding the known IT resource requirements

To provide a richer answer to sub–research question 1, I develop the answer further by comparing the previously identified post-acquisition IS integration IT resources with those presented as F1a. Previously discussed resources were identified through a literature review undertaken as part of this project, as described in Chapter 2. Comparing what was already known to the resources

identified in F1a provides a complete understanding of the known IT resources needed for post-acquisition IS integration. This finding (F1b) is valuable because it expands the understanding of required IT resources and enriches the undertaking of those already identified.

First, it confirms those resources already identified in literature within a new setting. This confirmation increases the reliability of previous studies and demonstrates the relatedness of this one. Additionally, it adds depth to the understanding of those already recognised. For example, previous literature has recognised the importance of prioritised plans for integration (Harrell and Higgins 2002; Wijnhoven et al. 2006). F1b developed the understanding further by demonstrating that many plans are needed, how varied they are, and the different people involved in making them. By comparing the known IT resources to new ones, this finding contributes a richer description of the known IT resource base.

Second, the comparison expands the list of known IT resources required for post-acquisition IS integration by presenting 17 IT resources that have not been discussed in previous literature. This study was able to identify so many due to the first-of-its-kind, longitudinal study of an IT department proactively building its IT resources. This is a different approach from other papers, which are retrospective studies, focusing on just one IT resource that has been applied in a post-acquisition IS integration. By adopting a new view and studying a new context, this successfully identified many previously unidentified IT resources.

This comparison between what was known and what was found in this study constitutes the second finding. Appendix 4 visualises the identified relationships between the resources, linking those previously known to those found in this study. The extensive resource list in Table 15 presents this comparison as a binary state of either known or new in column 2, *Known IT Resources*.

F1c – Extending with the resource-based view

Authors of resource-based view literature have proposed different taxonomies to describe and categorise the various organisational resources. Grant (2010) categorises firm resources as tangible, intangible, or human. Barney (1991) categorises them as physical, human, or organisational. To enrich the description of the IT resources needed for post-acquisition IS integration, those identified in this project have been analysed using Barney's (1991) resource taxonomy. Definitions for these are presented in Table 16. Applying this analysis extends the understanding of post-acquisition IS integration resources by continuing the application of a prevalent theoretical lens into this study. Paper #3 includes a detailed explanation of the method followed to deductively analyse the IT resources for post-acquisition IS integration against Barney's resource types.

Resource	**Definition**
Physical	*...include the physical technology used in a firm, a firm's plant and equipment, its geographic location, and its access to raw materials.*
Human	*...include the training, experience, judgment, intelligence, relationships, and insight of individual managers and workers in a firm.*
Organisational	*...include a firm's formal reporting structure, its formal and informal planning, controlling and coordinating systems, as well as informal relations among groups within a firm and between a firm and those in its environment.*

Table 16 – Barney's (1991, p. 101) *resource categories*

Applying this taxonomy, I categorised each of the IT resources as either physical, human, or organisational. This process identified 13 physical, 10 human, and 8 organisational resources, which are presented in column 3: *Resource Category* in Table 15. Interestingly two resources were classified as both human and organisational resources. This was the case as the resources embodied the development of skills within individuals while also creating new organisational engagement models. This is aligned with Barney's (1991) definitions of human and organisational resources.

This categorisation of the 29 resources identified in this research project extends the resource-based understanding of the IS integration capability by grounding it within existing resource-based theory. This output constitutes finding (F1c). The resource categorisation for each of the 29 resources is included in Table 15 under the *Resource Category* column.

F1d – Consolidating into IT resource types

After presenting the overview of known resources in Chapter 2, I discuss the possibility of resource types. These are groupings of resources which seem to resolve an implicit problem or challenge related to post-acquisition IS integration. In Chapter 2, I present two examples, one about developing a central human resource pool and another about managing IS infrastructure. As shown by the five themes identified in the literature review of Paper #1, post-acquisition IS integration is complex with many challenging areas. With a now richer pool of identified IT resources, more could be understood about integration challenges by considering the types of IT resources being developed to solve them.

To further explain the challenges of post-acquisition IS integration I sought to understand the types of resources required. To do this, I inductively analysed the 29 IT resources built by Maersk during the engaged scholarship study. Through this analytical process I assessed the resources for

similarities in terms of the challenge or problem they were built to overcome. An explanation of this process is included in Paper #3.

This analysis identified five types of IT resources proactively built at Maersk:

- Type A: Organisational engagement
- Type B: IS Infrastructure management
- Type C: Learning
- Type D: Planning
- Type E: Team development

Column 4: *Resource Type* in Table 15 shows which of the five resource types, contributing to the post-acquisition IS integration capability, each of the IT resources are coded as. Viewing the IT resources by type sheds light on the purposes for their development, in turn highlighting the challenge or capability gap they seek to resolve. The identification of IT resource types from the identified IT resources constitutes the fourth finding (F1d) towards sub–research question 1. The IT resource type is included in.

Sub-finding 1 summary

The first sub–research question of this PhD project asks, *What IT resources must a non-acquiring IT department develop to effectively deliver post-acquisition IS integration?* Through an engaged scholarship learning partnership with Maersk as they proactively prepared for their first acquisition, this study found 29 resources they developed to enable their IS integration capability. These were first presented in the peer-reviewed papers included in Chapter 5. This chapter draws on these findings to present an overarching answer to sub–research question 1. Consolidated under the heading Sub-finding 1, the four findings F1a, F1b, F1c, and F1d contribute a holistic resource-based view of the IT resources required to develop post-acquisition IS integration capability. This

constitutes the answer to research question 1. Rich descriptions of the findings on IT resources are consolidated into Table 15.

Sub-Finding 2: Proactively Building the Post-Acquisition IS Integration Capability

To complement the understanding of what to build, the second sub–research question asks, *How can a first-time acquirer proactively close the IS integration capability gap in the pre-acquisition preparation phase?* To answer this, I submit Sub-finding 2, consisting of the following seven findings drawn from the peer-reviewed papers submitted with this dissertation.

To understand this capability building process, I draw on dynamic capabilities, an extension of the resource-based view. In doing so, I conceptualise the proactive preparation process as a dynamic capability. Dynamic capabilities recognise that a new reconfigured resource set and new opportunities for competitive advantage come through the application of the three capacity processes of sensing, seizing, and reconfiguration, as visualised in Figure 7 (Teece 2007). This definition aligns with the process of proactive IS integration capability building as found in this case. Analysing Maersk's preparation through this process creates a rich description and explanation of how a first-time acquirer closes the IS integration capability gap.

Adopting this perspective, this Sub-finding consolidates seven findings from the submitted peer-reviewed papers into a dynamic capability process. This is presented as Figure 16, a substantive dynamic capability model explaining how the proactive IS capability building process unfolds. Collectively, this explanation constitutes Sub-finding 2, which I present as my answer to sub–research question 2. Figure 16 and the seven findings contributing to it are presented next.

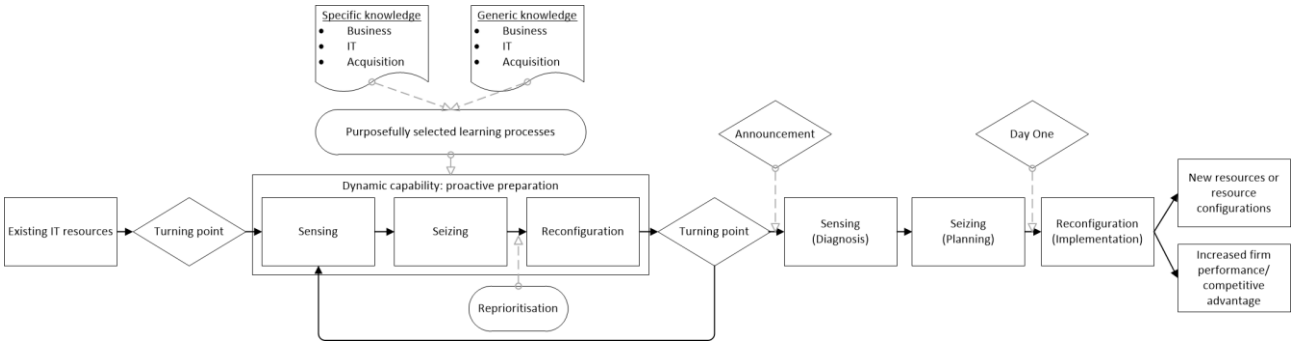

Figure 16 – Proactive IS capability building process

F2a – Iterative dynamic capability

Within the literature, dynamic capabilities are presented as a sequential flow. Their execution is preceded by a pre-existing resource makeup, they are executed through three capacities: sensing, seizing, and reconfiguration, and they result in new or reconfigured resources and a new means of competitive advantage (Teece 2007). The preparation process followed by Maersk IT began and finished in the same way; however, finding 2a (F2a) presents an alternative to the one-off, linear process.

F2a finds the dynamic capability of proactive preparation goes through a process of iteration. It finds that during the reconfiguration capacity, the IT department senses a new opportunity, which resets the dynamic capability. The case study showed how as time passed the IT M&A team sensed a renewed understanding of what would be acquired and the likely integration approach. Sensing this change triggered new preparation actions. The iterative nature of proactive preparation is visualised in Figure 16, by the loop from reconfiguration to sensing.

The case study of Maersk revealed two iterations prior to the announcement of the acquisition of Hamburg Süd. After the announcement was made, the loop was broken, and the final round of preparation began. Maersk adopted this iterative dynamic capability to respond to uncertainty caused by the phenomenon presented next, the paradox of preparation.

F2b – The paradox of proactive post-acquisition IS integration preparation

The next finding contributing to sub-finding 2 is the description of a dilemma facing IT departments that proactively prepare for post-acquisition IS integration. As discussed in Chapter 2, there are four main acquisition rationales, which rely on specific, different IS integration approaches to realise the anticipated benefits. The acquisition approaches require IT resources and capabilities as preconditions for successful integration. Finding F2b presents what we term in Paper #2 "the paradox of preparation."

Paper #2 found that the preparation process involved creating specific IT resources and capabilities for an anticipated IS integration approach. However, that specific approach was not known until the acquisition was announced, well into the preparation period. This paradox of preparation originates in the need to start preparations for post-acquisition IS integration long before the deal is announced and in the contradictory observation that only after the deal announcement will it be known to the acquirer what they should have prepared for.

As was seen in the case of Maersk, the IT department anticipated varying types of companies which could be acquired and ultimately followed an integration approach different from what IT originally foresaw. This shows the paradox of preparation as a real challenge faced during proactive preparation. This represents a risk to firms proactively building the IS integration capability. Most notably, firms could spend years building IT resources and capabilities just to enable the wrong integration approach. Fortunately, this case also produced knowledge describing how to avoid this potential problem, presented in the next findings.

F2c – Turning points

As presented in finding F2a, the proactive IS integration capability building process undergoes iterations. This iteration is a coping mechanism in response to the uncertainty brought about by the paradox of preparation. Finding F2c explains why the dynamic capability resets.

F2c is sourced from Paper #2 and finds that at times during the preparation process, critical new information is sensed by the IT department, which causes them to recognise a different understanding of the integration objective. Sensing this new information causes the IT department to seize upon the opportunity or threat. These turning points effectively set the dynamic capability of proactive preparation in a new direction.

Turning points are represented in Figure 16 as an outcome of the iterative dynamic capability building process. Each time the IT department senses new information about what will be acquired and the integration approach, the dynamic capability is reset, and a new resource configuration is developed. These are shown in the case of Maersk in Chapter 4 by the various phases the story is presented through. At the end of each section, Maersk had sensed a different understanding of who would be acquired and how they would be integrated. Based on this understanding they developed different IT resources. This represents one of two mechanisms for coping with the paradox of preparation; the second is presented next.

F2d – Reprioritisation of proactive preparation activities

F2c describes how sensing capacity responds to turning points. F2d finds the seizing capacity responds to turning points through the purposeful reprioritisation of proactive preparation activities. Upon sensing new information, the IT department seizes on activities to build IT resources deemed most appropriate for the anticipated integration approach.

Seizing on these conditions resulted in the reprioritisation of the resource reconfiguration activities being undertaken. This manifested in the case as either raising the priority of some resources, so they were developed sooner, or deprioritising some which had previously been deemed necessary. An example from the case study saw system scalability reprioritised several times during the preparation in response to how likely it was deemed that Maersk would absorb an acquired company's IT onto their own IT systems. Additionally, as it became more likely a

larger shipping company would be acquired, the degree to which the systems needed to scale was also reprioritised.

F2a states the proactive capability building process responds to uncertainty by iteratively resetting the dynamic capability. Within the iterations, the IT department reprioritised its IT resource development by seizing on the configuration it deemed most suitable for the anticipated acquisition. Within Figure 16 this reprioritisation of preparation activities is shown as a dotted line influencing the progression from sensing to reprioritisation. This symbolises that the seizing of activities to develop IT resources has occurred because of a deliberate reprioritisation process.

F2e – Threading knowledge through chosen learning processes

Together, the preceding findings describe the problem of the paradox of preparation and how the IT department manages it. While this contributes an explanation as to how the firm builds capability, it does not explain how the firm knows what to do. From this explanation it is not clear how the firm knew what to do to build a capability they did not possess. The next findings provide an explanation of how Maersk learned IS integration capability during the proactive preparation process.

Findings from Paper #4 explain how an IT department can learn how to build IS integration capability. Inspired by Bingham and Davis' (2012) analysis of learning processes used by firms undertaking first-time internationalisation programmes, Paper #4 applied a deductive analysis of the learning processes of a firm preparing for their initial acquisition. From this analysis two findings contribute an explanation of how the IT department learned to close the capability gap prior to an acquisition.

The first explains how firms proactively learn to build the IS integration capability through their purposeful selection of learning processes. As Paper #4 shows, Maersk elected to apply three of

the four learning processes that Bingham and Davis (2012) used in their study. Additionally, it reports the fourth learning process, improvisational learning, was actively avoided by Maersk. This study reveals the various ways Maersk was learning a capability it did not possess. These learning processes influenced the dynamic capability of proactive preparation by bringing in new knowledge and developing it within the context of Maersk. The effect of applying these learning processes is shown in the process model of Figure 16 as an input to the dynamic capability. Additionally, this study also found Maersk applied different types of knowledge through the learning processes; this is presented next.

The second key finding is an explanation of where the knowledge informing the learning process comes from. Maersk relied on two types of knowledge when building their post-acquisition IS integration capability. The first was generic knowledge: knowledge that is generally available to all within a field of expertise. The other was specific knowledge: knowledge contextually relevant to Maersk's unique situation.

Then, as part of building the post-acquisition IS integration capability, three categories of knowledge were applied, each coming from both generic and specific types. These were knowledge of IT, acquisitions, and Maersk's business (or shipping knowledge). Threading this knowledge provided a robust, contextually relevant understanding of what Maersk IT must do to close the capability gap. Figure 16 includes these knowledge types and their categories, showing them as inputs to the learning processes used by Maersk IT. A novel learning process, drills, made a significant contribution to capability development. The next finding presents this in detail.

F2f – Simulating learning experiences through drills

As presented in the previous findings, Maersk threaded types and categories of knowledge together through various learning processes. This developed their understanding of IS integration capability and how to build it within their organisation. One of the most beneficial and novel

approaches was their application of drills. Drills are a type of experimental learning (Bingham and Davis 2012) process, and critical to Maersk's proactive IS capability building process. No literature on IS integration has studied how firms can promote their IS integration development through simulation. As such, findings from this study describing the use of drills are new perspectives on their application and benefit.

As described in Paper #5, Maersk applied drills to validate the work they had done in building their IS integration capability. Two drills were undertaken, validating different skills and IT resources. Critical learnings were obtained from the simulated experiences. These were seized upon by the proactive preparation dynamic capability and influenced the preparation process.

Through an inductive analysis of the two drills applied by Maersk, Paper #5 identified seven characteristics of acquisition IS integration drills. These characteristics underpinned the design and execution of the drills to ensure they produced the desired learning experience. All seven characteristics are presented in Table 17.

Seven characteristics of acquisition IS integration drills
1. Tailor drills to the different phases of the acquisition IS integration project
2. Business rationale is a requirement for post–Day One IS integration planning
3. Functional acquisition IS integration drills can be derived from like experiences
4. Augment tabletop drills with realistic information to make them more functional
5. Increase the realism of the acquisition IS integration drill to increase participation
6. The right mix of IT, business, and acquisition participants and skills
7. The desired IS outcome is clear and communicated

Table 17 – Seven characteristics of acquisition IS integration drills

F2f presents a richer description of one of the learning processes applied in the case. The process model of Figure 16 shows learning processes as inputs to the proactive IS capability building process and experimental learning as one of these. Although it does not specifically show drills, these characteristics show an important practical finding, that much effort must go into designing and executing experimental learning processes. As a subset of experimental learning, drills were extremely effective in this case.

Finding F2f emphasises one of the experimental learning techniques, drills. It shows these as a novel technique to validate the efforts that have gone into proactively building IS integration capability and closing the capability gap. Drawn from the practical experiences of Maersk, they represent a vital tool for proactively closing the IS integration capability gap.

F2g – Capability transformation: from preparation to post-acquisition IS integration

The last finding (F2g) presents a description of how the period of proactive capability building transforms into, and overlaps with, post-acquisition IS integration. This study shows that capability building does not end at the announcement of an acquisition. Instead it shows the announcement as the last turning point before a final period of capability building. However, the case also showed that after this turning point the post-acquisition IS integration capability starts to be executed.

After the announcement turning point, the IT department knows both the company being acquired and the deal rationale. Now they must begin diagnosing the correct IS integration approach, the first capacity of post-acquisition IS integration capability. However, as Day One has not occurred yet, the companies are still separate entities, and no integration can happen. Only planning for integration occurs.

Based on this planning, the IT department continues its proactive IS capability building process, adding specific IT resources to support this goal. At the same time though, this planning is the planning for the actual integration. This period aligns with the seizing phase of the post-acquisition IS integration capability as it plans for the eventual reconfiguration of IT resources that will occur after Day One.

Once Day One occurs, the companies become one, and the plans that have been developed become enacted. At this time there is no more proactive preparation; it is now implementation. The post-acquisition IS integration capability implements the plans and reconfigures the IT resources of the firms.

Finding F2g is shown in Figure 16 after announcement as the final sensing and seizing capacities are overlapped with the post-acquisition IS integration terms of diagnosis, planning, and implementation. This finding extends the understanding of the post-acquisition IS integration capability as a dynamic capability by revealing its connection to proactive preparation. Previous research has not considered how these two capabilities connect. By drawing on the findings from this engaged scholarship project, this dissertation, through a process model, describes its occurrence.

Sub-finding 2 summary

Sub-finding 2 presents an overarching answer to sub–research question 2: *How can a first-time acquirer proactively close the IS integration capability gap in the pre-acquisition preparation phase?* It does so by drawing on and consolidating the findings from the five peer-reviewed articles presented in Chapter 5. From these, sub-finding 2 presents seven findings that together describe and explain how an IT department closes the IS capability gap.

It describes the iterative nature of the proactive preparation dynamic capability, brought on as a response to the paradox of preparation. The firm reacts to this new information, sensed at turning points, causing the dynamic capability to reset. In response to this, IT resource development it reprioritised. A purposely selected learning process threads generic and specific knowledge so that the IT department learns to build the IS integration capability. Finally, the sub-finding describes the transformation from proactive preparation into the concept known in literature as post-acquisition IS integration, revealing an overlap between the two processes. Taken together, these seven findings consolidated into sub-finding 2 constitute the answer to sub–research question 2.

Chapter Summary

Chapter 6 presents a consolidated view of the research findings presented in the five peer-reviewed articles submitted with this thesis. Two sub-findings are put forward, each responding to one of the sub–research questions defined for this project.

Sub-finding 1 presents a consolidated resource-based view of IS integration capability. Table 15 presents the 29 IT resources identified during Maersk's proactive capability building process. These were applied in the post-acquisition IS integration of Hamburg Süd. A rich analysis of these IT resources is provided through the four findings in sub-finding 1 to provide a detailed description.

Sub-finding 2 presents an extensive explanation of how the IT department proactively builds IS integration capability. By analysing this process as a dynamic capability, sub-finding 2 explains how the IT department iteratively repeats the process as it gains a better understanding of the IS integration challenge. This period is informed by knowledge developed through learning processes.

By aggregating the findings from each of the peer-reviewed research papers under sub-findings, this chapter provides encompassing answers to the research questions put forward in the introduction. Drawing on these findings, the next chapter discusses the contributions and implications of this research.

Chapter 7: Research Contributions and Implications

Drawing on the findings presented in the previous chapter, this chapter states the contributions made by this PhD study through this thesis. First, I state three overarching contributions of the work, which are grounded in the two sub-findings and the literature review from Paper #1. Then I build on these, by putting forward and discussing a range of implications for both academia and practice. As an engaged scholar, it was important that this study make a significant contribution to both camps. The implications are discussed with the existing literature on post-acquisition IS integration, so as to make visible where and how this work furthers this field.

Contributions

Each peer-reviewed paper submitted as part of this study presents its own unique findings and contributions to the field of post-acquisition IS integration. Abstracting from the individual papers' contributions and building on the sub-findings presented in Chapter 7, this section presents three overarching contributions of the PhD study.

Organised and structured post-acquisition IS integration literature base

Prior to this project practitioners and scholars alike had been studying the topic of post-acquisition IS integration. As presented in Paper #1, 30 years of research produced 70 peer-reviewed articles written by over 100 authors. Unfortunately, the research field suffers from a high degree of fragmentation throughout the research findings. My co-authors and I deemed this fragmentation a problem needing to be resolved as it was difficult to know the current state of the art of post-acquisition IS integration. What was known and what gaps remained were hidden among the thousands of pages. This thesis contributes to the state of knowledge on post-acquisition IS integration in two ways.

First, it addresses the fragmentation of the literature by conducting a systematic literature review of the 70 peer-reviewed articles on post-acquisition IS integration. Adhering to a rigorous process, we reviewed the findings and presented them in an aggregated and organised structure. This created a baseline understanding of the empirical findings of post-acquisition IS integration. In addition to this, we consolidated these findings into five research themes. This aggregation, organisation, and structuring of the empirical findings on post-acquisition IS integration now serves as a base on which others can build further knowledge.

In addition to consolidating the existing findings, our second contribution is the identification of an extensive series of recommendations for other researchers to pursue. Grounded in each of the five themes, we identified research gaps within the field. These findings helped to motivate this research project and provide direction others can use when defining their research projects.

Paper #1 produced a grounded understanding of the current state of the post-acquisition IS integration literature. This overarching understanding of both where the science is now and where it could go in the future constitutes the first contribution of this thesis.

The resource-based model of the post-acquisition IS integration capability

As presented in Chapter 2, acquisitions present an opportunity for firms to acquire the unique resources of other companies. To reap the benefits from transferring ownership of IT resources, an acquiring firm must possess the IS integration capability. This IS capability and its enabling resources are not found in non-acquisitive companies. Sub–research question 1 sought to identify these enabling IT resources. A description of these IT resources provides guidance to firms that must proactively build them prior to their first acquisition.

The second contribution of this study is a resource-based model of the acquisition-ready IT organisation. This holistic resource-based model is presented as Table 15. It presents a rich

description of the specific IT resources to be proactively built for use in post-acquisition IS integration. These were identified through an engaged scholarship inspired study of Maersk. This contribution is enhanced by the categorisation of the identified IT resources using a recognised resource-based taxonomy (Barney 1991). Additionally, analysis of these findings identified resource types. These provide insights to the problems or challenges the IT resources were developed to overcome.

This contribution is a rich, detailed resource-based view of the IT department, specifically focussing on the IT resources they must build for the purpose of post-acquisition IS integration.

Substantive dynamic capability model of post-acquisition IS integration preparation

The third contribution of this dissertation is a substantive dynamic capability model of the post-acquisition IS integration preparation process. This is drawn from a synthesis of the empirical results gathered in the case study of Maersk and the theoretical frame of dynamic capabilities. This process model explains the process a non-acquiring firm's IT department goes through to build its IS integration capability and is presented as Figure 16. The presentation of this substantive dynamic capability model of the post-acquisition IS preparation process constitutes the answer to sub–research question 2.

The model shows the proactive preparation process began prior to any acquisition being considered. The first capacity, sensing, was deployed when IT first identified the need to begin preparing for an unknown future acquisition event. Critically the model addresses how IT responds to this uncertainty, termed "the paradox of preparation." The preparation dynamic capability controls for this by adopting an iterative approach as opposed to the linear model dynamic capabilities normally take. The sensing capacity is constantly monitoring for critical information, which, through turning points, causes the preparation process to reset and reprioritise

the reconfiguration of IT resources. This continues until an acquisition and its deal rationale is announced.

This process of building the IS capability while responding to the increasing understanding of what the acquisition will be is presented in the model. It reveals how the gradual uncovering of the requirements for post-acquisition IS integration within the context of the specific, yet unknown future acquisition impacts the proactive preparation period. This is developed through an iterative dynamic capability which reconfigures the IT resources so as to be capable of carrying out post-acquisition IS integration.

Academic Implications

This section presents the implications of this research project for academia. Three broad implications are presented and discussed within the context of the relevant literature. Building on the foundation laid by the literature review written in Paper #2, this dissertation enriches the understanding of post-acquisition IS integration, especially in the context of the preconditions required for success. It takes Paper #1's Theme D as a point of departure and describes and explains how preconditions are managed through proactive preparation. Three implications covering this topic are discussed next.

Setting a foundation

After 30 years of research, it was timely to produce a consolidated view of the complete research on post-acquisition IS integration. Findings from the last 30 years of research were fragmented, with little consolidation and integration among the works. Previous studies had recognised the need for consolidation and called for it (Hedman and Sarker 2015; Henningsson and Carlsson 2011). In recent years, others have performed focussed reviews of the literature, but none as extensive as the one submitted as Paper #1. The extensive, holistic review done as part of this

dissertation supersedes other reviews on the topic to lay the research foundation for post-acquisition IS integration in 2018.

Toppenberg and Henningsson (2014) undertook a preliminary review of the post-acquisition IS integration literature, identifying 48 articles on the subject (22 fewer than those reviewed in Paper #1, although it was completed four years prior). Their review recognised the lack of theoretical consolidation among the researches and organised the articles by their theoretical contribution. This produced a fundamental overview of the theoretical standing of the knowledge on post-acquisition IS integration and highlighted the need for a richer, fuller analysis. The findings from Paper #1 extend this understanding. First, Paper #1 reviewed a broader range of literature than Toppenberg and Henningsson (2014). Second, it went further by going beyond the first step of analysing the theoretical contribution. Our paper presented a consolidated view of the theoretical application throughout the post-acquisition IS integration literature and built on that by first identifying the known variables within these texts and then abstracting those to five research themes. In doing this we built a richer and fuller understanding of the field of post-acquisition IS integration.

A second review, this one by Henningsson and Kettinger (2016a), analysed 62 published case studies on post-acquisition IS integration. This is a significantly different review from Paper #1 as it is based solely on cases described in the literature rather than all articles and associated findings. Drawing on a configuration perspective, their review identified nine causal configurations that lead to deficiencies in post-acquisition IS integration. Building on those, they then looked at successful cases to identify approaches to avoiding such problems. Their review substantially differs from the one submitted as Paper #1. It focusses only on case studies and only reviews for configurations that contribute to outcomes. In comparison, our review is a holistic look at all known variables across the full literature on post-acquisition IS integration. We

recognise configuration as one variable of many that influence successful post-acquisition IS integration.

That there are current reviews suggests the time is right for a consolidated view of the last 30 years of literature. However, while both reviews make a significant contribution, they both have a more narrowly defined purpose than the review in Paper #1. By making such a narrow contribution, there was a large pool of literature and findings not covered by these works. The need for a broader, holistic understanding of the fragmented literature persisted and was resolved by Paper #1.

The practical need for a review can be seen in recent work on the subject. For example, Benitez et al. (2018) and Du (2015) both claim that academic research into the role of IT in M&A has been limited. Our literature review revealed that extensive effort has been made by many researchers to understand post-acquisition IS integration. Benitez et al. (2018) present a flexible IT infrastructure as one of the few known findings that explain how IT contributes to business value from acquisitions. Our review presents a holistic view of all the known variables and their influence over successful post-acquisition IS integration. We recognise a flexible IT infrastructure alongside other findings, such as IT standardisation and enterprise architecture, and their robust relationship towards the success of post-acquisition IS integration.

While we also concluded that more research on IS integration is needed, Paper #1 makes that claim by understanding all that is known and by providing direction. Our analysis identified research gaps and posed potential research questions. These outcomes of the paper help to ground future researchers so they may study areas requiring attention. Instead of blindly stating research into IT in acquisitions is limited, researchers can ground their justifications in our extensive analysis of where research gaps currently exist.

Extending the resource-based view

Past literature has identified the criticality of the post-acquisition IS integration capability (Merali and McKiernan 1993; Tanriverdi and Uysal 2011) and the need for acquirers to possess unique IT resources to enable it (Benitez et al. 2018; Du 2015; Toppenberg et al. 2015). These constitute IT resource preconditions as defined in Paper #1. However, as discussed in Chapter 2, there is limited understanding of what these enabling IT resources are. This paper extends the academic understanding of these enabling resources by specifically researching the case of how non-acquiring firms' IT departments proactively prepare for their first acquisition. The contribution of this study has two key implications for academia. First, it extends the understanding of the known IT resources which must be built proactively in advance of an acquisition. Second, it confirms and develops the understanding of IT resources already discussed in the literature. This section relates these findings to the previous literature on IT resources as preconditions for IS integration.

As revealed by the literature review in Paper #1, a core group of articles have adopted the theoretical perspective of the resource-based view to identify and explain how specific IT resources contribute to acquisition success. Paper #1 identified these as preconditions for success. Generally, these papers present a single IT resource, such as IT infrastructure flexibility (Benitez et al. 2018), IT standardisation (Du 2015), or enterprise architecture (Toppenberg et al. 2015). As such, there is a long list of papers, presenting just one IT resource. The exception to this is Yetton et al. (2013), who inductively identified five resources from a single-case study. Many of them adopt the resource-based view as the theoretical lens.

This thesis contributes a significant leap forward in the understanding of the specific IT resources needed for post-acquisition IS integration. It does this by providing a holistic list of IT resources a firm developed in anticipation of their first, albeit unknown, acquisition. This perspective is a

departure from that taken by previous studies, which investigate how a specific resource contributed to past integrations.

The case study of Maersk revealed 29 IT resources were built in preparation for their first acquisition. This list was developed further by comparing it to those already known, categorising it with Barney's (1991) taxonomy of resources, and inductively identifying resource types. This complete list of IT resources developed by Maersk constitutes an extension of the resource-based understanding of the IT preconditions needed for successful post-acquisition IS integration. This understanding not only identified new IT resources but also enriched the understanding of some previously known ones.

Jain and Ramesh (2015) identified the critical role human resources have as boundary spanners in acquisition integration projects. They gain management support and nurture the understanding and willingness of stakeholders to participate. Adopting resource-based view terminology, this deliberate boundary spanning represents an organisational resource (Barney 1991). As seen in the case of Maersk, while IS integration capability was proactively built, similar organisational resources were developed. This was purposely achieved through the creation of several core boundary spanning relationships. There were relationships with IT to build partnerships, relationships with management to gain legitimacy, and relationships with the strategy team to gain early insight into acquisitions. As a specific acquisition came closer, new IT organisation resources, such as joining a larger team, were established to span new boundaries. This study builds on Jain and Ramesh's (2015) work by reinforcing the necessity of the boundary spanning role and developing the concept further. It is characterised as an organisational resource, but there is not just one organisational resource. In the case of building capability, the IT department must proactively build many boundary spanning relationships between different groups and continue building them as preparation evolves.

Another instance where this study builds upon known IT resources is the understanding of how human resources contribute the knowledge needed to build IS integration capability. Previous research has identified consultants as a contributing source of best practice knowledge, that can be leveraged to build the post-acquisition IS integration capability (Henningsson and Øhrgaard 2016). During preparation, consultants can contribute as *brain* resources, where they advise the firm on how to build the IS integration capability. For non-experienced acquirers, consultants can advise on and manage the integration process (Henningsson and Kettinger 2016b). The case of Maersk showed limitations to this approach, as consultants hired for this purpose did not have adequate understanding of the company specific to the context in which they were working. Instead, Maersk found it best to recruit acquisition specialists and train them in understanding Maersk and Maersk's IT systems. Hiring external expertise presents an alternative means to source the acquisition expertise needed to build the IS integration capability.

Additionally, at a time when more manpower was needed as a specific integration plan was being designed in preparation of execution, internal staff were temporarily brought in to skill up the IT M&A team. The leadership made a purposeful decision to hire internally, as opposed to bringing in *muscle* or *craft resources* (Henningsson and Øhrgaard 2016), because they had the understanding of Maersk and specific Maersk IT systems. At this point of the acquisition, these were deemed key pieces of knowledge to have, and the choice was explicitly made to not hire externally. This supports other recommendations from the literature of using internal staff for acquisitions and backfilling day-to-day operations work with consultants (Robbins and Stylianou 1999; Yetton et al. 2013). However, bringing in staff not familiar with acquisitions presents a challenge. As shown in the case, a core resource is the development of a foundational understanding of acquisitions. This was needed by members of the team to work within the specific project. To overcome the missing acquisition knowledge an onboarding package was

developed during the proactive preparation that would quickly provide a foundational understanding of acquisitions to new team members. This was a novel approach to solving a problem not previously identified or discussed in the literature.

The dynamic capability of proactive IS capability building

Existing literature warns of the dangers of not being ready for acquisitions by the time an announcement is made (Henningsson and Kettinger 2016a; Yetton et al. 2013). To be ready, IT departments must build their post-acquisition IS integration dynamic capability in advance of an acquisition (Benitez-Amado and Ray 2012; Tanriverdi and Uysal 2011). This study corroborates existing research that has found that the capability does not exist in non-acquiring firms and that it takes a long time to develop.

Although the capability is discussed in the literature, research does not explain how it is built in advance of a first acquisition. Articles discussing the capability generally either assume its existence or describe its development through a process of reactive learning derived from its previous application (Henningsson 2015). This study extends the understanding of post-acquisition IS integration capability by presenting the proactive capability building process as a dynamic capability which explains how firms prepare for their first acquisition.

This paper looked at how the first iteration of this knowledge can be learned proactively prior to an acquisition. It showed how the IT department of Maersk engaged in the purposeful selection of specific learning processes to figure out how to close the capability gap. Building on the work of Bingham and Davis (2012), it recognises that firms use a mixture of learning processes and that they purposely select ones useful to their situation. This is contrary to other literature that explains learning how to acquire as a reactive process, based on the experiences of past acquisitions (Henningsson 2015; Zollo and Singh 2004).

An effective learning process, as demonstrated by Maersk, is experimental learning (Bingham and Davis 2012; Cook and Campbell 1979). Maersk executed two drills to simulate the learning experiences of repeat acquirers. By executing specific and realistic drills, non-acquiring firms can simulate experiences similar to acquisitions and adopt the learning outcomes into their proactive preparation. This is a new direction for research into IS integration capability building. No studies have explored learning through drills. Additionally, due to the realism of drills, this technique could act as a bridge between the literature on reactive learning and that on proactive preparation.

A core characteristic of the proactive preparation process, identified in this study, is the iterative nature of the dynamic capability. This is shown in the substantive model in Figure 16. In terms of understanding dynamic capabilities, this represents a departure from process as described previously in literature. Teece (2007) describes a dynamic capability as a linear process made of three progressive capacities: sensing, seizing, and reconfiguring. The process completes with a reconfigured resource pool and the enablement of new strategic opportunities. This study found a different flow. The dynamic capability of proactive preparation differs by iteratively looping back on itself. Instead of being a single linear process, when critical new knowledge arrives, turning points are enacted and the dynamic capability resets. This is likely due to the unfolding understanding of the opportunity the capability is reacting to. As an acquisition becomes known, the prioritisation of resource reconfiguration is adapted. Showing this iteration challenges the academic understanding of the linear flow of a dynamic capability.

This study also has implications towards the understanding of what the post-acquisition IS integration capability is. Tanriverdi and Uysal (2011) find that acquirers with a strong post-acquisition IS integration capability are perceived as better acquirers by the market and therefore considered more likely to succeed in realising IT-enabled acquisition value. Although they recognise a difference in types of acquisitions, they treat the integration capability as one

capability. Similarly, in their finding that IT infrastructure flexibility enables the development of the post-acquisition IS integration capability, Benitez et al. (2018) present it as a single capability. In response to changes in the anticipated acquisition and integration approach, Maersk reprioritised its capability building efforts. This suggests that there is not just one capability, but many which are suited for different situations. This could have an impact on past research. Scholars such as Tanriverdi and Uysal (2011) may need to reassess their findings to look for evidence of different capabilities.

This study has discussed the risk of not having IS integration capability in place prior to an acquisition. However, another risk acquirers face comes from a willingness to replace the acquisition's IT via an absorption strategy (Henningsson and Carlsson 2011). The threat of acquirers simply imposing their IT onto a target, with little regard to consequences, is a real threat to acquisition value (Mehta and Hirschheim 2007). Potentially better IT systems and their enabling business processes can be lost. This concerns shareholders and is visible in market reactions to acquisition announcements (Tanriverdi and Uysal 2015).

In the case of Maersk, an early guiding principle was to replace the target's IT with their own. However, this case revealed how the proactive preparation of Maersk matured their understanding of acquisition integration, leading them to conclude that their original premise was not necessarily the best approach. In particular, their experience from executing an early drill, designed as a simulated absorption, revealed how they would potentially destroy the value of their acquisition target if they simply moved them onto their systems. This study highlights the real risk of electing to incorrectly follow an absorption integration (Henningsson and Carlsson 2011; Mehta and Hirschheim 2007; Tanriverdi and Uysal 2015). However, it contributes to this understanding by first providing an explanation as to why companies may consider this the right approach and then offering a technique for changing this mindset.

Practical Implications

As an industrial PhD fellow studying through an engaged scholarship learning partnership, it was important to develop useful practical contributions for other first-time acquirers. As outcomes from my papers and my overall research project, I present four contributions to practice from this study. It is hoped that others can adopt these practices when proactively developing their own post-acquisition IS integration capability.

Presentation of Maersk as an exemplar case

The first contribution to practice is the case as a whole and the effort and prioritisation that Maersk put into building their IS integration capability. They followed the recommendations of research to begin preparing their IT organisation well in advance of an acquisition. This paid off in the form of a successful post-acquisition integration of Hamburg Süd. It is important to pause and recognise this. All the success created by the IT resources and capabilities they put in place came about following the opportunity to prepare well in advance. Of course, challenges arose as the acquisition unfolded. However, due to the time spent preparing, building knowledge, designing plans, and proactively building IT resources and capabilities, they were well positioned to handle unforeseen challenges. The time afforded to IT to proactively build the IS integration capability through the IT M&A team and the activities they undertook to build their IT resources serve as an exemplar case for others to follow.

Rich description of what to build

A primary motivation of this research was to understand what IT resources should be built in anticipation of an acquisition to enable the IS integration capability. By applying the resource-based view, this research identified 29 resources, which were categorised as physical, human, or organisational. This is a significant contribution to practice as it describes the IT resources which need to be in place for acquisitions. This provides a guide that other practitioners can follow as

they begin proactively preparing their IT department for post-acquisition IS integration. Additionally, the amount of time needed for building these IT resources was again demonstrated in this case. This should be seen as yet another call to action for CIOs to begin developing acquisition IS integration capability well before an acquisition is announced.

Explanation on how to build

How to proactively close the IS integration capability gap is an important question for practitioners faced with this challenge. Without building on the experiences of recent, previous integrations, firms lack an understanding of what they should do to prepare. This study revealed two key contributions by explaining how IT departments proactively build their IS integration capability. First it revealed the tension faced by firms having to prepare well in advance for an acquisition that is not yet defined. This paradox of preparation presents the uncertain challenge IT departments must deal with. Fortunately, this study provided an explanation on how to do this. By reacting to critical new information and reprioritising IT resource development, the IT department can work towards what the most likely integration approach is. This allows for the gradual development of IT resources and avoids overcommitting to an unconfirmed approach. The second contribution was by explaining how firms learn to build an unknown capability. This focussed around the purposeful selection of learning processes that suit the specific learning environment. Through these learning processes generic and specific knowledge of acquisitions, IT, and the business were combined to produce the IS integration capability suitable for the specific firm. This study's explanation of how the firm proactively closes the IS integration capability gap by carefully responding to the paradox of preparation and threading knowledge through learning processes is a valuable contribution to practitioners faced with doing this in their own organisation.

Validating preparation with drills

A novel finding to come from this study is an understanding of how Maersk used drills to validate their plans for post-acquisition IT integration. This was a truly unique approach that had not been documented before. Paper #5 makes a strong contribution to practice not only by demonstrating the benefits of the drills but also by offering rich descriptions of the features of the drills which made them so successful. These IS integration drill characteristics can be used as the basis for designing useful drills for validating the proactive capability building process. As literature shows, the best acquirers hone their capability over many acquisitions. For companies preparing in advance of an acquisition, this is not an option as they build their capabilities from scratch. Drills offer a unique opportunity to validate the preconditions that enable the IS integration capabilities in a near real-life experiment. In doing so, they simulate the effects of an acquisition, making a significant contribution to proactive capability development.

Chapter Summary

Based on the consolidated findings presented in Chapter 7, this chapter presents a discussion centred on the contributions of the research and its implications. Three key contributions were made. First, the research organised and structured the understanding of post-acquisition IS integration, setting a point of departure for this and future research. Second, it contributed to the overall resource-based understanding of the preconditions for successful IS integration. It also extended that understanding into a previously unresearched area, of the proactive IS capability building process. Finally, the inclusion of a substantive dynamic capability process model provides a rich explanation of how firms in this situation should proactively close the IS integration capability gap. Following the presentation of the contributions of the research, implications for academia and practice are presented and discussed. The presentation of a

discussion of the research and its implications is the final contribution of this dissertation. The next chapter summarises and concludes the study.

Chapter 8: Conclusion

This dissertation is presented as the conclusion to a three-year study into how firms proactively prepare for their first post-acquisition IS integration by building specific IT resources and capabilities. The study was inspired by the significant challenge faced by organisations when executing post-acquisition IS integration, as reported by both practice and academia. Through the Danish Industrial PhD Programme, a learning partnership was established between the researcher and Maersk with the aim of developing theories of description and explanation which supported Maersk's proactive capability building process.

This research project was grounded within the state-of-the-art knowledge on post-acquisition IS integration as a result of the systematic literature review completed for Paper #1. This paper contributed a base understanding of this topic, which this project built upon. This base also serves as a point of departure for other IS scholars. From this review, it was identified that firms must develop specific IT resources and capabilities as preconditions for successful integration. However, no research had focussed on explaining how firms build these in preparation for their first acquisition. Based on what was and was not known, an overarching research question was derived. To answer it, it was broken into two sub–research questions, which this PhD study addressed.

To build descriptive and explanatory mid-range theories of this phenomenon, this study adopted an overarching engaged scholarship approach to research (Gregor 2006; Van de Ven 2007). This choice of approach formalised the learning partnership between the researcher and Maersk. Informing the research was a single-case study of this firm as they proactively built their IS integration capability in anticipation of an unknown acquisition. This represents the first time an in-depth, real-time study of this complex phenomenon has been performed and reported in academic literature.

From the single-case study of Maersk, four peer-reviewed research papers were written and published. This dissertation combines the findings of these papers through the theory of the resource-based view and its extension into dynamic capabilities. Through this aggregation, this dissertation presents 11 findings, a resource-based model of the acquirer (presented as Table 15), and a dynamic capability model of proactive IS capability building (presented as Figure 16) as answers to the sub–research questions inspiring this study. Taken together, they provide descriptive and explanatory answers to the overarching research question:

How does the IT department of a non-acquiring firm proactively develop the critical post-acquisition IS integration capability in anticipation of an acquisition?

It does this by presenting two conceptual models. The first, presented in Table 15, is a resource-based view of post-acquisition IS integration capability. This was derived by observing the IT resources the case company developed specifically for post-acquisition IS integration. Additionally, by conceptualising the preparation as a dynamic capability, this dissertation presented a substantive dynamic capability model (Figure 16) describing and explaining the firm's capability development process.

Each paper makes contributions to academic and practitioner understanding of the phenomenon, as does this dissertation at an overarching level. It extends the understanding of post-acquisition IS integration by studying this new phenomenon, proactive capability building, through the lens of the resource-based view. Additionally, practitioners benefit from the resource-based view describing what IT resources they should proactively build and from an explanatory dynamic capability model of how to do this.

Along with the many contributions, this research has also helped to develop the agenda for future research into post-acquisition IS integration. A significant number of recommendations were

identified and presented along with the five research themes developed in Paper #1. Each theme contained recommendations for future research related to its core concepts, findings, and variables.

Additionally, the results of this overarching study create additional research opportunities. As a single-case study and the first focussing on the proactive IS capability building process, it would be pertinent for other researchers to also study this process. Additional learnings could come from studying what IT resources similar and dissimilar companies build in anticipation of acquisitions. Additionally, the understanding of *how* companies proactively build the IS integration capability could be confirmed or improved by studying those anticipating differently than Maersk. For example, companies that anticipate the acquisition rationale would be business improvement and innovation or strategic renewal could offer complementary insights to this case. Also, more could be learned about the development process of firms anticipating they will follow a best-of-breed or renewal IS integration approach. Finally, this project studies firms undertaking acquisitions, not mergers. Comparing the preparatory process of firms anticipating a merger would help expand into the broader M&A literature.

Boundary Conditions, Generalisability, and Limitations of the Research

As final remarks to the study, this section aims to provide transparency to the limitations of this research while positioning it in terms of both boundary conditions and generalisability.

There were several key boundary conditions which defined this case. First, the work going on in the case, the preparation, was being carried out proactively for an unknown event. It was not until the acquisition of Hamburg Süd was announced that Maersk IT knew who they were acquiring and how they were to be integrated. This preparation in the face of the unknown was a core characteristic of the work being done as the object of study.

Another boundary condition was the organisation's being afforded the opportunity to proactively build its IS integration capability. Unfortunately, IT is often the last to find out about an acquisition (Curtis and Chanmugam 2005; Wübben 2007), and if IT lacks leadership with the foresight to see acquisitions as likely happening in the future, then the opportunity to proactively build the capability will be lost. This situation could also occur if the opportunity to acquire came unexpectedly or with a short deadline. For example, if a sudden market event caused a firm to want to divest some part and they offered a sale with a short deadline, the years afforded for preparation in the current case would not be available.

Finally, this case is grounded in the boundary condition that the firm *does* proactively build the capability. It is not enough that the firm is aware of the need to build the capability; they must begin building it far in advance. Maersk did this, allowing them to develop the required IT resources. To apply these findings to other cases, these boundary conditions must also be met.

It is often thought that the findings of single-case studies cannot be generalised; however, this is not the case (Shanks 2002; Yin 2009). By structuring the study and applying a strong theoretical lens, a single-case study can offer a point of departure towards analytical generalisation (Yin 2009). Theoretical lenses were used in the case study based, peer-reviewed papers, and this dissertation adopts the well-respected perspective of the resource-based view. Future studies can build on this foundation to work towards analytical generalisability.

In addition to this, the findings of this dissertation can be generalised and applied to other practically similar situations. Companies fitting the boundary conditions described and facing the same situation as Maersk can adopt the generalised findings. They can take the findings of this study and apply them to the proactive capability building process within their IT departments.

As in any study, limitations apply to the findings. Each submitted paper presents and discusses the individual limitations within them. Additionally, some apply to the study as a whole.

Most notably, this is a single-case study, and the findings are derived from the individual case's context. The nuances of this case may be different from those of others. A large European transport and logistics company is obviously different from a small Southeast Asian farming firm. These nuances must be discovered and resolved through additional research.

The study is also limited by the focus of the firm during preparations and the eventual post-acquisition IS integration. Despite the uncertainty of who would be acquired and what would be done with them, Maersk IT's identification of the likely acquisition case was close to what was done. As described, they started by believing they would acquire many small shipping companies and absorb them. They ended up acquiring a large one and following a mostly coexistence approach with some absorption. The starting point and finishing point were not so far apart. It was not as if they had ended up buying a completely different business and following a renewal strategy. This accuracy in planning may represent a limitation over the findings, especially in the IT resources needed for post-acquisition IS integration. Again, this highlights the need for additional studies of IT departments proactively building their IS integration capability.

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Appendix

Appendix 1 – IT Resources: Literature Review Protocol

This appendix describes the interview protocol applied when conducting a preliminary literature review to identify known IT resources used in post-acquisition IS integration. It follows the method prescribed by Randolph (2009) to ensure an outcome aligned with the intended goal.

Article selection

Four search criteria framed the paper solicitation:

1. Peer-reviewed articles in high-quality outlets
2. Only articles in English
3. No “earliest date” limit was applied
4. In the case of republished studies, only the most recent was to be retained

The contents of three major reference databases (Springer, Business Source Complete, and ScienceDirect) were searched using the search term (or a slight variation of):

("Information Technology" OR "Information Systems") AND Integrat AND (Merger OR Acquisition)*

The initial search returned 931 articles. The title and abstract were screened to determine if they were indeed about post-acquisition IT integration. This search revealed 51 articles meeting the search criteria. Following that, a reverse search using Scopus was conducted, starting with the oldest article and anything that cited it. This returned a total of 697 papers, and after removing duplicates and those that did not match the criteria, a total of 152 articles were returned. After reviewing the title and abstract, 10 were deemed worthy of inclusion in the review. The search of the four databases resulted in 61 articles to be read. Finally, after reading the full articles, an

additional 23 were deemed inappropriate to be included as articles in the review. This left a total of 38 articles to be included in the coding exercise.

Article coding

The first round of coding identified resources mentioned as conducive to acquisition IT integration in the selected articles. Coding was done using Glaser and Strauss's (1967) constant comparison method. Once a resource was identified, as per the constant comparison method, it was compared against the existing codes to see whether it matched an existing one. If it did, the incident was coded the same way. If it did not, a new code was created that best described that incident. Upon completion of the coding exercise, a total of 13 resources had been identified from the 38 papers.

A deductive round of analysis was then done to code the identified resources using Barney's (1991) resource taxonomy. Thus, the 13 resources were coded as:

- 7 – Physical
- 3 – Human
- 3 – Organisational

Appendix 2 – Interviews

Interview Stages	Date	Position	Length
Learning from Maersk's past	02/03/2016	Delivery Manager - E-business	01:04:19
	07/03/2016	Programme Manager	00:49:12
	07/03/2016	Head of Professional Services	01:14:02
	07/03/2016	Programme Manager	00:49:17
	08/03/2016	Delivery Manager - Operations	00:53:45
	09/03/2016	Project Manager - Online	00:47:43
	11/03/2016	Production Services Manager	00:54:46
	11/03/2016	Application Manager	00:57:58
	25/05/2016	Business Analyst	00:38:08
Proactively building IT resources and the IS integration capability	16/02/2016	Head of EA & M&A	01:15:11
	24/02/2016	Head of EA & M&A	01:08:54
	26/02/2016	Project Manager	01:01:10
	29/07/2016	Senior IT Manager	00:37:00
	29/07/2016	Business Analyst	00:56:22
	01/08/2016	Business Analyst	00:39:19
	01/08/2016	Business Analyst	00:45:08
	09/08/2016	Technical Analyst	00:34:45
	22/08/2016	Technical Analyst	00:57:41
	01/09/2016	Project Manager	00:51:32
	22/11/2016	M&A Technical Analyst	01:05:45
	23/11/2016	IT M&A Team	00:57:52
	12/01/2017	CIO	00:53:02
	17/01/2017	Head of Mergers & Acquisitions, IT	00:27:56
Validating readiness with drills	30/01/2017	Head of UCC	00:54:32
	30/01/2017	Business Analyst	00:35:52
	30/01/2017	M&A Technical Analyst	00:49:04
	31/01/2017	Head of On-Site Infrastructure Support	00:47:14
	31/01/2017	Demand Manager	00:27:44
	02/02/2017	Project Manager	00:50:04
	15/02/2017	Head of Infrastructure Architecture and Strategy	00:38:50
Due diligence	13/03/2017	Business Analyst	00:24:02
	13/03/2017	Business Analyst	00:25:04
	14/03/2017	Business Application Landscape Manager	00:20:09
	14/03/2017	Technical Analyst	00:28:51
	15/03/2017	Chief Legal Counsel (IT)	00:22:38
	15/03/2017	Project Manager	00:46:40
	15/03/2017	M&A Technical Analyst	00:26:36

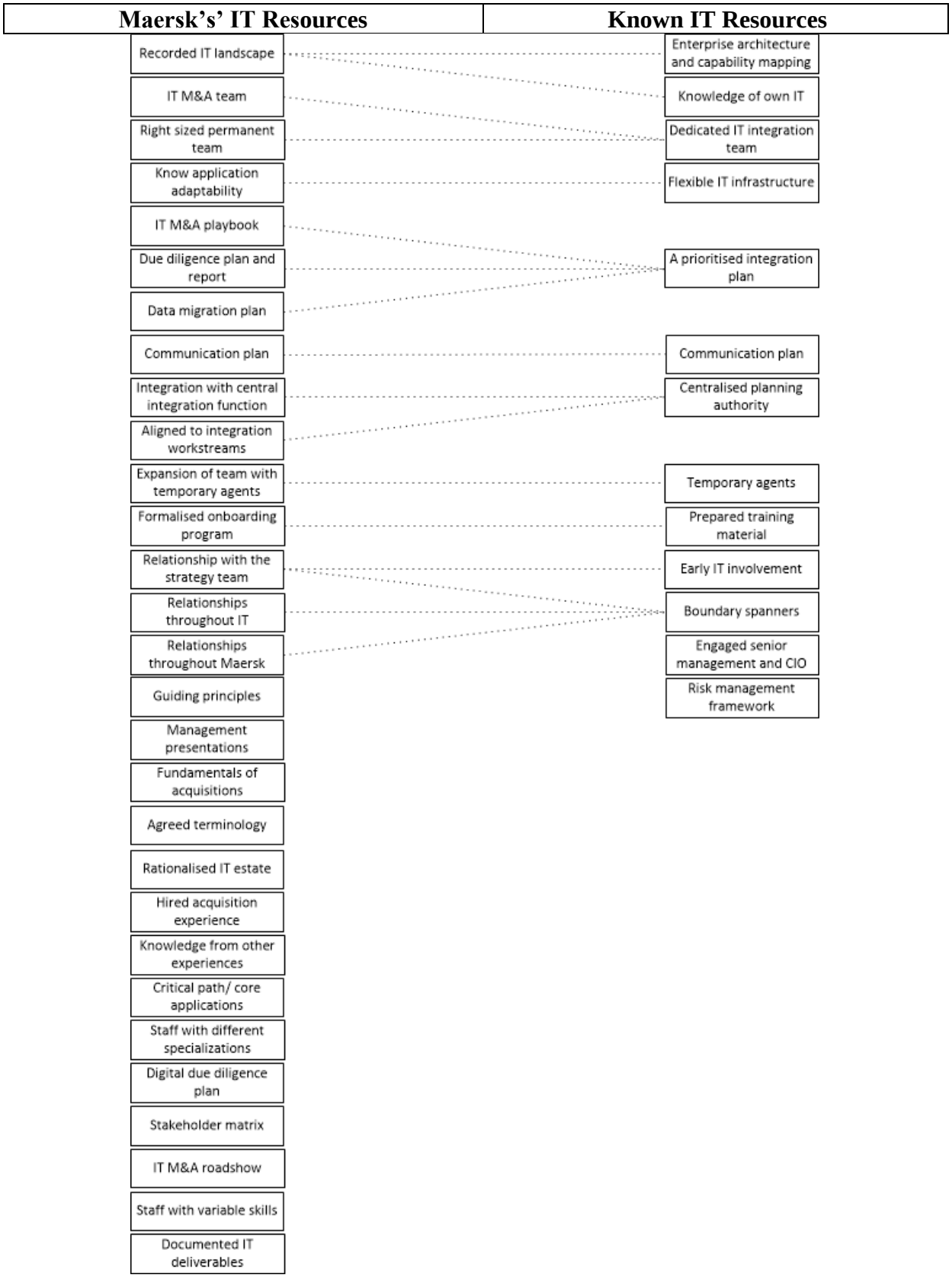
	16/03/2017	Head of Mergers & Acquisitions, IT	00:25:14
	20/03/2017	Head of IT M&A integration	00:19:32
	20/03/2017	Europe Finance Business Partner	00:28:09
	20/03/2017	IT Manager	00:25:59
	21/03/2017	Senior Strategy Advisor - Mergers & Acquisitions	00:17:56
	21/03/2017	Senior Finance Manager	00:27:24
	06/04/2017	M&A Technical Analyst	00:44:17
	24/05/2017	Business Analyst	00:32:58
	06/06/2017	Technical Analyst	00:29:12
Planning for Hamburg Süd	22/12/2016	Senior IT Manager	00:25:36
	17/01/2017	Senior IT Manager	00:11:51
	27/01/2017	Project Manager	00:24:23
	09/02/2017	Senior IT Manager	00:07:56
	17/02/2017	Project Manager	00:19:58
	22/03/2017	Head of IT M&A Integration	00:09:16
	21/04/2017	IT Manager	00:17:12
	12/06/2017	Head of IT M&A Integration	00:26:04
	19/06/2017	Integration Lead, HR	00:33:56
	19/06/2017	Head of Coordination & Integration Team	00:26:40
	19/06/2017	Integration Lead, Procurement	00:25:12
	19/06/2017	Integration Lead, OpsEx	00:29:52
	23/06/2017	Head of IT M&A Integration	00:24:12
	26/06/2017	Integration Lead, Finance	00:20:40
	26/06/2017	Integration Lead, Fleet Management	00:21:42
	05/07/2017	IT Manager	00:25:42
	10/07/2017	IT Manager	00:37:20
	04/08/2017	IT Manager	00:27:05
	01/09/2017	IT Manager	00:26:12
	26/09/2017	IT M&A Team	01:09:11
	26/09/2017	IT M&A Team	00:49:16
	27/09/2017	Head of IT M&A Integration	00:31:36
	31/10/2017	Head of Mergers & Acquisitions, IT	00:56:55
	03/11/2017	IT Manager	00:25:47
	07/11/2017	IT Manager	00:28:32
	14/11/2017	Head of Mergers & Acquisitions, IT	00:58:56
	17/11/2017	IT M&A Team	00:58:15
	23/11/2017	Temporary Members of IT M&A Team	01:12:21
Day One and integration	15/01/2018	Senior IT Manager	00:17:21
	15/02/2018	Business Analyst	00:55:32
	19/02/2018	Business Analyst	00:56:19

	22/02/2018	Senior IT Manager	00:57:32
	22/02/2018	Project Manager	00:51:22
	22/02/2018	Senior IT Manager	00:52:25
Post-integration	17/08/2018	Project Manager	0:53:54
	20/08/2018	Project Manager	0:51:46
	21/08/2018	Senior IT Manager	0:56:54
	21/08/2018	Project Coordinator	0:45:49
	23/08/2018	Head of Mergers & Acquisitions, IT	0:53:06
	24/08/2018	Head of IT M&A Integration	0:50:50
	24/08/2018	Integration Lead, OpsEx	0:50:49
	27/08/2018	IT Manager	0:42:54
	28/08/2018	Project Manager	0:55:42
	28/08/2018	Integration Lead, Procurement & Head of CIT PMO	0:49:47
	29/08/2018	Manager, ITS-OP Infrastructure Operations (Hamburg Süd)	0:34:29
	29/08/2018	Manager, Corporate Systems (Hamburg Süd)	0:55:37
	30/08/2018	Senior Project Manager (Hamburg Süd)	1:03:04
	30/08/2018	Team Lead, Service Operation Processes (Hamburg Süd)	0:23:31
	30/08/2018	CIO (Hamburg Süd)	0:52:24
	03/09/2018	Head of Coordination & Integration Team	0:51:26

Appendix 3 – Expert Interviews and Discussions

Date	Industry	Position	Length
28/04/16	Technology	M&A Leadership Team	1:00
09/06/16	Technology	Head of M&A	0:30
09/06/16	Insurance	Head of Technology and Operations	0:25
27/06/16	Food ingredients	CIO	1:00
07/07/16	Research	Professor	1:00
11/10/16	Banking	Senior Vice President	1:00

Appendix 4 - Relationships between Case Specific and Known IT Resources



Appendix 5 – Research Papers

Research paper #1

A Review of Information System Integration in Mergers and Acquisitions

Henningsson, S., Yetton, P. W., and Wynne, P. J. 2018. "A Review of Information System Integration in Mergers and Acquisitions," *Journal of Information Technology* (33:4), pp. 255–303. (https://doi.org/10.1057/s41265-017-0051-9).

Journal of Information Technology (2018) 33, 255–303

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Review Article

A review of information system integration in mergers and acquisitions

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Abstract

For three decades, research has investigated the role of information systems integration (ISI) in mergers and acquisitions (M&As). This research has improved our understanding of the M&A IS challenges and their solutions. However, consolidation and integration across the research is limited. To redress this omission, we review 70 articles published between 1989 and 2016. To do this, we adopt and extend the methodology developed by Lacity and her colleagues to review the empirical evidence in a fragmented IT literature. We code 53 dependent variables and 195 independent variables to identify the robust relationships among them and to model how ISI decisions, including the choice of IS integration methods, partially mediate the effects of the independent variables on ISI outcomes. Examining the relationships in this model, we identify five quasi-independent thematic domains on which we draw to develop an agenda for future research. Our contribution is the aggregation, organization and structuring of the empirical findings in the M&A ISI literature as a basis on which to develop a cumulative knowledge process.
Journal of Information Technology (2018) **33**, 255–303. https://doi.org/10.1057/s41265-017-0051-9; published online 27 February 2018

Keywords: merger; acquisition; information systems; integration; literature review

Introduction

In 2016, 46,000 mergers and acquisitions (M&As) were recorded with a total value of more than US$3.7 trillion (Thomson Reuters, 2017). M&As are a source of great opportunity for a few companies, including Cisco, Cemex and Santander (Kanter *et al.*, 2007; Busquets, 2015; Toppenberg *et al.*, 2015), but are frequently challenging and problematic for the many. In practice, 60–70% of M&As in the private sector destroy rather than create financial value as measured by short-term performance, long-term performance and market value (see, for example, King *et al.*, 2004).

Stimulated by the growth in activity, M&As have become a subject of research in several academic fields. Haleblian *et al.* (2009) reviewed M&A research in the accounting, economics, finance, management and sociology literature from 1992 to 2007. They identified 864 articles that examine the challenges to successful M&As and recommend how to overcome those challenges. The research shows that M&As are multifaceted phenomena to which financial, strategic, managerial, sociological, organizational and psychological research contributes insights and normative recommendations.

One critical factor not considered by Haleblian *et al.* (2009) is that businesses have become pervasively dependent on their information systems (IS). These now play a critical role in the realization of value in M&As. Sarrazin and West (2011) estimate that 45–60% of the expected benefits from M&As directly depend on IS integration (ISI). Similarly, a survey by Accenture reports that ISI is the second most important reason for M&A failures, causing billions of dollars in losses (Accenture, 2006).

In response to these and other surveys, research on the role of ISI in M&As has increased, documenting an emerging understanding of ISI as a highly diverse challenge. Three cases illustrate this diversity. First, Yetton *et al.* (2013) explain why the Danish sugar producer, Danisco, had to halt its acquisition program after several years to consolidate its scattered IT infrastructure onto one standardized central IT platform that could support a growth-by-acquisition strategy in the area of food ingredients. The accumulated IT infrastructure, consisting of more than 150 different ERP systems that were loosely integrated with peer-to-peer interfaces and middleware,

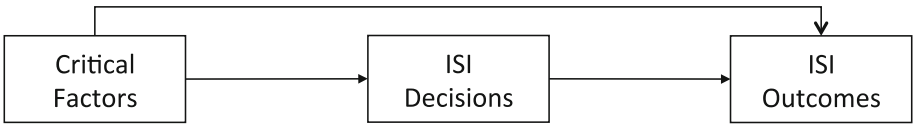

Figure 1 Review model.

made continued growth slow and costly. The critical challenge for Danisco was to develop the capacity of the IT infrastructure to support growth. This took Danisco several years and could not have been financially justified by a single acquisition.

Second, the Teaching Health Centre (THC) case (Vieru and Rivard, 2014) shows how people involved in ISI affect the outcome significantly. They interpret, object, politicize, discover and, in many other ways, shape the unfolding ISI, creating unintended work processes, structures and power relationships. The initial design for THC, a merger of three Canadian hospitals, was based on best practice, but the final configuration revealed a blend of industry standards and local premerger contingencies. Personnel at the different sites actively engaged in interpreting the new systems, shaping them to work within premerger working procedures, norms and cultures.

Third, the Mekong-Indus acquisition (Mehta and Hirschheim, 2007) illustrates how external factors, particularly time pressure, exacerbate the ISI challenges. Because of shareholder pressure to quickly realize the merger synergies, Mekong decided to standardize the post-acquisition combined businesses based on its own IS platform. This was despite the fact that the Indus IS platform was generally considered to be a better fit for the new organization's business aspirations. Mekong management considered the Indus systems to be unproven and that adopting it would be high risk. However, after a few years of struggling with operating on Mekong's preacquisition IS platform, the combined organization migrated to an updated platform similar to the Indus platform that had been retired during the merger project.

The three cases illustrate how critical factors, including, for example, time pressures and IT platform flexibility, affect ISI outcomes. The cases also illustrate how ISI decisions, including diagnosis, planning and implementation, both affect ISI outcomes and partially mediate the effect on ISI outcomes of other variables, including time pressures and IT platform flexibility. To explain these relationships, the literature on ISI in M&A has adopted at least 18 different theoretical perspectives and has employed grounded theory approaches to identify new and intriguing aspects of the phenomenon. However, because of this theoretical diversity and the explorative research approaches, the literature is fragmented (Wijnhoven *et al.*, 2006) and has evolved in a non-cumulative way (Mehta and Hirschheim, 2007; Henningsson and Carlsson, 2011) with inconsistent definitions and conceptualizations.

We address the fragmentation by aggregating, organizing and structuring the findings in the M&A IS literature. To do this, we adopt the methodology outlined by Jeyaraj *et al.* (2006) and developed by Lacity *et al.* (2010, 2011, 2016) that was specifically designed to consolidate the knowledge in another fragmented IT literature, namely the IT outsourcing literature. Within this approach, the review is guided by a single research question:

- *How to aggregate, organize and structure what we know about M&A ISI decisions and their outcomes?*

To answer this question, we examine 70 articles published between 1989 and 2016. We inspect both the quantitative and qualitative researches to identify the most frequently studied constructs and the relationships among those constructs. Specifically, we investigate the variables that affect ISI decisions and ISI outcomes. Aggregating these findings, we develop a descriptive model of the robust findings that explain how ISI decisions partially mediate the effects on ISI outcomes of the critical M&A factors (Figure 1), where robust findings are defined as empirical findings that have been replicated a minimum of five times in the ISI literature (see methodology section for explanation).

This review is written primarily for an academic readership with an interest in M&A ISI research. The output of Lacity *et al.*'s (2010, 2011, 2016) methodology is not a theory or a theoretical model. Instead, it is a structured documentation of the findings in a research domain. Taken together, the research reviewed here contributes a consolidated base of the existing, robust findings in M&A ISI research. Inspecting these findings, we identify five research themes. Discussing the themes, we propose new research questions to develop each theme and briefly speculate how research between the themes could develop our overall understanding of M&A ISI.

The remainder of this review is structured as follows. First, we describe the Lacity *et al.* (2010, 2011, 2016) protocol to identify the robust relationships in the M&A ISI literature and our extension to their protocol to identify five themes to structure the interdependences among the robust relationships. Second, the findings are presented in two sections. One begins by setting the context with a short overview of the M&A ISI research over three decades, then identifies and presents the robust relationships in the literature. The other section examines the density of relationships among the robust findings to identify five research themes and to develop future research questions within and between the themes. Finally, we discuss the implications of our findings for future research and present a short conclusion.

Methodology

M&A ISI research is fragmented across many authors and theories, and across the explorative case studies of the challenges to M&A ISI. For example, only one author, Yetton (Johnston and Yetton, 1996; Böhm *et al.*, 2011; Henningsson and Yetton, 2011; Yetton *et al.*, 2013), from the first decade continued publishing in this domain after 1999, and few

theories or concepts have consistently been the subject of research. An exception to the latter observation is the frequent study of the choice of methods to implement M&A ISI as both a dependent variable and an independent variable in ISI research. In addition, the research has been practice led rather than theory driven, with many practitioner authors. Indeed, many studies are atheoretical and report only empirical findings.

Inspecting the literature, there are no two or three dominant analytical frameworks on which to base a traditional narrative, theory-based review. Instead, the literature includes research that ranges across many different topics, including studies of politics and power (Kovela and Skok, 2012), the effects of stock market-based time pressures on ISI project performance (Tanriverdi and Uysal, 2011) and rebuilding the acquisition target's supply chain management system on the acquirer's IT platform (Yetton *et al.*, 2013).

Responding to these characteristics, this review adopts an empirical-based (see, for example, Lacity *et al.*, 2016), rather than a theoretical-based approach (Leidner and Kayworth, 2006). The role of data as a basis for theory development is a position shared by many researchers, including those who adopt methodologies as distinct as grounded theory methodology (Strauss and Corbin, 1990) and meta-analysis (see, for example, Hunter and Schmidt, 2004). As Hunter and Schmidt (p xxvii) write: 'There are two steps to the accumulation of knowledge: (1) the accumulation of results across studies to establish facts, and (2) the formulation of theories to organize the facts into a coherent and useful form.' The primary focus of this review is the first step: the established facts (empirical findings) across studies in the M&A ISI literature.

Here we describe, classify and present a descriptive model of what is known about M&A ISI. This is similar to the reviews by Lacity *et al.* (2010, 2011, 2016) that Rowe (2014) defines as an example of a descriptive review. Adopting and extending the Lacity *et al.* protocol, we describe our review protocol under three headings: locate and select, code and aggregate.

Locate and select

To identify the relationships to review, we first drew on our knowledge of the domain to select databases that contain journals and conference proceedings on the general topic of M&A ISI. We also drew on Webster and Watson (2002), Boell and Cecez-Kecmanovic (2015b) and Okoli and Schabram (2010) to design a rigorous literature search. By searching databases, as opposed to specific journals, we included sources other than those with which we were already familiar. As Webster and Watson point out, IS is a multidisciplinary field, and, therefore, it was important to conduct a broad search to identify articles outside a limited sample based, for example, on only the AIS library and the Basket of Eight journals.

We searched for empirical articles on the phenomena of M&A ISI in ABI Inform, AISeL library, EBSCOhost, JSTOR, Science Direct and Springer Link using the search terms of 'information systems,' 'information technology,' 'IS,' 'integration,' 'acquisition,' 'merger,' 'M&A,' 'acquire' and 'merge.' As recommended by Boell and Cecez-Kecmanovic (2015b), we widened our search as we became more familiar with other terminologies, research and authors. Finally, we extended the search by performing backward and forward searches (Webster and Watson, 2002).

Collectively, the searches of the six databases identified 563 publications for potential inclusion in the review. Inspecting the titles and abstracts of these publications, articles were judged to be relevant only if they specifically researched the phenomenon of ISI in the M&A context. Of the initial list of 563 articles, 461 were judged not to be relevant. Most frequently, this was because the articles researched the integration of new IT systems, rather than the integration of IS in M&As.

We agree with Boell and Cecez-Kecmanovic (2015a) that, even for experienced reviewers, judging whether a paper is relevant to a review only on its title and abstract is difficult and subject to error. Therefore, we took a conservative approach to minimize false negatives by reviewing in full any paper about which there was any doubt as to whether the paper did, or did not, study M&A ISI. A further 43 publications were rejected after full reviews because they included topics judged to be tangential to our focus on M&A ISI. Frequently, these included conceptual or methodological papers. In addition, some papers that had been provisionally accepted were rejected. These were conference papers that were later published as journal papers, and which are included in the sample.

This database-driven search was incomplete because several journals and conferences were not indexed throughout the time span for the search. For example, the AISeL library indexes AMCIS only after 1997, and the Information Systems Journal is included in the Business Source Complete database only after 1997. To compensate for these limitations, and to widen the search as recommended by Webster and Watson (2002), we conducted backward and forward searches for additional articles.

In the backward search, we reviewed the reference lists of the articles included in the preliminary sample to identify relevant articles not captured by our database search. For the forward search, Thomson Reuters' Web of Science and Google Scholar were used to identify articles that reference articles already included in the sample. These searches identified eight additional articles and three unpublished PhD theses (Linder, 1989; Tafti, 2009; Glazar-Stavnicky, 2016). Other relevant PhD theses were identified but were not included in the sample because their relevant findings are included in subsequent journal publications (e.g., Alaranta and Henningsson, 2007, 2008).

The final sample contained 67 articles and three PhD theses. For shorthand, this sample of 70 studies is henceforth referred to as the sample of 70 articles published between 1989 and 2016. The complete list of the studies included in the review sample is reported in 'Appendix A.' This appendix also presents an overview of the unit of analysis, empirical data, industry context and theoretical framing for each study in the sample. Table 1 lists the publication sources of the review sample.

Code

To identify the constructs to be investigated in this review, we adopted the coding protocols for open coding, axial coding and constant comparison that are specified in grounded

Table 1 Publication frequency by source.

Outlet	*Articles*
International Conference on Information Systems	7
Information & Management	5
European Conference on Information Systems	4
European Journal of Information Systems	4
Journal of Strategic Information Systems	4
Pacific Asia Conference on Information Systems	4
Management Information Systems Quarterly Executive	3
PhD thesis	3
Americas Conference on Information Systems	2
Hawaii International Conference on System Sciences	2
Information Systems Research	2
Long Range Planning	2
MIS Quarterly Executive	2
ASCI Journal of Management	1
Australasian Conference on Information Systems	1
Business Information Systems	1
Business & Information Systems Engineering	1
Computers & Security	1
Communications of the IIMA	1
Enterprise Information Systems	1
European Management Journal	1
Health Informatics Meets eHealth	1
Industrial Engineering and Management Systems	1
Industrial Management & Data Systems	1
Information Systems Frontier	1
Information Systems Journal	1
International Journal of Business and Management	1
International Journal of Information Management	1
International Multiconference on Computer Science and Information Technology	1
Journal of Engineering and Technology Management	1
Journal of International Technology and Information Management	1
Journal of Information Technology Theory and Application	1
Journal of Leadership, Accountability and Ethics	1
Journal of Management Information Systems & E-commerce	1
Journal of Social and Organizational Dynamics	1
Journal of Systems and Information Technology	1
Journal of the AIS	1
Management Information Systems Quarterly	1
Practice-driven Research on Enterprise Transformation	1
Grand total	70

theory methodology (Strauss and Corbin, 1990) to develop a list of master codes and their definitions/descriptions. Creating the list was a five-step iterative process that required coding individual papers multiple times.

First, two of the authors, with experience in qualitative research and grounded theory methodology, independently coded 20 randomly selected articles from the sample of 70 articles. They listed each dependent and independent variable as named and described in each article. These became the list of 'author variables' and 'author variable descriptions.'

The two authors then met to identify the variables that could be combined across studies to begin to build the two lists of 'master variables' and 'master variable descriptions.' For example, Alaranta and Kautz (2012) use the term 'culture conflict,' while Weber and Pliskin (1996) and Robertson and Powell (2001) use the term 'culture clash' to refer to a similar phenomenon of friction between the merging units' organizational cultures that spills over on to the ISI project. Some variables required careful consideration. For example, we coded a number of variables that describe the effects on the people involved in the merger, including stress from additional work tasks and the loss of required competences. In those situations, we resolved coding consolidation through discussions among the authors.

Second, during the next iteration, the same authors independently coded another random set of 20 articles. As before, they coded the dependent and independent variables used in each study. They also mapped the variables onto the master list of variables and descriptions. They then met to compare and discuss any differences in the two sets of codes.

Third, the remaining 30 articles were coded by the two authors. As new variables and descriptions were added to the master list, the two authors reviewed previously coded articles to determine whether they needed to be recoded based on the extended master list. This process was repeated until all the articles had been coded.

Fourth, when all articles had been coded, one author did a final review of each article to check that the codes for all variables in the 70 articles were consistent with the final master list. By following this method, we standardized the variables across articles that used different terms to capture essentially the same variable. The final list of master codes and their descriptions is presented in 'Appendix B.'

Fifth, for each paper we then identified independent and dependent variables and documented relationships between the two variable types. Doing so, we documented 619 relationships in the 70 articles. As recommended by Lacity *et al.* (2010, 2011, 2016), we coded significant positive relationships as '+ 1,' significant negative relationships as '− 1' and nonsignificant relationships as '0.' In quantitative studies, we relied on the values of test statistics to judge whether the relationships are significant. In qualitative studies, we based our judgments on the strength of the verbal arguments.

Significant relationships that include categorical variables are coded M because no direction, positive or negative, could be assigned to the relationships. For example, in Toppenberg (2015), industry is operationalized as a categorical variable referring to the specific industry of the M&A. While in some studies in the sample that employ categorical variables, it is possible to speculate that there is an underlying dimension on which the categories could be assigned, we did not do this if the authors treated the variables as distinct categories. Critically, coding relationships M (rather than positive or negative) does not affect the *total* number of significant relationships among these variables in the analysis below. Instead, this protocol affects only the *relative* number of significant variables that are coded positive/negative or as

Table 2 Coding protocol.

Relationship	*Code*	*Meaning*	*Quantitative example*	*Qualitative example*
Significant positive	+ 1	*Positive relationship* higher values of the independent variable are associated with higher values of the dependent variable; $P < 0.05$ for quantitative studies or strong argument by authors for qualitative studies	Tanriverdi and Uysal (2011): 'Cross-business IT integration capability' has positive effects on 'stock-market reaction' and 'operating profit'	Busquets (2015): 'Discovery'-oriented planning has a positive effect on 'IS synergies'
Significant negative	− 1	*Negative relationship* higher values of the independent variable are associated with lower values of the dependent variable; $P < 0.05$ for quantitative studies or strong argument by authors for qualitative studies	Robbins and Stylianou (1999): 'User involvement in IS decision' has a negative effect on 'ISI success'	Holm-Larsen (2005): 'IT extensiveness' has negative effects on 'ISI project time' and 'ISI project cost'
Significant matter	M	A relationship between a categorical independent variable and a dependent variable mattered; $P < 0.05$ for quantitative studies or strong argument by authors for qualitative studies	NA	Henningsson (2015): 'ISI method' matters for the dependent variable 'ISI capabilities'
Not significant	0	A nonsignificant relationship is reported	Morsell *et al.* (2009): 'IS employee morale' has a nonsignificant effect on 'ISI success'	Baker and Niederman (2014): 'Post-merger alignment' has a nonsignificant effect on 'Merger benefits'

generally mattering. Table 2 provides an overview of the guidelines adopted to code relationships in the 70 reviewed articles.

Aggregate

The aggregation process involves two steps. In step 1, we follow Lacity *et al.* (2010) to identify the robust findings reported in the M&A ISI literature. Robust findings are relationships that are replicated at least five times in the literature: These are the facts in Hunter and Schmidt's (2004) terms. To do this, we aggregate across relationships that include variations on the same underlying constructs.

Then, in step 2, we extend Lacity *et al.*'s approach to organize and structure the robust relationships into five themes: the ISI context, relational fit, the human side, preconditions and time pressures. Doing this, we create a research database within which researchers can locate their research or on which they can draw to motivate research. Essentially, this step is a precondition to support and focus the theorizing that Hunter and Schmidt (2004) describe as step 2 in their research strategy.

Step 1: Identifying the robust relationships

Our review identified a large number of dependent and independent variables. To facilitate the identification and presentation of the robust relationships among them, we mapped the variables onto a limited number of categories. To do this, we followed a grounded sorting process based on the principles of the constant comparison method (Strauss and Corbin, 1990). Disagreements on categorization were resolved by the researchers through discussion (Saldaña, 2009).

This process was chosen to capture and document the variety in the research, rather than restricting that variety by selecting those findings that could be integrated within a single or limited number of theoretical frameworks. Importantly, this categorization process introduces only an organizing layer for improved presentation and does not affect the analysis of the robust findings, or of the five research themes. For researchers who wish to map the variables within various theoretical frameworks, the full set of variables is presented in 'Appendix C.'

We found 619 relationships involving the effects of 195 independent variables on 53 dependent variables. For reference, the full list of relationships between variables is presented in 'Appendix D.' At this fine-grained level of analysis, the frequency with which findings are replicated across studies is minimal. To aggregate the empirical literature to be concise, meaningful and well-structured, we follow Lacity *et al.*'s (2010, 2011, 2016) methodology and move to a higher-level of abstraction.

To do this, we partition the 619 findings into two broad categories for the dependent variable: ISI decisions and ISI outcomes (see 'Appendix C'). We retain the specific independent variables and sort them by frequency within the two broad categories. Although we lose some precision when we aggregate the findings, we gain a better overall understanding of the variables that affect M&A ISI decisions and outcomes.

To identify the independent variables that consistently have an effect on ISI decisions and ISI outcomes, we follow two decision rules proposed by Lacity *et al.*'s (2010, 2011, 2016) methodology. One is to extract the relationships that have been examined by researchers at least

five times. Although five may seem an arbitrary number, it has been used elsewhere in this type of review as a means by which to identify 'well-utilized' variables (Jeyaraj *et al.*, 2006; Lacity *et al.*, 2010, 2011, 2016). Restricting our results to only those studied five or more times ensures they can be relied on as solid evidence and not emergent concepts. However, quantity alone is not a suitable measure; therefore, we couple this with a second decision rule: to differentiate between the levels of 60–80% and above 80% corroboration across findings. Lacity *et al.* (2010, 2011, 2016) report that these decision rules were valuable in their research to distil nuances within the IT outsourcing literature.

Consistent with Lacity *et al.*'s (2010, 2011, 2016) methodology, we use '(++)' to indicate that more than 80% of the time, when a relationship has been examined, the authors found a positively significant relationship. For example, in 'Appendix C,' IT flexibility has been examined seven times in relation to ISI outcome and, in all seven cases, it is found to positively and significantly affect ISI outcomes. Therefore, we assign the relationship between IT flexibility and ISI outcome the symbol '(++).' We use a '(+)' when 60–80% of the evidence is positively significant.

Conversely, we use '(− −)' to indicate when more the 80%, and '(−)' when 60–80%, of the evidence shows a negative relationship. Consistent with this notation, we use '(00)' and '(0)' to indicate when 80% or more, or between 60 and 80%, are found to not have a significant relationship. Finally, we use '(MM)' to indicate when more than 80% of the evidence shows an independent variable mattered when operationalized as a categorical variable, and '(M)' to indicate when it mattered in 60–80% of the studies.

Step 2: Integrating relationships within research themes

To begin to address the challenge of fragmentation represented by the large number of robust relationships identified, we extended the Lacity *et al.* (2010) protocol to investigate whether there are a limited number of research themes that structure and contextualize those relationships. To address

Table 3 Most studied robust relationships.

Independent variable	*Dependent variable*	*Count*	*Thematic association*
IS–business collaboration in planning	Outcome	14	A
Application and IT compatibility	Outcome	13	B
ISI method	Outcome	13	A, B, C, D, E
Changes in workforce size	Outcome	12	C
IS employee morale	Outcome	11	C
User training and support	Outcome	10	C
Organizational M&A planning	Outcome	10	A
M&A motivation	Decision	10	A, B
IT communication	Outcome	9	C
IT investment at target	Outcome	9	D
Discovery (consistency)	Outcome	8	E
Risk management	Outcome	8	E
IT flexibility	Outcome	7	D
Pre-M&A org. performance	Outcome	7	D
Collaboration dynamics	Outcome	7	C
Level of data sharing pre-M&A	Outcome	7	D
Use of external resources	Outcome	6	D
Top management support	Outcome	6	A
IT standardization	Outcome	6	D
Changes in policies and procedures	Outcome	6	C
Decreases in IS staff compensation	Outcome	6	C
IT leadership in integration project	Outcome	6	C
Political considerations	Outcome	6	C
System size/complexity	Outcome	6	Not assigned
EA capability	Outcome	6	D
Time pressure	Outcome	5	E
ISI proactivity (verus reactive)	Outcome	5	E
IS configuration fit	Outcome	5	B
Communication of M&A activities to IS	Outcome	5	C
Quality of ISI planning	Outcome	5	A
Time pressure	Decision	5	E
Power and politics	Decision	5	C
Organizational integration objectives	Decision	5	A, B
ISI objectives	Decision	5	B
Integration alignment	Outcome	5	B

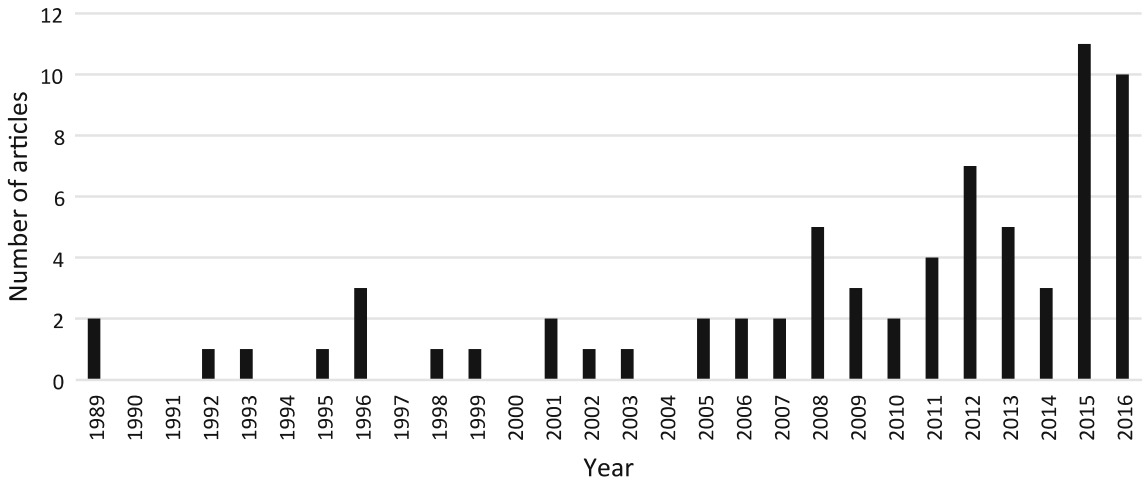

Figure 2 Temporal distribution of articles.

this question, two criteria were imposed on the search for the themes. One is that the themes collectively span the research domain, where span is defined as including all, or nearly all, of the robust relationships. The other is that the themes are independent of each other. Specifically, few relationships are included in more than one theme.

We began the search by identifying the most frequently studied robust relationship. This is the impact of IS–business collaboration in planning on ISI outcomes. This has been studied 14 times (see Table 3). We assigned this relationship to a theme initially labelled as Theme A. Then, analysing the research in which this relationship is investigated, we assigned the relationships among those variables and ISI to Theme A.

Next, we identified the second most frequently studied robust relationship not included in Theme A. This is between application and IT compatibility and ISI outcomes. We assigned this relationship to Theme B and investigated its relationships to variables in other robust relationships. Continuing this process identified five themes A–E that satisfy the first criterion of spanning the space defined by the robust relationships.

With respect to the second criterion, there is a low degree of overlap among three of the five themes and between those themes and the other two themes. However, there is a high overlap between the other two themes. We discuss the overlaps below when we present a brief overview of the themes after describing and modelling each theme.

The relationships

To understand what we know, it is frequently helpful to reflect on where we have come from. So, before identifying and describing the robust relationships in the ISI literature, we briefly inspect the time line of the research on ISI. We then present the findings from step one in the aggregation process: the robust relationships in the ISI literature.

The time line 1989–2016

Figure 2 presents the temporal distribution of the articles in the review sample. During the two first decades, the pace of publication was slow. Seventy-one percent of all articles are published since 2008 and more than 50% since 2012. If this trend continues, the literature would be more than double in less than five years.

The first decade of research (1989–1999) is explorative. Frequently, the research does not distinguish between different types of M&As and lacks an explicit theoretical framing. An exception is Johnston and Yetton (1996), who adopt an alignment framework. Only two findings are carried forward to research in the next decade. One is the conclusion that the critical role of IS is to realize IT-dependent business benefits. The other is that ISI methods can be partitioned under four headings: absorption, co-existence, best-of-breed and renewal.

Comparing the second decade (2000–2009) with the first decade of research, the style is more explanatory and relies more on formal theoretical frameworks. For example, Brunetto (2006) draws on a contingency perspective, Wijnhoven *et al.* (2006) and Mehta and Hirschheim (2007) employ a framing based on alignment theory, and Alaranta and Henningsson (2008) adopt a strategic planning perspective.

As mentioned earlier only one of the authors who published on ISI during the first decade ever published on the topic again. This may have contributed to the fragmentation in the literature. During the second decade, authors generally refer to the first decade of research to motivate the focus on ISI as an enabler of M&A benefits. However, when doing this, they do not draw on the constructs and findings from the previous decade. The exception, as also noted above, is the continued use of the four ISI methods.

In the third decade (2010 and onward), research increasingly distinguishes between different types of M&A transactions. For example, Seddon *et al.* (2010) explicitly focus on the merger of equals. Smaller acquisitions by serial acquirers are the explicit focus in papers by Henningsson and colleagues (Henningsson and Yetton, 2011; Henningsson, 2015; Henningsson and Kettinger, 2016); Du (2015) analyses horizontal acquisitions.

Other researchers highlight different aspects of the ISI challenge, including, for example, merging IS departments (Alaranta and Martela, 2012), and problems with vendor–acquirer collaboration in acquisitions that are also

divestments (Böhm *et al.*, 2011). Generally, research in the third decade, compared with previous years, is empirically and methodologically more sophisticated, reporting a higher frequency of significant robust research findings (e.g., Tanriverdi and Uysal, 2011, 2015).

Over the three decades, research displays pluralism in theoretical framings and methodological approaches (see 'Appendix B'). Eighteen different theoretical perspectives are adopted in the 70 articles. Of these, alignment theory and the resource-based view of the firm are the most frequently adopted theoretical frameworks. They are also the dominant analytical frameworks adopted in two of the five themes discussed below. Critically, many articles do not employ an explicit theoretical framework.

Methodological approaches include single and multiple case studies, expert panels, surveys, database analysis, design research and focus groups. Fifty-six articles are qualitative, eleven are quantitative, and three combine qualitative and quantitative analyses. The relative use of qualitative and quantitative data has been stable over the three decades.

Relationships

Figure 3 presents all relationships in the IS M&A literature that are corroborated at least five times. The data are reported in 'Appendix D' to allow others to conduct analyses using different decision rules.

Independent variables affecting ISI decisions

Four broad categories – the M&A context, ISI design, ISI capabilities and external environment – include independent variables that are examined at least five times and report consistent results for their effect on ISI decisions (see 'Appendix D').

M&A context Within this category, the three variables merger motivation, organizational integration objectives, and power and politics are found to affect the choice of integration method.

There is general consensus about how M&A motivation influences ISI methods. In all ten studies that this variable has been investigated, M&A motivation is found to affect the choice of ISI methods. For example, Yetton *et al.* (2013) report that Danisco used an expansion integration method to realize economies of scale and an extension method to realize economies of scope. Similarly, after reviewing the answers from an expert panel, Myers (2008) models 'M&A Objectives and Business Strategy' as a critical factor affecting the ISI decision. In addition, Gregory *et al.* (2012) argue that, at times, M&A motivations are paradoxical and that the parties involved develop decision-making strategies that balance the tensions between conflicting objectives.

The ISI method is also contingent on the organizational structure that the merger companies intend to implement (Wijnhoven *et al.*, 2006). For example, a preservation approach is linked to an IT co-existence integration method (Henningsson and Carlsson, 2011). Similarly, Gorla and Pang (2001) find that an absorption approach to organizational integration is closely linked to an ISI method based on the redeployment of one organization's IS to the other.

The variable power and politics shows how factors other than efficiency and effectiveness influence the ISI method. The decision on how to integrate IS effectively becomes the decision on which business processes to keep, and which IS department post-M&A keeps its headcount intact. In this way, the decision on the ISI method is heavily influenced by the relative organizational power within the M&A (Mehta and Hirschheim, 2007; Kovela and Skok, 2012).

ISI design Within this category, the variable of ISI objectives refers to the strategic objectives that have been assigned to the IS functions in the IT merger project. The effect of these objectives on the ISI decision has been investigated five times. For example, Wijnhoven *et al.* (2006) compare how the ISI objectives influence decision-making in different hospital mergers. In one case, the ISI objective of enabling a single organization was difficult to achieve in one step. Instead, patient administration, the function with the highest operational priority, was integrated first. This resulted in partial integration in the short term. Subsequently, the financial and managerial systems were integrated. In another case, the ISI objectives of retaining the organization's independence influenced the decision to leave any unique systems intact during the integration process.

Brunetto (2006) distinguishes between the strategic goals of synergy, value and cost rationalization in his analysis of ISI in the construction industry. He finds that these broad ISI objectives typically result in the choice of different ISI methods. Similarly, Steininger *et al.* (2016b) find that migration objectives were the key criteria when three hospitals decided on the appropriate migration scenario. The importance of ISI objectives is that they shape the compromises and priorities in ISI decisions when optimal solutions are out of reach.

ISI capabilities The use of external IT resources, commonly sourced as consultants, influences ISI decision-making. Henningsson and Øhrgaard (2016) identify four different roles for consultants in ISI projects: muscle, expertise, craft and brain. In the fourth role, brain, the merging companies rely extensively on external resources to actively design the ISI method. The uses of external resources in this capacity range from complete reliance for all ISI decisions to active avoidance of giving away decision authority.

Wynne (2016) reports an alternative strategy in which the focal organization hired managers with substantial M&A experience to guide them in ISI decisions. Seddon *et al.* (2010, p. 1087) explain that, while this strategy might be relevant to retaining knowledge after the ISI project, this use of external resources can still be challenged by the fact that 'many key decisions about people, systems, technologies, and their locations, remain both complex and highly situationally dependent.'

External environment Time pressure is an independent variable that influences the ISI decision. Five studies highlight its importance for the ISI decision. Time pressure comes partly from the market, which expects merger synergies to be realized within a short time frame. For example, Mehta and Hirschheim (2007) explain how synergy promises have a time component and that shareholders expect to see rapid value creation. Similarly, Robertson and Powell (2001) explain how the targets set when 'selling' the merger to shareholders and to the market become a constraint on IS decision-making. Along similar lines, Holm-Larsen (2005) explains how the long-term ideal option of building a new IT platform could not meet the time expectations.

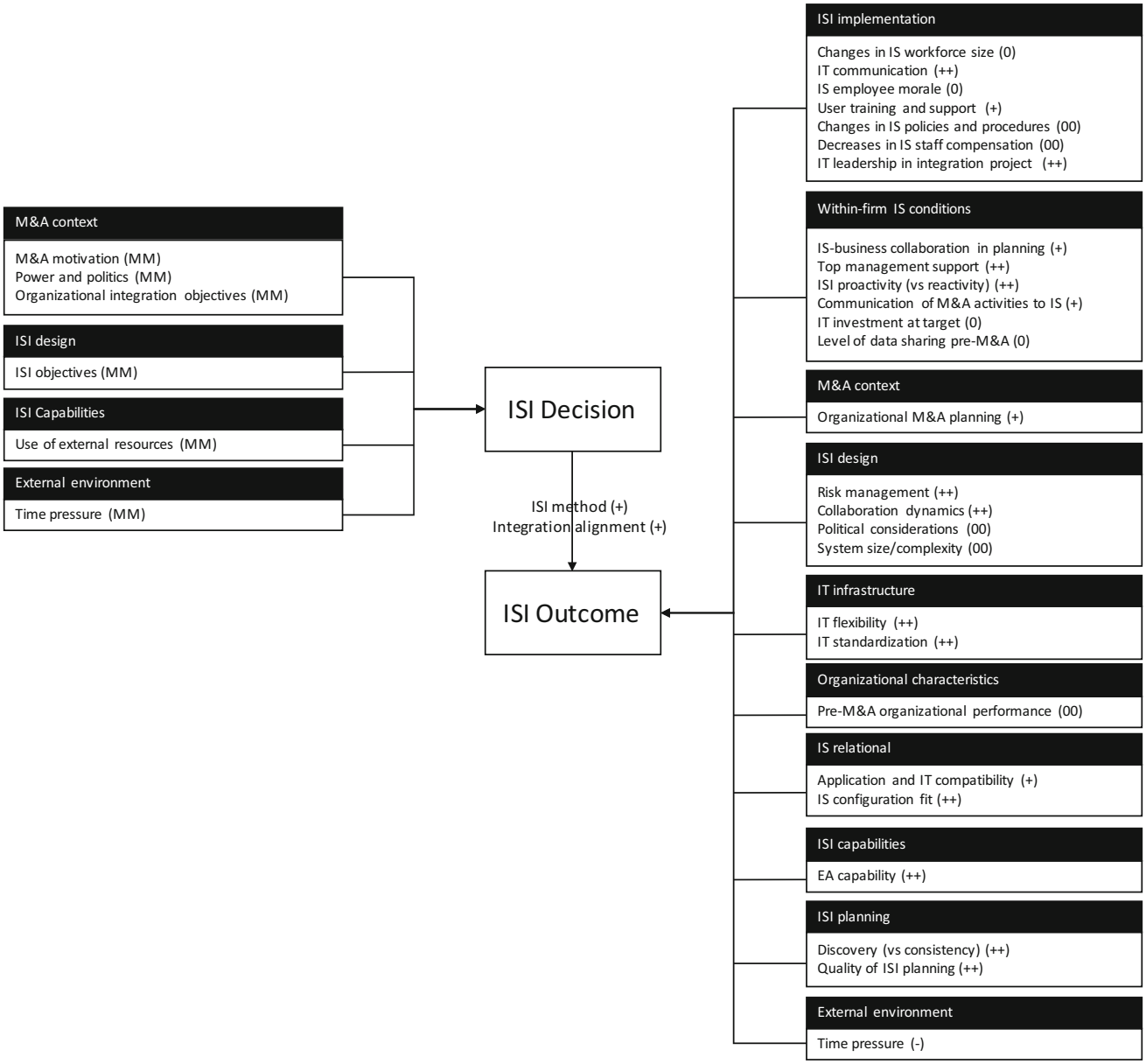

Figure 3 Robust research findings.

Time pressures also come from legal and regulatory authorities. Johnston and Yetton (1996) report that, within a bank merger, pressure from financial authorities demanding joint reporting and risk governance after the legal merger was in place contributed to the bank abandoning plans for a best-of-breed integration method. Because of time pressures, organizations may choose interim integration methods that meet market and legal demands, keeping long-term roadmaps of more radical redesigns that unlock the full potential of mergers.

Independent variables and the ISI outcome

Eleven broad categories – ISI implementation, within-firm IS conditions, M&A context, ISI design, IT infrastructure, organizational characteristics, IS relational, ISI decision, ISI capabilities, ISI planning and external environment – include independent variables that are examined at least five times to generate consistent significant findings ('Appendix D').

ISI implementation As shown in 'Appendix D,' of the 37 variables in this category that are reported to affect ISI outcomes, only seven are investigated at least five times with consistent results. Four of these, changes in IS workforce size, IS employee morale, changes in IS policies and procedures, and decreases in IS staff compensation, have no significant effect on ISI outcomes. All four variables address issues during IS implementation that affect individual IS employees. These variables have commonly been measured through survey instruments (Stylianou *et al.*, 1996; Robbins and Stylianou, 1999; Morsell *et al.*, 2009). As a result, we lack practical examples of why these measures do not affect ISI outcomes.

When these variables are found to have an effect, it has been on proxy measures such as IS employees' satisfaction with the integrated system. However, there are no significant effects on the value creation measures or the avoidance of M&A problems. One possibility is that these findings show that IS staff contribute frequently to the goals of the M&A despite being demoralized. The extent to which the demoralization of staff affects long-term organizational performance has not been measured in the studies investigating these variables.

In contrast, both the extent and qualities of IT communication, and IT leadership in integration projects are found to positively affect ISI outcomes. For example, Brown *et al.* (2003, p. 24) advise: 'Use rich communications media to read emotions and recognize successes at every opportunity because a merger is an emotional event: you cannot communicate too much.' Brown *et al.* also find that the establishment of clear leadership for the ISI project is critical because it addresses difficult decisions quickly and drives the integration forward. Corroborating the importance of leadership, Alaranta and Martela (2012) and Kim *et al.* (2005) report that insufficient and inadequate leadership has negative effects on ISI outcomes.

Finally, user training and support have been investigated both quantitatively (Robbins and Stylianou, 1999; Morsell *et al.*, 2009) and qualitatively (Kim *et al.*, 2005; Alaranta and Kautz, 2012). The findings are consistent: Better user training has a positive effect on ISI outcomes. These findings are consistent with the findings on related variables, including the involvement of users in ISI decision (Robbins and Stylianou, 1999), the effect of user resistance (Alaranta and Kautz, 2012) and the existence of strong habits and practices (Vieru *et al.*, 2016).

In general, we conclude that the factors associated with how ISI is implemented affect ISI outcomes and, specifically, that extensive communication, strong leadership and adequate resourcing for user training and support, have a positive effect on ISI outcomes. However, the explanation for which factors influence which outcomes is in its formative stage.

Within-firm IS conditions: Six variables measuring within-firm conditions have been investigated at least five times. Four have significant positive effects on ISI outcomes: IS–business collaboration in planning, top management support, ISI proactivity and communication of M&A activities to IS personnel, are positively correlated with ISI outcomes. Although these variables emphasize slightly different aspects of the conditions for successful ISI, they all show that a positive perception of the IS organization, early inclusion in M&A activities and support throughout the ISI project, have positive effects on ISI outcomes.

As Brown *et al.* (2003) conclude: 'Don't underestimate the value of prior IT-business relationships for project success.' Similarly, LeFave *et al.* (2008, p. 175) write: 'A lack of IT credibility within former Sprint business functions' affected the plans for the merger. Yetton *et al.* (2013, p. 29) report: 'A prerequisite for the CIO and IT management team to act efficiently and effectively in the ISI of Genencor was the confidence built by the IT team during the years preceding the acquisition. IT had shown that, instead of being a problem, it had become a strategic resource to implement the Danisco growth-by-acquisition strategy.'

So, the perception of IT, the involvement of IT in the early phases of the merger and support throughout the process, are interlinked. When a constructive IT–business relationship exists, it allows the IS organization to hit the ground running at the time of the M&A announcement (Yetton *et al.*, 2013), reduce cost (Brown *et al.*, 2003), shape the ISI to satisfy the critical business needs (Stylianou *et al.*, 1996) and better position the IS organization to support the post-M&A combined businesses (Brown *et al.*, 2003). When such a relationship does not exist, it leads to the exclusion of IT executives in M&A planning (Alaranta and Kautz, 2012; Al Suliman, 2015), a view that IT will just make things happen (Mehta and Hirschheim, 2007), top management steering of ISI activities, including vendor selection (Alaranta and Kautz, 2012), and negative ISI outcomes (Stylianou *et al.*, 1996; Robbins and Stylianou, 1999; Morsell *et al.*, 2009).

Two variables, IT investment at the acquisition target and level of data sharing pre-M&A, have no significant effect on ISI outcomes. Tafti (2009) finds that, while IT investments in the acquirer have a significant effect on ISI outcome, there is no effect for investments in the target. The author reflects on three possible explanations for this. First, acquiring firms are not leveraging or integrating target firms' IT capabilities to the extent that we might expect. Second, acquiring firms do not adopt the 'best-of-breed' ISI method that preserves unique IS capabilities in the target. Third, the IT infrastructure and capabilities of the target firm are phased out in favour of the acquiring firm's IT infrastructure. All three explanations are examples of trade-offs and suboptimal decision-making during the ISI process.

Finally, the level of data sharing in the organizations pre-M&A (Robbins and Stylianou, 1999) does not have a significant effect on ISI outcomes. While Stylianou *et al.* (1996) report that there is a significant effect on the IS department's own assessment of ISI success, data sharing does not have a significant effect on users' perception, the exploitation of M&A opportunities or the avoidance of M&A problems.

M&A context The M&A context, as a category of variables, is the second most researched category that influences ISI decisions and outcomes. However, the research covers a wide range of variables, only one of which, organizational M&A planning, is consistently found to have a positive effect on ISI outcomes. This effect has been validated qualitatively by Kim *et al.* (2005) and quantitatively by Stylianou *et al.* (1996), Robbins and Stylianou (1999) and Morsell *et al.* (2009). High-quality planning creates a foundation for the ISI project, while low-quality M&A planning has a negative spillover effect on ISI project performance.

Given the fragmented research, we can say that the M&A context is critical for ISI project outcomes. However, there is limited knowledge about which specific attributes of the context are most relevant. Interestingly, despite the importance of the overall M&A context, there is no research on who should, or how to, reframe the M&A context to improve IT project performance.

ISI design Four variables in this category have been investigated more than five times with consistent results. Constructive collaborative dynamics and the presence of risk management are consistently found to positively affect ISI outcomes (Brown *et al.*, 2003; Henningsson and Kettinger, 2016). Constructive ISI collaboration requires that the parties

to an M&A form teams to develop integration plans. Risk management accepts that there are always unpleasant surprises and organizes to act proactively. Consistently, higher values of these two variables have a positive effect on M&A ISI decision-making. Together with the previously discussed variable capturing emergence in the ISI planning process, the three variables represent complementary strategies to manage the lack of information required to design ISI at the closure of an M&A deal. Emergent IS planning processes, collaborative dynamics and a proactive orientation toward risk management, align ISI decision-making to the specific characteristics of an M&A.

Political considerations in the ISI design and consideration of system size/complexity have no overall significant effect on ISI outcomes. Stylianou *et al.* (1996) find that political considerations have a significant negative effect on the users' assessment of ISI success, but no significant effect on the IS function's own assessment, the exploitation of M&A opportunities or M&A problem avoidance. Similarly, while taking complexity into account has a significant positive effect on the users' assessment of ISI success, complexity has no significant effect on the IS function's own assessment, the exploitation of M&A opportunities or M&A problem avoidance.

Where the strategic objectives assigned to the IS function in the M&A were found to significantly impact the decisions made, a close examination of the effect of ISI design on ISI decisions suggests that the effect of design on outcomes is mediated by how it influences the trade-offs made in the choices of ISI method and degree of ISI.

IT infrastructure Two attributes of the IT infrastructure, flexibility and standardization, are consistently found to influence ISI outcomes. Higher values of these attributes have a positive effect on M&A ISI outcomes. These effects can be explained in terms of path dependency. The historical development of IS constrains how the IS can be developed. Lack of flexibility constrains options, resulting in unrealized M&A potential or difficulties in the integration project. For example, options are constrained when IT resources do not scale, limiting the realization of the potential M&A value (Tanriverdi and Uysal, 2015).

Three of the four ISI methods reuse the existing IS of the two parties to the M&A to develop the shared IS assets. This redeployment of IT resources is supported by IT infrastructure flexibility and modularity, typically delivered through a service-oriented architecture (SOA) (Benitez-Amado and Ray, 2012). Because SOA is designed to provide reusable components, IS departments do not need to reinvent the wheel, decreasing both the time to integration and development costs. Additionally, a well-designed SOA lets organizations manage multiple small integration projects with less capital and resource investment compared with the high investment and resource commitments associated with traditional solution development architectures (Henningsson *et al.*, 2007).

Organizational characteristics A wide range of organizational characteristics has been studied. However, only one characteristic shows consistent results. Pre-M&A organizational performance, profit, has a positive effect on ISI outcome. Stylianou *et al.* (1996) find that acquirer revenues have a significant effect on the IS function's own assessment of ISI success, but no significant effect on the users' assessment, the exploitation of M&A opportunities or M&A problem avoidance. Tanriverdi and Uysal (2015) report that high profitability in combination with extensive previous growth and a large IT capability gap between the involved organizations triggers a positive reaction from the stock market on deal announcement, as measured through cumulative abnormal returns (CAR). These positive effects of high profitability on ISI outcomes appear to be contingent on the presence of both extensive previous growth and a large IT capability gap. The study by Tanriverdi and Uysal (2015) shows that the effect of organizational characteristics on ISI outcomes plays out through complex systems of interacting variables.

IS relational IT compatibility between the M&A organizations is one of the earliest variables investigated in the ISI literature. Buck-Lew *et al.* (1992, p. 363) argue: 'Since company data and information technology (IT) are as much a management resource as the financial and human resources for the combined firm, the proposal is made that IT fit should be explicitly considered in analysis of corporate acquisitions.' Motivating this argument are the findings that IT compatibility has a positive effect on ISI outcomes in terms of the time and resources needed to complete integration. This finding has been corroborated ten times (Johnston and Yetton, 1996; Stylianou *et al.*, 1996).

However, the data supporting these findings were collected in the 1990s. It may be that technological innovations have made some of the 1990s hardware and IT application compatibility issues irrelevant. Since then, research has shifted to study a broader framing of IS compatibility that includes other attributes of the IS organization. This research suggests that IS configurational fit, both technical (application and IT) and organizational, has a positive effect on ISI outcomes (Brunetto, 2006).

ISI decision Considering all the variables in the category ISI decision, the only two that are linked consistently to ISI outcomes are the ISI method and the integration alignment variables. In the relationship between ISI method and ISI outcomes, each of the four integration methods is designed to deliver specific, different outcomes (Holm-Larsen, 2005; Garcia-Canal *et al.*, 2013). Effectively, the choice of the ISI method becomes the choice of which benefits are given priority in practice. For example, a co-existence strategy both enables economies of scope and increases IT infrastructure complexity.

In the relationship between ISI outcomes and integration alignment, which refers to the fit between the strategy for organizational integration and ISI, alignment is typically found to have a positive impact on ISI outcomes (Wijnhoven *et al.*, 2006; Mehta and Hirschheim, 2007). However, recently this conclusion has been challenged by evidence showing that alignment is not a prerequisite for M&A success (Baker and Niederman, 2014). *ISI capabilities:* Enterprise architecture (EA) is the only capability that is consistently linked to ISI outcomes. EA is frequently referred to as 'the organizing logic for business process and IT capabilities, reflecting the integration and standardization requirements of the firm's operating model.' (Ross *et al.*, 2006, p. 9). Specifically in M&As, an enterprise architecture capability contributes to ISI processes in pre-M&A preparation, partner selection, merger integration and post-integration management (Toppenberg *et al.*, 2015). EA enables M&A organizations to manage the

specific M&A objectives without losing track of the potential long-term organizational performance effect of induced complexity and accumulated inefficiencies over a series of M&As. No other ISI capability has been consistently linked to M&A performance. While many authors agree that ISI capabilities are important, little agreement exists about which other capabilities are required for effective delivery of ISI in M&As.

ISI planning Discovery and quality of ISI planning, two variables belonging to the category ISI planning, are found to have a positive effect on ISI outcomes. The discovery variable captures the degree of emergence in the planning process (Busquets, 2015). In an emergent planning process, instead of committing to a fixed strategy, the M&A partners adapt integration plans as the organizations discover synergistic potential. This is essential in large mergers, where not all the IT synergies can be specified in advance because the relevant information to create a detailed integration scenario is not available. Busquets (p. 178) argues that 'while some steps that lead to synergies can be planned in advance, other essential variations are only learned and discovered during the M&A process itself, thus leading to emergent synergies.'

Morsell *et al.* (2009) argue that the quality of ISI planning has two effects on ISI outcomes. One is a direct effect on the IS function's ability to complete the project on time and budget. The other is that planning failures spill over onto the overall M&A project, contributing negatively to the scheduling and resourcing of the M&A project. These two robust findings present a paradoxical tension and a dilemma for management. Developed plans that are followed are important, but so too is the flexibility to respond to emergent opportunities.

External environment Research on how time pressures affect ISI decisions reports that time pressure forces M&A organizations both to make decisions without having all the relevant information and to choose suboptimal solutions that can be accomplished within the given time frame (Holm-Larsen, 2005; Henningsson and Kettinger, 2016). These suboptimal decisions reduce performance. Specifically, time pressure forces the parties to focus on short-term goals, ignoring the potential negative long-term effects on the integration.

Five research themes

The consolidated model presented in Figure 3 summarizes the robust empirical findings in the ISI literature. However, given the number and complexity of the relationships in Figure 3, this model does not identify any core set or sets of relationships that explain the effects of ISI on M&A performance. This is an outcome of adopting the Lacity *et al.* (2010) approach with its focus on identifying the list of robust relationships and its absence of a protocol to investigate the interdependences among the relationships.

Here, to address the challenge of fragmentation, we apply the protocol developed and described in Methodology section. This process identifies five themes that include the robust findings that define the critical, known challenges of ISI. To ground the discussion, we present a case study to illustrate the relevance of each theme.

As described in the method section, we began the search for research themes by identifying the most frequently studied robust relationship. This is the effect on ISI outcomes of IS–business collaboration in planning. This has been studied 14 times (see Table 3). We assigned this relationship to a theme initially called 'Theme A.' Inspecting the research in which this relationship is investigated (e.g., Main and Short, 1989; Al Suliman, 2015), we identified associations with other variables, for example, quality of ISI planning, top management support, organizational integration objectives, organizational M&A planning, ISI objectives and ISI method. We also assigned the relationships among these variables and ISI to Theme A.

The most frequently studied robust relationship that is not included in Theme A is between application and IT compatibility and ISI outcomes. We assigned this relationship to Theme B and investigated its relationships to variables in other robust relationships. Continuing this process, we identified five models A–E that satisfy the first criterion of spanning the space defined by the robust relationships. Specifically, all but one of the robust relationships are included in at least one theme. The exception is the effect on ISI outcomes of system size/complexity, which we could not fit into any theme.

In addition, relationships involving ISI method are included in each of the five themes. In each of the models of the five themes, ISI method mediates the influence of ISI decisions on ISI outcomes. For two reasons, we should have expected the overlaps involving ISI methods. One is the structure of the research literature in which ISI methods occupy a unique position as both a dependent variable and independent variable (see Figure 1). The other reason is that ISI methods is the only construct that has been the subject of research in all three decades.

In the second step of our protocol, we labelled the five themes in terms of their core constructs: M&A context, relational fit, human behavior, preconditions and time pressures. Within each of these research subdomains, we propose a research agenda to address research gaps in the theme. This research would begin to develop a set of middle-range, substantive (c.f. Boudon *et al.*, 1991; Lee, 2015) theories that are contextually contingent and managerially actionable.

Theme A: The M&A context

Taken together, the variables defining the M&A context form a thematic domain that is embedded in the M&A project (see Figure 4). For example, the outcomes of the ISI project are partially defined in terms of the M&A business objectives (Holm-Larsen, 2005; Steininger *et al.*, 2016a). It is impossible to understand how ISI success is realized without considering the M&A context. This is so pervasive in its effect on ISI success that future research should investigate how much of ISI success is contingent on the ISI project and how much on the overall M&A context.

The importance of the context is illustrated by the ForestCo case study (Jain and Ramesh, 2015). ForestCo, a Fortune 500 company in the paper and packaging industry, aggressively completed multiple acquisitions. The rapid growth was partially a consequence of industry consolidation.

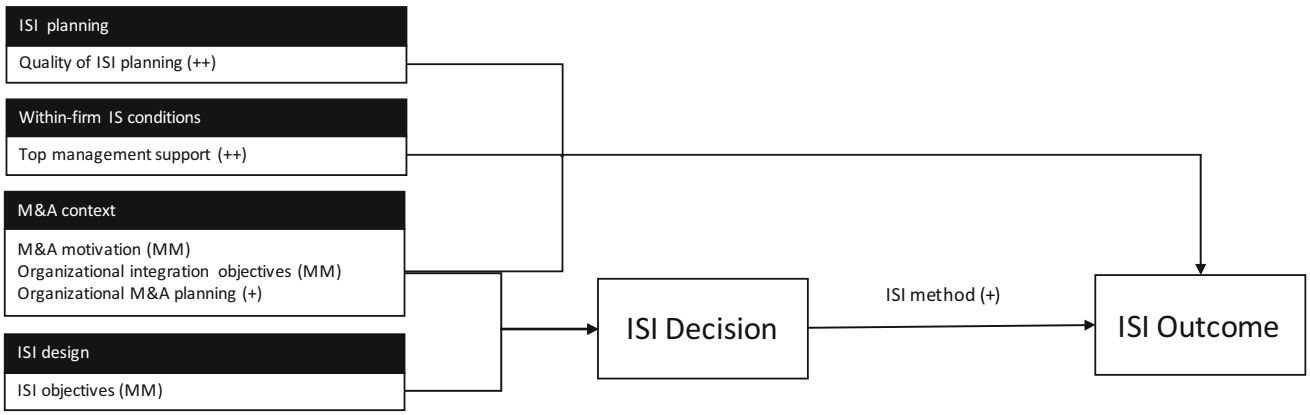

Figure 4 M&A context.

During a period of 15 years, 40% of the capacity expansions at existing firms in this industry were achieved through horizontal acquisitions.

The timing of acquisitions was not entirely in the hands of ForestCo. It had to act as companies became available in the market. Nor could ForestCo stop its growth program in order to restructure because opportunities would have been foregone. Therefore, ForestCo did not consolidate business at the corporate level as the firm expanded. Instead, ISI was resolved by retaining much of the pre-existing IS in the acquired businesses.

While this supported the rapid growth, the rapid expansion created four business divisions that were vertically structured silos. These were governed within a federated organizational structure with limited interaction among the divisions. Independence was valued over any benefits contingent on corporate control and cross-division synergies. Doing this, ForestCo failed to realize the synergies at the corporate level. To unlock the cross-division synergies, the top management team of ForestCo finally decided to develop a shared corporate IT platform.

The M&A context is a component in several explanations of ISI performance (Garcia-Canal *et al.*, 2013; Glazar-Stavnicky, 2016). However, it is rarely treated as central to explaining the dynamics between the overall M&A business context and the ISI project (Freitag *et al.*, 2010; Jain and Ramesh, 2015). To extend the explanation of ISI performance, future research should examine how M&A contexts affect the design and implementation of ISI projects.

The theoretical frameworks to do this potentially include general theories of coordination (Malone and Crowston, 1994) and task dependency (Thompson, 1967). These theoretical frameworks could provide the mechanisms for modelling differences among dependencies, the challenges that dependencies create and how the proposed coordination processes address those challenges (Grant, 1996; Medema, 1996). Recognition of these differences is fundamental to understanding how processes or integration methods are contingent on the context. Other theoretical frameworks addressing, for example, industrial characteristics could provide a starting point for analysing how the contextual influencers emerge in the first place.

Theme B: Relational fit

The most frequently studied relationship that is not a member of Theme A is the impact of application and IT compatibility on ISI outcomes (Chang *et al.*, 2014; Hsu and Chen, 2015). These relationships comprise a subdimension of the construct IS configuration fit, which affects ISI outcomes (Buck-Lew *et al.*, 1992; Johnston and Yetton, 1996; Brunetto, 2006). The effects of these variables are frequently explained in terms of the limitations that they impose on the options for implementing ISI, restricting the choice of ISI methods (Johnston and Yetton, 1996; Gorla and Pang, 2001; Brunetto, 2006; Myers, 2008).

Incompatibilities and lack of fit lead to misalignment between business and ISI integration processes (Wijnhoven *et al.*, 2006). Cumulatively, this creates an organization in misalignment (Figure 5) (Wijnhoven *et al.*, 2006; Mehta and Hirschheim, 2007; Baker and Niederman, 2014). The basic argument is that the ISI method should be matched to the M&A strategy to create the expected business benefits (Giacomazzi *et al.*, 1997; Wijnhoven *et al.*, 2006).

This argument is illustrated by the discussion of Cisco's acquisition of VS (Toppenberg *et al.*, 2015), a provider of solutions for streaming video. At Cisco, the acquisition protocols include mechanisms to design and implement multiple work streams to integrate its business and technical capabilities with those of an acquisition. Frequently, these are complex acquisitions with multiple business benefits that require multiple work streams to retain business/IT alignment.

The VS acquisition was driven by three distinct business benefits. First, the primary motivation for acquiring VS was to rapidly extend Cisco's product offerings in video services. VS's major product was VideoGuard, which was used by 85 pay TV operators around the world. Second, the intent was to extend VS's reach to the service provider market in China and India, where VS had an established customer footprint. Third, Cisco expected that some of VS's technical capabilities could be integrated into Cisco to support its existing business operations.

Instead of applying a single integration method to realize the multiple benefits, Cisco adopted and combined three ISI methods, absorption, co-existence and best-of-breed. Cisco then integrated VS at a capability level, where each capability was matched to an integration method. This meant that in the VS acquisition, various VS business and technical capabilities were retained, running in parallel with Cisco's corresponding capabilities. Others were implemented across the Cisco organization to deliver business improvements, and

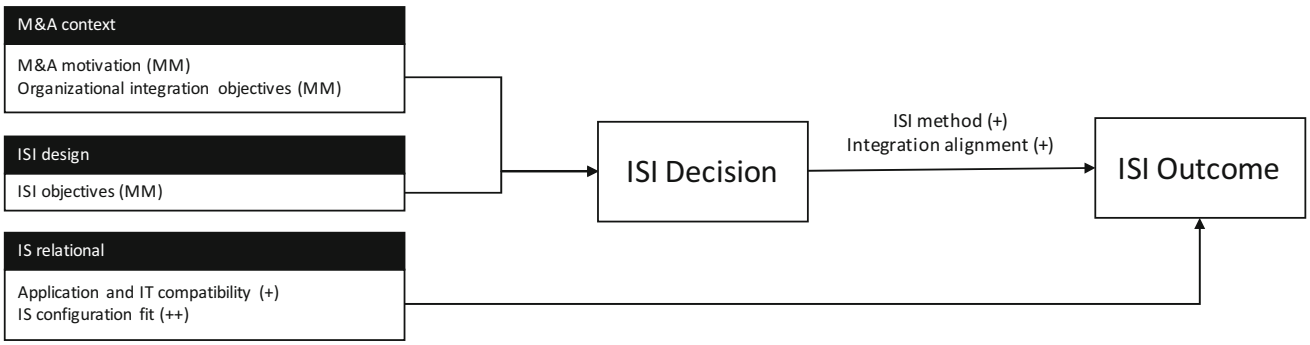

Figure 5 Relational fit.

yet others were replaced by Cisco's pre-existing set of capabilities to implement best practice and to realize economies of scale in the VS business.

Typically, alignment theory is adopted to explain the influence of the four integration methods on ISI. For example, within this framework, research has investigated the effects on IS and business strategic alignment of the choice of ISI method (Mehta and Hirschheim, 2007), alignment as an outcome of M&As (Wijnhoven *et al.*, 2006) and whether alignment between organizational and ISI methods is necessary to create value (Johnston and Yetton, 1996; Baker and Niederman, 2014).

The findings for the effect on M&A performance of alignment are inconsistent. Johnston and Yetton (1996), Wijnhoven *et al.* (2006) and Mehta and Hirschheim (2007) conclude that alignment is critical for ISI success. Baker and Niederman (2014) challenge this assumption. They report eight cases of misalignment out of 22 successful mergers. They conclude that alignment is not a prerequisite for ISI success. Consequently, for alignment theory to be a valid theoretical framework for the explanation of ISI outcomes, future research must theoretically integrate these disparate findings. A careful examination of methods and alignment in relation to the different definitions of ISI outcomes is a potential starting point to do this.

One major knowledge gap revealed by this review is that the existing literature does not have a well-defined understanding of the relevant outcomes of M&A ISI. Above, we identify 53 outcome variables, ranging from the time and resources required to complete the ISI project (Stylianou *et al.*, 1996), to stock-market reactions and post-integration operational performance (Tanriverdi and Uysal, 2011, 2015). Most researchers focus on only one or two of these outcomes.

A few researchers attempt to conceptualize ISI success as a multi-dimensional construct. For example, Stylianou *et al.* (1996), Robbins and Stylianou (1999) and Morsell *et al.* (2009) define ISI success as a five-dimensional construct: user satisfaction, ability to exploit merger opportunities, ability to avoid merger problems, IS resource utilization and improved IS capability.

However, these composite constructs of success are difficult to investigate because a close examination of the outcome variables reveals that several of them would be almost impossible to achieve at the same time, while others appear to be closely related. For example, the two constructs, more time and more resources, that are required to realize ISI benefits are highly interdependent. Similarly, user satisfaction and avoiding ISI problems are difficult to measure independently. To compare and contrast findings to develop theory, we need improved conceptualization of ISI outcomes.

In addition, the literature typically assumes the adoption of a single ISI method. For example, in their analysis of post-integration alignment, Baker and Niederman (2014) map a single ISI method to a single organizational integration strategy. In contrast, several of the rich case descriptions in the literature present ISI projects with mixed integration methods. For example, Cisco's acquisition of VS, discussed briefly above, combined three integration methods (Toppenberg *et al.*, 2015). In addition, some ISI methods can be partial, for example a partial IS co-existence method (Wijnhoven *et al.*, 2006; Henningsson and Kettinger, 2016). In practice, this method is effectively a combination of a co-existence and an absorption integration method.

This analysis shows that the current conceptualizations of ISI methods are subject to two limitations. One is that they do not allow for fine-grained definitions of integration methods. The other is that the choice of method is limited to the choice of a single method and not a portfolio of methods to realize multiple ISI benefits. Therefore, the improved precision of explanations based on alignment theory is contingent on conceptual development of the ISI method construct and its relationship to performance. Future research should address this issue.

Theme C: The human side

Changes in workforce size, IS employee morale and user training and support, are frequently linked to ISI outcome. Typically, these explanations of ISI outcomes emphasize the importance of communication (Stylianou *et al.*, 1996), politics (Linder, 1989; Kovela and Skok, 2012) and leadership (Kim *et al.*, 2005; Williams *et al.*, 2015). Taken together, these studies represent an explanatory theme that ISI includes an important human dimension: ISI methods affect and are affected by human behavior (Figure 6) (Linder, 1989; Kovela and Skok, 2012).

The THC case (Vieru and Rivard, 2014) illustrates this theme. In the THC case, a merger of three Canadian hospitals, the new organization tried to integrate the different units and introduce best practice through the introduction of a laboratory IS. At the outset of the merger, the three sites

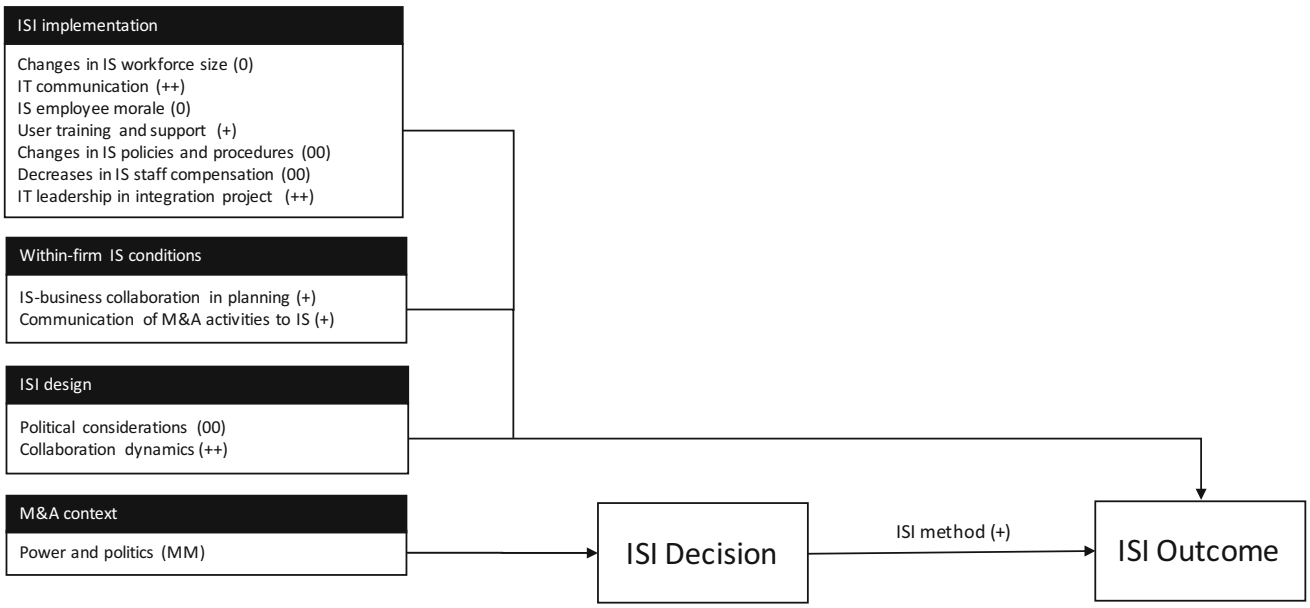

Figure 6 The human side of ISI.

that formed THC had distinct laboratory procedures. Management saw the ISI project as an opportunity to implement standardized processes throughout the merged organization, enabled by a single unified IT system.

The initial implementation design was based on a single IT system. However, it was only partly implemented because the people involved shaped the implementation to fit with their premerger working habits. Divergent organizational identities and team members' alternative interpretations of others' practices, norms and organizational symbols, prevailed during the integration phase. In general, the people involved in and subject to an ISI project do not simply enact managerial intentions. Rather, they take an active role in shaping ISI and its outcomes.

The human side of ISI design and implementation includes culture, power, change management, resistance and knowledge gaps (Linder, 1989; Alaranta and Martela, 2012; Vieru and Rivard, 2014). This human side of ISI comprises three critical dimensions: The human resources involved in realizing ISI, operating the integrated IS solutions and using the services contingent on ISI (Linder, 1989; Alaranta and Martela, 2012; Vieru and Rivard, 2014). While research has explored the scope of these three constructs, it is comparatively silent on how to resolve the associated ISI challenges (Alaranta and Martela, 2012).

So while there is limited understanding of what causes an ISI project to drift from its initial plans (Alaranta and Henningsson, 2008; Vieru and Rivard, 2014) and the importance of creating a project environment with good leadership, communication and user support (Linder, 1989; Alaranta and Martela, 2012; Vieru and Rivard, 2014), the answers as to how this can be achieved are inadequate. Attending to this issue requires attention to a broader range of questions pertaining to skill sets, team construction, location of decision-making on tactics and operations, and the potential to build and source expertise. Critically, future research on the human side of ISI should develop solutions to these challenges by studying these variables individually while also looking for overarching variables that may enable or influence all of them. Another important observation is to recognize that even projects with good leadership, communication and user support have failed. The presence of these three variables does not guarantee ISI success.

The above analysis implicitly treats the pre-M&A IS of the acquirer and of the acquisition as independent of each other and self-contained. Instead, human resource-based explanations of ISI must also address the permeability of organizational boundaries. Initially, this was limited to the growth of IT outsourcing and supply chain management (Richmond and Seidmann, 1992). Increasingly, organizations share their IS with other stakeholders, including suppliers, customers and partners that form part of larger information infrastructures that transcend organizational boundaries to form platforms on which other organizations build (Baldwin and Clark, 2000; Tiwana and Konsynski, 2010). Currently, the relevant dimensions of the composition and structure of these links with respect to M&A ISI are unknown. To understand the human side of ISI, future research should extend the scope of inquiry to include the wider set of stakeholders involved in co-designing, co-developing and co-implementing ISI.

Theme D: Preconditions for ISI

The fourth theme focuses on the preconditions to deliver successful ISI. Typically, these are described in terms of three dimensions: capabilities (Kim *et al.*, 2005; Henningsson, 2015), IT infrastructure (Tafti, 2009; Benitez-Amado and Ray, 2012) and the relationship between IT and business in the combined organization (Stylianou *et al.*, 1996; Brown *et al.*, 2003). These preconditions enable (or inhibit)

organizations to choose and effectively implement the ISI methods to realize the intended M&A benefits (Yetton *et al.*, 2013; Toppenberg *et al.*, 2015) (Figure 7).

The Danisco case (Yetton *et al.*, 2013) illustrates the importance of the ISI preconditions. Danisco was created in 1989 through a series of mergers that created a conglomerate in which more than 100 SBUs were managed as profit centres. In 1997, the new CEO initiated a radical strategy to transform Danisco from a regional conglomerate into a global food ingredients company, with sales to food processing companies instead of to retail consumers.

To implement this strategy, Danisco began an acquisition program targeted at food ingredient companies. The program was funded by divestments in other areas. The absences of a flexible IT infrastructure and of standardized business processes were major barriers to post-acquisition ISI. Integrating the next acquisition became an increasingly costly and slow process. Halting its growth program, Danisco rebuilt its IT platform with standardized business processes to support future acquisition ISI projects. The standardization also simplified the training of the integration team.

As a result, the cost of and time to deliver successful ISI were reduced significantly. The extreme case was Danisco's acquisition of Rhodia. This was completed on day one of the acquisition. Adopting an absorption ISI method, all Rhodia's IT resources were retired and the data transferred to the Danisco platform. The CIO acknowledged that they could not have done this without both implementing the new platform and business process standardization strategy, and training the acquisition team, to create the required preconditions to support the serial acquisition strategy.

In this theme, the dominant theoretical framing is the resource-based view of the firm (Tanriverdi and Uysal, 2011; Yetton *et al.*, 2013) and its extensions into the capability-based and knowledge-based views (Gregory *et al.*, 2012; Henningsson, 2015). Critically, research recognizes that it takes years, not months, to develop the IT resources to deliver successful ISI projects. However, how these resources are developed is not well understood. For example, Tanriverdi and Uysal (2011) report that cross-business IT integration capability affects ISI performance, but they do not address the question of how that capability is developed.

More research is also needed on the preconditions to deliver specific categories of ISI. This review reveals a major inconsistency between the variance in potential ISI benefits and the homogeneity in how the literature defines the relevant ISI capabilities and assets. Specifically, capabilities are not elaborated beyond the general capabilities of designing, planning and implementing, and properties of IT assets are typically restricted to issues of flexibility.

The above discussion identifies three gaps for future research. First, research should identify and link particular capabilities to specific ISI integration challenges and benefits. For example, this would include linking capabilities to specific integration methods and comparing successful ISI in single acquisitions with ISI in successful growth-by-acquisition programs.

Second, research should investigate alternative theoretical frameworks to accommodate the observed heterogeneity in the ISI challenges. For example, the capability literature has converged on theories of organizational routines in its search for the micro-foundations of capabilities (Helfat *et al.*, 2009). However, Henningsson (2015) observes that even for frequent acquirers, ISI can rarely be routinized. Instead, the formation of ISI capabilities appears to be subject to ad hoc problem solving.

Third, research should explore technology trends that transform the organizational use of technology. Many research findings are based on studies done or data collected ten or more years ago. What is missing is an understanding of the ISI challenge within the technological context of today's world, where concepts including 'cloud computing,' 'big data' or 'BYOD' are no longer buzzwords, but credible options within an IT organization's toolkit.

For example, a concept running through many studies in the sample is that systems must be able to scale to support an absorbed company's IT records and to process the new load (Merali and McKiernan, 1993; Eckert *et al.*, 2012). However, there is no discussion of how cloud computing may lessen the problems contingent on scaling. Where previously a lack of capacity to support the combined business was a barrier to successful ISI (Hsu and Chen, 2015), cloud computing potentially enables additional capacity to be sourced as a component in the integration project. A critical unaddressed

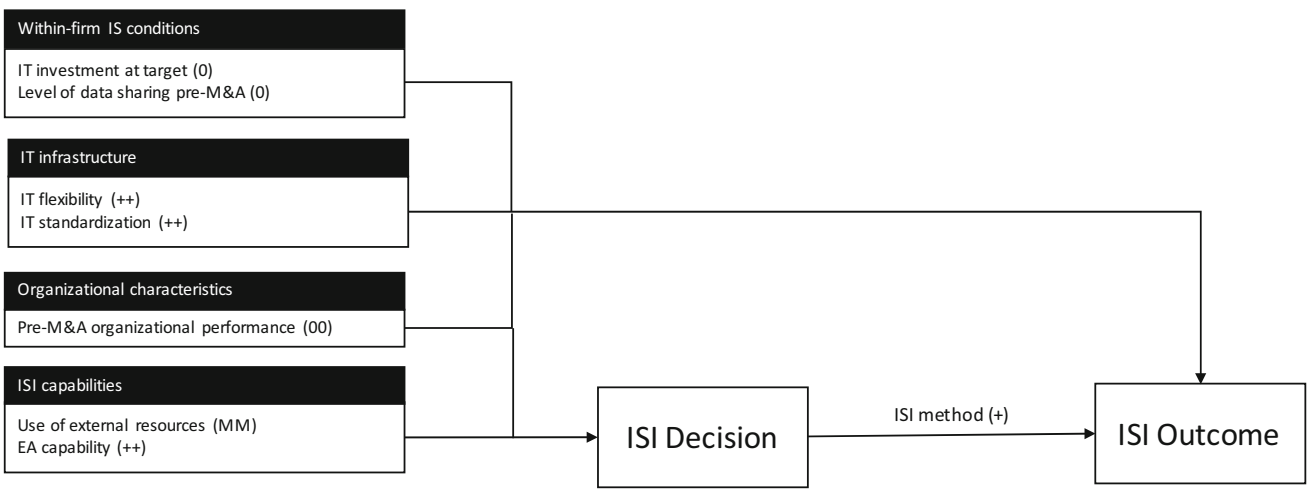

Figure 7 Preconditions for ISI.

question is: How do major changes in the provision of IT services shape the challenges of ISI and their solutions? Of course, new technologies would also introduce new challenges and limitations. For example, while the infrastructure may scale as a feature of a cloud-computing platform, perhaps the contracts do not scale so favourably.

Theme E: Time pressures

The fifth theme emphasizes the role of time pressure, which is frequently found to affect both ISI decisions and outcomes. The pressure to integrate rapidly takes several forms, including market pressure to realize the expected benefits (Mehta and Hirschheim, 2007) and legal pressure to report and govern risk (Johnston and Yetton, 1996; Mehta and Hirschheim, 2007). In Figure 8, time pressure interacts with these variables to affect the choice of ISI methods, and, hence, of ISI outcomes (Mehta and Hirschheim, 2007; Eckert *et al.*, 2012).

The Mekong-Indus merger (Mehta and Hirschheim, 2007) illustrates the effect of time pressure on merger ISI decision-making. Because ISI had in the past taken too long compared with stock-market expectations, Mekong decided to standardize the post-acquisition combined business based on the existing Mekong IS platform. Considering the external time pressure, moving to the preferred but unproven Indus platform was judged to be too much of a risk.

However, after a few years of struggling with operating on Mekong's preacquisition IS platform, the combined organization migrated to an updated platform similar to the Indus platform that had been retired during the merger project. This suggests that an option could have been to manage the ISI in two phases. In phase one, the Indus platform would have been retained. In phase two, the combined organization would have been transferred to a new Indus-type platform. In this way, while time pressures cannot be avoided, the time frame over which the various components of the ISI are achieved is a strategic IT decision.

Time is rarely included as a construct in theories of organizational behavior or strategic management. Critically, suboptimal decision-making due to time pressure has a major negative effect on ISI performance (LeFave *et al.*, 2008; Busquets, 2015). In addition, ISI decisions exhibit complexity and uncertainty, which make it difficult to identify and evaluate all the options within a tight time frame (LeFave *et al.*, 2008; Busquets, 2015), resulting in suboptimal decisions (Johnston and Yetton, 1996).

Complexity and uncertainty have an extensive history in organizational decision-making research beginning with the behavioural theory of the firm (March and Simon, 1958; Cyert and March, 1963) and its extension into the attention-based view of the firm (Ocasio, 1997) and the organizational response literature (Dutton and Duncan, 1987; Dutton and Jackson, 1987). In the literature on managerial cognition, complexity and uncertainty are linked to theories of mental models, emotions, intuition, ideology and sense making (Kiesler and Sproull, 1982; Walsh, 1995).

Specifically, in the case of M&As, ISI is challenged to accommodate complex multi-business decisions that are frequently the subject of competing and inconsistent business objectives within a short and tight time frame. However, these aspects of ISI project are typically noted in passing, while focusing on other parts of the explanation of ISI outcomes (Johnston and Yetton, 1996; Henningsson, 2015). In the M&A ISI literature, theoretical explanations that focus on the influence of time pressures are lacking.

ISI decisions are also subject to intertemporal effects. In our consolidated model, many variables occur as both independent and dependent variables, including ISI capabilities, IS–business relationships and IT infrastructure (Figure 3). For example, improvements in ISI capabilities result from learning processes across a series of acquisitions (Henningsson, 2015). So, ISI performance on one M&A influences the general perception of the IS organization, which in turn affects its ability to deliver the next ISI project (Main and Short, 1989). In addition, contemporary IT infrastructures are highly path dependent. Decisions made under time pressure on one ISI may be difficult to reverse and, therefore, could have major cumulative effects beyond the individual acquisition (Yetton *et al.*, 2013).

In this way, the cumulative effects of a growth-by-acquisition program generate very different managerial challenges compared with those of a single merger or acquisition. It follows that serial acquisitions must be understood not as individual events but as components in a growth-by-acquisition program. Beyond the direct acquisition benefits, research must include learning effects that improve ISI capabilities for the next acquisition, the

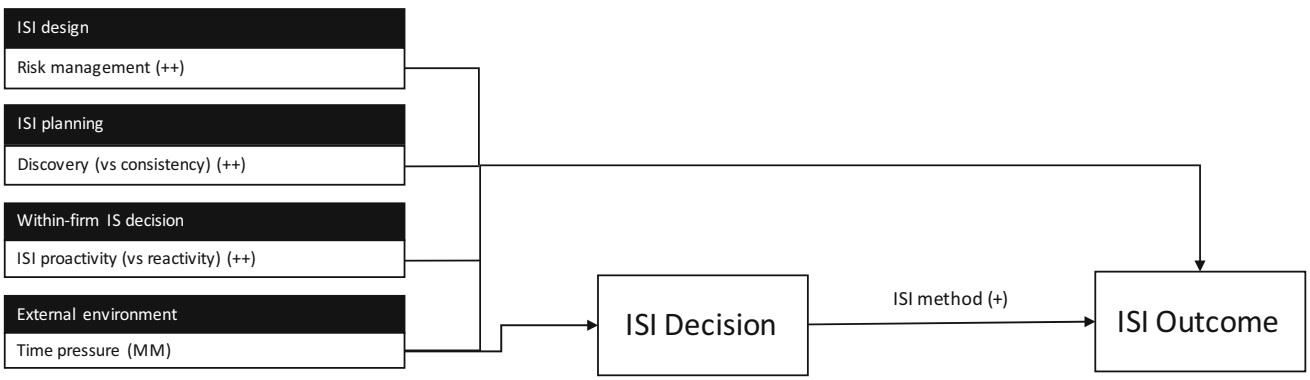

Figure 8 Time and suboptimal decision-making.

reputation trajectory of the IS organization and the technological limitations built into the IT infrastructure that inhibit future acquisition options.

Analysis of how the serial acquisition context affects ISI decisions and ISI outcomes is absent from the literature. While many of the case studies in the review sample analyse acquisitions by serial acquirers, they generally disregard the serial dimension and treat the acquisition as a discrete event (e.g., Seddon *et al.*, 2010; Busquets, 2015; Jain and Ramesh, 2015). This is a critical gap in research because 60% of all acquisitions are made by serial acquirers (Kengelbach *et al.*, 2011). While it may not be justified for organizations involved in an individual M&A to focus on the broader strategic context, doing this is critical for any organization implementing a growth-by-acquisition strategy. Future research should investigate the learning within a project, the learning between projects, and how, in combination, this learning makes an acquirer 'ready to acquire,' reducing the time pressures experienced, and, hence, the negative effects of time constraints.

Implications for research

The five themes frame the implications for research in four ways. First and foremost, the themes identify five major research subdomains in the literature on IT in M&As. By partitioning the robust relationships into five research themes or subdomains, the complexity contingent on the large number of relationships in Figure 3 is kept tractable for research within each theme. This focuses and enables the analysis of each theme.

Second, reviewing and comparing the five themes, we examine the overlaps among the themes. The intent to identify a limited number of themes that include all, or nearly all, of the relationships in Figure 3, while limiting the overlaps among the themes, has two implications for research. One is that it helps to keep the analysis within a theme tractable by limiting the requirement to explain and/or control for interdependences with relationships in other themes. The other implication is that the independence between themes enables us to investigate the theoretical status, or lack of status, within each theme.

Third, we hope that identifying the five themes will influence research in two other ways. One is to motivate the analysis of interdependences between themes at a theme, rather than at a relationship level of analysis. The other is to use what is known, the robust relationships that constitute a theme, to identify and focus on what is not known or is emerging as a new research stream and therefore potentially as a new theme.

Fourth, responding to the identified research gaps will require pluralism in methodological approaches. We note that research in the area has been dominated by qualitative case studies. While these studies continue to be relevant, increased methodological pluralism will be needed to address the knowledge gaps identified within, between and outside the emergent themes.

Formalizing the research contributions

We partition the robust findings across five themes. Each theme represents a major subdomain defined by a set of related robust findings in the M&A literature. Implicit but not made explicit, the analysis of each theme identifies the major thematic themes and core constructs, the related theoretical frameworks, the research gaps and some potential research questions. Here, we extract and formalize those contributions to make them more accessible and potentially useful to other researchers (see Table 4).

In Table 4, we identify a set of theoretical frameworks that are potential points of departure to develop the theoretical coherence of the emergent themes. In addition, there is an opportunity to investigate the unique M&A ISI context to increase the explanatory power of the frameworks. For example, the resource-based literature is relatively silent about how resources are recognized, developed, transferred and discarded when not needed. Research in the novel M&A ISI context could provide empirical observations that would both develop and validate the theory of M&A ISI, and generate general insights into the theoretical frameworks adopted.

Overlaps among and theoretical status of the themes

Inspecting the thematic domains and core constructs in Table 4, the overlaps can be partitioned into two sets. One set consists of the overlap common to the models of preconditions, relational fit and the ISI context. The other set of overlaps is between the relational fit and the ISI context themes. The differences between the theoretically based and the empirically based themes in Table 4 motivated the second issue reviewed here: the theoretical status of each theme.

Overlaps among the themes

The first overlap above involves the models of preconditions, relational fit and the ISI context. All three themes include the effects of ISI objectives on the ISI decision. On reflection, we would assign ISI objectives to be a component in the ISI decision construct. ISI objectives determine the ISI methods chosen to deliver the ISI outcomes. This change in classification would remove the interdependence between the preconditions theme and the other two themes.

The second set of overlaps is between the relational fit and the ISI context themes. The former, excluding ISI objectives, includes the effects of organizational integration objectives, M&A motivation, application and IT compatibility and IT configuration, on the ISI decision. The latter, ISI context, includes the effects of quality of ISI plan, top management support, M&A motivation, organization integration objectives and organizational M&A plans, on the ISI decision.

Two responses to the overlaps were considered. One was simply to combine the themes, reducing the number of themes to four independent themes. Empirically, this would have been a simple solution to satisfy the second criterion, minimizing the overlaps among the themes. The other was to retain them as different themes in which the common variables played different roles in M&A ISI. Inspecting the two models, the former option was rejected and the latter was accepted.

For example, we concluded above that the relationships comprising the relational fit theme constitute a subdimension of the construct IS configuration that affects ISI outcomes (Buck-Lew *et al.*, 1992; Johnston and Yetton, 1996; Brunetto, 2006). In which case, drawing on developments in that theoretical domain could help develop the

Table 4 Research agendas within each theme.

Thematic domain and core constructs	*Related theoretical frameworks*	*Research gaps*	*Potential research questions*
The M&A context Quality of ISI planning Top management support M&A motivation Organizational integration objectives Organizational M&A planning ISI objectives ISI method	Coordination theory Task-dependency theory	Conceptualizations of dynamic interactions between organizational integration and ISI Unexplored M&A contexts, including innovation-driven mergers in the hi-tech industries The value creating mechanisms of M&As in digital industries Challenges in transitioning from an established M&A practice to an innovation-oriented practice	What is the interface between the M&A project and the ISI project? How can the interdependences between the M&A project and ISI project be managed? How can acquirers manage incremental ISI in highly uncertain technology acquisitions? What are the appropriate ISI methods to integrate disruptive business models? What are the implications of M&As for digital ecosystems?
Relational fit M&A motivation Organizational integration objectives ISI objectives Application and IT compatibility IS configuration Integration alignment ISI method	Alignment theory Configuration theory	Inconsistencies in the importance of alignment A coherent framework for understanding M&A ISI outcomes Adopting a portfolio of ISI methods	How does alignment of ISI methods and merger strategies affect M&A outcomes? What are the relationships between different outcomes? To what extent do differences in outcome variables explain inconsistencies in extant research? What are the explanatory implications of relaxing the assumption of a single ISI method? How can a more granular perspective of ISI methods be conceptualized?
The human side of ISI Changes in IS workforce size IT communication IS employee morale User training and support Changes in IS policies and procedures Decreases in IS staff compensation IT leadership in integration project IS–business collaboration in planning Communication of M&A activities to IS Political considerations Collaboration dynamics Power and politics ISI method	Power and politics Change management Resistance Human resource management	Resolutions to identified human challenges The constituents of a good project environment The permeability of organizational boundaries and the M&A ISI project	How to manage ISI in M&As with valuable IT-enabled capabilities? What are the solutions to power, politics and resistance challenges? Which actors, excluding the merging organizations, affect M&A ISI and how can the extended organization be managed in the merger ISI context?

Table 4 Continued

Thematic domain and core constructs	*Related theoretical frameworks*	*Research gaps*	*Potential research questions*
Preconditions for delivering ISI IT investment in the target Level of data sharing pre-M&A IT flexibility IT standardization ISI objectives Use of external resources EA capability ISI method	Resource-based view Capability-based view Knowledge-based view	The building of preconditions for M&A ISI Interaction between M&A ISI learning processes and other organizational events Specific ISI capabilities for specific M&A subclasses Conceptualization of ISI capabilities accommodating variation in challenges The impact of emerging technology management practices	What are the origins of ISI capabilities and how do organizations develop them? Which ISI capabilities are required for specific categories of mergers? How can ISI capabilities be conceptualized to cater for the heterogeneity of ISI challenges? In which ways do trends such as cloud computing and software-as-a-service affect ISI in M&As?
Time and suboptimal decision-making Risk management Discovery ISI proactivity Time pressure ISI method	Organizational response Attention-based view Path-dependency theory Temporal scales	The impact of time pressure on ISI decision-making in M&A Intertemporal effects in serial acquirers The challenges and management of acquisition programs and acquisition-based growth strategies Antecedents of ISI capabilities	How are ISI decisions affected by time pressure? To what extent are M&A objectives mutually exclusive or conflicting in their effects on ISI? How do trade-offs generate suboptimal outcomes? Which are the critical implications of the intertemporal nature of ISI decisions in M&As? What are the critical cumulative effects in a series of M&As?

theme in future research. For example, recent developments include a model to explain business and IT strategic alignment in multi-business organizations (MBOs) (Reynolds and Yetton, 2015).

Reynolds and Yetton (2015) explain how incompatibilities between business and IT strategies lead to functional and structural misalignment within and between strategic business units (SBUs) in MBOs. Their model could be extended to explain how different integration methods would affect ISI at the SBU level of analysis. In addition, Reynolds and Yetton explain how dynamic misalignment is created over time within the IT investment cycle. So, their model could also be extended to explain how dynamic misalignment is created in a growth-by-acquisition program. In both suggestions, the basic argument is that the ISI method should be matched to the M&A strategy to create the expected business benefits (Giacomazzi *et al.*, 1997; Wijnhoven *et al.*, 2006).

In contrast, we conclude above that the relationships in the ISI context theme form a thematic domain that is embedded in the M&A project in which, for example, the outcomes of the ISI project are contingent on the M&A business objectives (Holm-Larsen, 2005; Steininger *et al.*, 2016a). Compared with the relationships that constitute the relational fit theme, which share a common theoretical analytical framework, the relationships that constitute the ISI context theme are embedded in what is essentially an empirical, practice-based rather than theory-driven research domain. Therefore, there is no theoretical or empirical reason for merging the relational fit and the ISI context themes, which critically would have increased the number of relationships and, in turn, the analytical complexity within the merged single theme.

Theoretical status of the themes

Inspecting the five themes, the ISI context theme is essentially an empirical practice-led theory, even though in Table 4, we suggest that co-ordination theory and task-dependency theory are potentially related theories. As discussed above, the relational fit theme is a theory-led theme based on alignment theory. The preconditions theme is a theory-led theme based on the resource and related theories. The human side theme draws on a multitude of theoretical frameworks, and the time pressures theme is an empirical practice-led theme.

For example, the time pressures on integration take various forms, including market pressure (Johnston and Yetton, 1996; Mehta and Hirschheim, 2007). Similar to the ISI context theme, the time pressure theme is an empirically based theme. However, unlike the ISI context theme, the time pressure theme is not embedded in an IT practice-based domain. Instead, it includes all the external pressures on an M&A. As such, the reference literature is the general M&A literature.

The resource-based view of the firm (Tanriverdi and Uysal, 2011; Yetton *et al.*, 2013) and its extensions into the capability-based and knowledge-based views (Gregory *et al.*, 2012; Henningsson, 2015) is the dominant theoretical framing for the preconditions theme. So, similar to the relational fit theme, future research on this theme should draw on recent theory developments in the resource-based reference literature.

Finally, the human side of ISI design and implementation includes culture, power, change management, resistance and knowledge gaps (Linder, 1989; Alaranta and Martela, 2012; Vieru and Rivard, 2014). This is a wide range of reference literature. However, we speculate that this literature can be partitioned under three headings: The human resources involved in realizing ISI, operating the integrated IS solutions and using the services contingent on ISI (Linder, 1989; Alaranta and Martela, 2012; Vieru and Rivard, 2014). To make future research on this theme tractable, it should draw on only one of these three large reference literatures to frame the research.

Gaps within and between themes

The third issue discussed here concerns gaps within themes and the relationships between themes. An example of the former would be to acknowledge that the unit of analysis in ISI research is typically a single merger or acquisition. However, in practice, many acquisitions are elements in a growth-by-acquisition strategy (Toppenberg *et al.*, 2015) and, therefore, we know little about the dynamics of performance in growth-by-acquisition strategies. An example of the latter would be combining the preconditions for ISI theme with the time pressures theme to focus the analysis on how an organization could become 'ready to acquire' or 'ready to be acquired.'

Gaps within themes

Here, we present two examples of research in the gaps within themes. First, adopting a single M&A as the unit of analysis excludes the analysis of growth-by-acquisition strategies, which account for 60% of M&As (Kengelbach *et al.*, 2011), and the development of capabilities over multiple acquisitions. For example, Henningsson (2015) concludes that developing the critical ISI capabilities is contingent on the experience of and the learning from a series of heterogeneous acquisition projects. He does acknowledge, however, that the learning trajectory may be influenced by other related experiences, including, for example, implementing a major enterprise system.

While serial acquirers learn from repeat acquisitions, research should document this knowledge to make it available to novice acquirers. This would enable them to avoid the trial-and-error learning mistakes that their serial acquiring colleagues have made. Research has already begun to investigate this form of learning (Henningsson, 2015) but without examining the implications for novice acquirers.

The flipside to this would be to understand the challenges novice acquirers face as they embark on their earliest acquisitions, and how to identify and avoid unexpected pitfalls. Wynne (2016) starts to explore the learning processes of a novice acquirer. Given the prevalence of novice acquirers in the M&A market, it is critical that research enables the transfer of learning from experienced to novice serial acquirers.

Second, the importance of the M&A context raises the question of whether ISI has been investigated in all of the relevant M&A contexts. While research has investigated ISI in a number of industries (see 'Appendix B'), there is limited formal analysis of whether ISI is a standard process for all, or is contingent on the industry, company or product line? For example, Toppenberg (2015) comments that many of the industries studied are traditional 'low-tech' industries. Studies of 'hi-tech' industries are not well represented in the extant literature. The exceptions include studies of manufacturers of hi-tech goods (Chang *et al.*, 2014), telecoms (Alaranta and Henningsson, 2008; LeFave *et al.*, 2008) and IT service providers (Alaranta and Martela, 2012). However, even in these studies, the 'high-tech' nature of the industry is not treated as relevant and, certainly, not as central to the analysis.

The lack of studies of hi-tech companies is relevant for two reasons. One is that hi-tech industries account for about 20% of all M&A activity, including many of the largest M&As (Toppenberg, 2015). The other reason is that hi-tech industry dynamics differ from those in traditional industries in ways that influence ISI performance (Henningsson *et al.*, 2016). For example, in hi-tech M&As, the acquisitions are frequently start-ups with emergent, potentially disruptive business models. These are frequently difficult to accommodate within the acquirer's existing IS landscape.

M&As in digital industries are another example of the salience of the context. These M&As are different from acquisitions in 'non-digital' hi-tech industries, such as pharmaceuticals and health science. Many digital firms, including Google, Apple, Microsoft and Facebook, complete multiple acquisitions each year. This digital dimension is absent from the general research on M&As (c.f. Graebner *et al.*, 2010). Yet, we know that digital industries are characterized by distinct business dynamics, including network effects, platform-based business models and cooperation within business ecosystems (Henningsson *et al.*, 2016). The mechanisms of value creation and the interplay with the digital technologies enabling them should be the topic of future studies of ISI performance.

Analysis between themes

The research in the time pressures theme focuses on the dysfunctional responses to time pressures (Mehta and Hirschheim, 2007). Within this theme, the literature is limited to examining the poor options available to manage this threat to ISI performance. Instead, consider how combining the time pressures theme with the preconditions theme would motivate research on how improvements in the capabilities within the preconditions theme would reduce time pressures, rather than attempting to improve the management of those pressures within the time pressure theme.

In general, developing a high level of preconditions would make acquirers increasingly 'ready to acquire' and reduce the level of time pressure on acquisition teams. This research could be extended to enable organizations that are divesting a business unit to make that unit 'ready to be acquired.' Similarly, improving our understanding of the relational fit theme could reduce IT implementation project specification errors. This would enhance IT project performance within the ISI context theme.

In addition, consider how combining the time pressures theme with the ISI context theme could reduce the management challenges in the time pressures theme. For example, in a subsequent acquisition, the bank in Johnston and Yetton (1996) integrated the retail bank business of its next acquisition target using an absorption method but ring-fenced the wealth business until the acquirer's next platform upgrade because its current platform could not host the acquired wealth business.

This is similar in form to the two-phase solution that we propose above to the challenge faced by Mekong in its acquisition of Indus. This approach to ISI simply requires that the assumption in which ISI occurs at a single point in time is relaxed, at least for the integration of the IT platforms. Future research should explore the interdependencies among the five themes to identify under-researched effects on ISI.

Methodological considerations

In the general literature on M&As, studies based on quantitative data (surveys and empirical studies) outnumber the studies based on qualitative data (single and multiple case studies) by a factor of 20 (Bengtsson and Larsson, 2012). In the extant research on ISI issues in M&A, only 14 of 70 identified publications are based on quantitative data (see 'Appendix A').

The primarily case-based research approach employed has been instrumental in the exploratory theory development that has taken place. Certainly, further case-based exploration will continue to be important to expand the current knowledge base to additional actors and types of M&As, yet to be addressed from an IS perspective, for example, in expanding the study of the M&A context to digital industries (Toppenberg, 2015) or to uncover the impact of the increased adoption of cloud technologies to extend the theme on preconditions for ISI.

For the areas that are already relatively well covered, in particular the acquisition of individual business units, and the themes that have reached some degree of theoretical maturity, there is now a requirement to empirically investigate and statistically verify the theoretical propositions that have been developed. For example, a survey could provide valuable insights into the relationships between ISI capabilities and integration methods. It could reveal both positive and negative effects of different capabilities within the context of a range of different M&As.

However, because of the lack of validated constructs, this type of analysis will be expensive in terms of resources needed. We identified 53 different ways of describing the effects of ISI. However, with few exceptions (Stylianou *et al.*, 1996; Tanriverdi and Uysal, 2011, 2015), measurement constructs are not available to model and estimate these effects.

Finally, the status of the themes and their gaps calls for an additional set of qualitative studies. Specifically, these studies would adopt methodologies in which researchers are immersed in the context, and explore from the inside. The methodologies would include action research, design research and participant observation. The general research question would be: How do the people involved in ISI projects manage the tensions, complexities and uncertainties as the project unfolds?

Two examples illustrate this line of research. In one, the researcher would engage with practitioners in design research to develop tools and approaches grounded in the emergent academic understanding of ISI to address the challenges of the ISI process (Wynne, 2016). The other example could be the subject for an action research study: How is successful M&A ISI contingent on the level of digitalization?

Conclusions

To overcome the fragmentation of the research on ISI challenges and solutions in M&As, we document, organize and structure the empirical findings of 70 research articles that collectively cover three decades of research on the topic. The research question guiding the review is: *How to aggregate, organize and structure what we know about M&A ISI decisions and their outcomes?*

To answer this question, we examine the independent and dependent variables investigated in the literature and the relationships among them. We identify 195 independent variables, 53 dependent variables and 619 relationships among them. Distinguishing between categories of ISI decision and ISI outcomes as dependent variables, we identify the robust research findings reported in the literature and consolidate them in a model that presents the critical factors that consistently affect ISI decisions and ISI outcomes.

We then inspect the consolidated model to identify five themes in the explanations of ISI and its effects on performance: M&A context, relational fit, human behavior, preconditions and time pressure. For each theme, we identify the core constructs, discuss the presence, or absence, of theoretical frameworks and give an illustrative example of practice. Each of the themes highlights complementary aspects of ISI dynamics. We do not claim that these five themes are the only ones relevant for ISI research. Rather, they represent points of convergence that allow us both to structure the relationships among the robust findings and to identify critical gaps in this fragmented research domain.

Advancing the research domain in the directions suggested would develop a set of mid-range theories that are contextually contingent and managerially actionable. Given the practical relevance of the topic, this is an appropriate course of action in the short- and mid-term perspective. In the longer term, the challenge remains to integrate the diverse themes. In our view, more research needs to be done to develop individual explanatory models of the themes before it would be possible to theoretically integrate them.

We recognize that our review is subject to limitations contingent on the choice and execution of our review methodology. Three are reviewed here. First, while we have attempted to identify all relevant research that meets our criteria for inclusion and to code it correctly, we cannot guarantee that we have not made errors of omission in the former and errors of commission in the latter. However, given the large amount of data analysed, we believe that the major findings and conclusions are independent of any such errors. In addition, we have made our review method transparent to enable other researchers to replicate our analysis.

Second, the relationships in our review do not reflect the substance or magnitude of the effects. Nor do they include interactive and dynamic effects, for example, examining how changes in decisions and contextual conditions evolve during the ISI project. However, there are not enough data to conduct a structured review to do such research. In addition, just because a relation between a set of variables has not been documented, it does not mean that the relation does not exist. The lack of evidence supporting the relationship may be a factor of the industries and in which the context of ISI has been investigated, or that research has investigated variables that are easier to measure than others.

Third, Lacity *et al.*'s (2010, 2011, 2016) review methodology organizes and structures the empirical findings to report what is known. It does not provide and is not intended to provide a coherent theoretical explanation of the domain reviewed. Our intent, given the current fragmented state of the research domain, is to document what is known and develop a research database within which researchers can locate their research or on which they can draw to motivate research.

Our general conclusion from looking both backward and forward to examine the ISI research on M&As is that, despite an extensive body of literature, we have but scratched the surface of this problem domain. With the large number of relationships identified above that influence ISI decisions and outcomes, it is easy to see why ISI is reported as one of the critical problem areas inhibiting successful M&As. M&A ISI should be a major IS future research domain.

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Stefan Henningsson is an Associate Professor at Copenhagen Business School, Department of Digitalization. His current research addresses managerial aspects of IT in contexts that include corporate mergers and acquisitions and international trade processes. Previous publications include peer-refereed papers published in academic journals such as Journal of Management Information Systems, Information Systems Journal, European Journal of Information Systems, and Journal of Strategic Information Systems, as well as practice-oriented journals such as Management Information Systems Quarterly Executive and Cutter Business Technology Journal.

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Appendix A: Paper overview

See Tables A1, A2, A3 and A4.

Table A1 Papers in the review.

#	*References*
1	**Al Suliman, M.H.** (2015). In Mergers and Acquisitions-IT: Results of the Absence of CIO in Ex-ante Planning and the Absence of Key IT Staff in Ex-post Integration, *Journal of Management Information Systems & E-commerce* **2**(2): 1–110.
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Table A1 Continued

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Table A2 Research methods.

Research methods	*Frequency*
Single case	29
Multi-case	21
Survey	5
Database	4
Expert panel	4
Multi-case and survey	2
Survey and database	2
Design science	1
Expert panel and survey	1
Focus group	1

Table A3 Object of study.

Object of study	*Frequency*[a]
M&A generic	37
Acquisition	17
Merger	16
Divestment	1

[a]One article has both the acquisition and divestment as its object of study.

Table A4 Theoretical framework.

Theoretical framework	*Frequency*[a]
No explicit theory	37
Alignment theory	8
Resource-based view	7
Process perspective	4
Strategic planning	2
Structuralist	1
Individualist	1
Knowledge transfer	1
Evolutionary organization theory	1
Knowledge-based view	1
Culture conflict	1
Organizational identity	1
Sociomaterial practice	1
Ambidextrous IS Strategy	1
Governance theory	1
Practice perspective	1
Learning theory	1
Boundary spanning	1
Cultural messages	1

[a]One article explicitly combines structuralist, individualist and process perspectives.

Appendix B: Master variables

See Tables B1 and B2.

Table B1 Independent master variables.

#	*Independent master variable*
1	Acquirer's IT capability. The general IT capability of the acquiring firm (e.g., Tanriverdi and Uysal, 2011)
2	Acquiring another MBO. If the target acquired is another multi-business organization (e.g., Du, 2015)
3	Acquiring from another MBO. If the target is acquired from another multi-business organization (e.g., Du, 2015)
4	Aligned post-M&A state. Business and IT alignment as a post-M&A state (e.g., Mehta and Hirschheim, 2007)
5	Alignment of integration objectives. The fit between the organizational integration objectives and the ISI objectives (e.g., Wijnhoven *et al.*, 2006)
6	Alignment of integration processes. Fit between the choice of organizational integration process and ISI process (e.g., Baker and Niederman, 2014)
7	Alignment of vendor and acquirer IT transaction strategies. The fit between the way a unit is carved-out and integrated (e.g., Böhm *et al.*, 2011)
8	Application and IT compatibility. The compatibility of technical platforms, programming languages and software (e.g., Chang *et al.*, 2014)
9	Attention to IT. The level of attention given to ISI issues in the overall organizational integration project (e.g., Merali and McKiernan, 1993)
10	Basic conditions. Technological constraints with importance for the ISI (e.g., Steininger *et al.*, 2016b)
11	Boundary consolidation. Presence and effectiveness of strategies to collaborate and alter the pre-M&A boundaries (e.g., Vieru *et al.*, 2016)
12	Boundary spanning versatility. ISI team's ability to assume different roles in the consolidation of stakeholders (Jain and Ramesh, 2015)
13	Burning desire. The eagerness of the team to succeed in a once-in-a-lifetime experience (e.g., Brown *et al.*, 2003)
14	Business analysis. Quality of the activities to assess the business rationale of integration (e.g., Kim *et al.*, 2005)
15	Business and IT alignment preconditions. The pre-M&A business and IT alignment in the respective merging organizations (e.g., Henningsson and Yetton, 2011)
16	Business understanding of IS development. The business manager's knowledge about IS development challenges (e.g., Kim *et al.*, 2005)
17	Business-based priorities. The extent to which business needs drives ISI decision-making (e.g., Kovela and Skok, 2012)
18	Changes in policies and procedures. The extent of M&A-related change in IS policies (e.g., Stylianou *et al.*, 1996)

Table B1 Continued

#	*Independent master variable*
19	Changes in workforce size. Increases and decreases in the number of IS staff (e.g., Stylianou *et al.*, 1996)
20	Cognitive sunk costs. The social and psychological costs associated with altering firm habits and routines that prevent firms from seeing economically feasible alternative (e.g., Chun and Whitfield, 2008)
21	Collaboration dynamics. The spirit of collaboration in the project team (e.g., LeFave *et al.*, 2008)
22	Common ISI goals. The degree to which commonly accepted and realistic goals are established for the ISI (e.g., Linder, 1989)
23	Communication of M&A activities to IS. The effectiveness by which progress and plans of the M&A are shared with the IS function (e.g., Morsell *et al.*, 2009)
24	Company language. The language that is commonly used in the company (international vs local) (e.g., Schonewille and Bouwman, 2012)
25	Company scale. The size of a company, as well as its market and operation (e.g., Schonewille and Bouwman, 2012)
26	Comparative analysis. Presence of comparative systems analysis (e.g., Seddon *et al.*, 2010)
27	Competing business models. The extent of competition between the business models of the merging organizations (e.g., Toppenberg, 2015)
28	Complexity being a criterion for ISI decision. The recognition of ISI method complexity influencing ISI decision (e.g., Robbins and Stylianou, 1999)
29	Complexity. The overall complexity and therefore risk of an ISI method (e.g., Alaranta and Kautz, 2012)
30	Comprehensiveness. Being exhaustive or inclusive in gathering information relevant to ISI planning (e.g., Alaranta and Henningsson, 2008)
31	Corporate culture. The way a company and its employees conduct business, work together and view their business operation and industry network (e.g., Schonewille and Bouwman, 2012)
32	Cost focus. The cost for ISI as a decision criteria (e.g., Mehta and Hirschheim, 2007)
33	Cost-efficient ICT. The existence of a pre-M&A cost-efficient IT infrastructure (e.g., Parada *et al.*, 2009)
34	Cost. The cost characteristics of an ISI method (e.g., Holm-Larsen, 2005)
35	Credible deadlines. The establishment of credible and accepted deadlines (e.g., Linder, 1989)
36	Cross-business IT integration capability. The extent to which the acquirer combines the target's system of complementary IT resources with its own and unifies them into a whole (e.g., Tanriverdi and Uysal, 2011)
37	Culture clashes. The extent of cultural inconsistencies between the merging firms (e.g., Weber and Pliskin, 1996)
38	Data integration. Level of data sharing across applications in combined organization (e.g., Stylianou *et al.*, 1996)
39	Decision process. The structure of the ISI decision process: market, negotiate, cooperate (e.g., Linder, 1989)
40	Decreases in IS staff compensation. M&A-related limitation in the compensation to IS staff (e.g., Stylianou *et al.*, 1996)
41	Defined business strategy. Existence of a clearly specified business strategy for the M&A (e.g., Williams *et al.*, 2015)
42	Degree of ISI. The level to which IS are integrated in the M&A (e.g., Weber and Pliskin, 1996)
43	Development and testing. Presence and quality of adequate IS development and testing (Kim *et al.*, 2005)
44	Diagnostic capability. The ability to design the mix of ISI methods that fits the M&A (e.g., Yetton *et al.*, 2013)
45	Differences in management needs. The extent to which management in the merging organization needs different input from IS (e.g., Giacomazzi *et al.*, 1997)
46	Digital resource redeployment. The extent to which the acquirer's software is implemented in the target after the acquisition (e.g., Du, 2015)
47	Discovery (Consistency). As opposed to planning consistency, the inclusion of emergent variations in ISI plans throughout the ISI (e.g., Busquets, 2015)
48	Distributed decision authority. The distribution of decision-making authority to the seasoned people close to the ISI (e.g., Brown *et al.*, 2003)
49	Division of integration task. The decomposition of the ISI project into a set of minor tasks (e.g., Sumi and Tsuruoka, 2002)
50	EA capability. The extent to which the EA capability contributes to the ISI (e.g., Toppenberg *et al.*, 2015)
51	Economic climate. The state of the economy when a M&A takes place (Schonewille and Bouwman, 2012)
52	Effort. The overall resources needed to complete an ISI method (e.g., Eckert *et al.*, 2012)
53	End-user involvement in ISI. Degree to which end-users are included in integration activities (e.g., Morsell *et al.*, 2009)
54	Enterprise systems (presence of). The presence of an integrated enterprise-wide IS (e.g., Bhattacharya, 2016)
55	Ex-post evaluation. Presence of activities to assess ISI after completion (e.g., Merali and McKiernan, 1993)
56	Existing IS-IT qualities. The qualities of pre-M&A IS (e.g., Eckert *et al.*, 2012)
57	Expansion (shrinkage) of target. The changes in size of the target's business (e.g., Du, 2015)
58	Experience variation. The degree of disparity between a set of ISI experiences (e.g., Henningsson, 2015)

Table B1 Continued

#	*Independent master variable*
59	Financial slack – Target. If the target produced a positive financial result pre-M&A (e.g., Du, 2015)
60	Flow. Top-down or bottom-up flow of decisions in ISI planning (e.g., Alaranta and Henningsson, 2008)
61	Focus. Focus on creativity (opportunities) or control (risk) focus in ISI planning (e.g., Alaranta and Henningsson, 2008)
62	For-profit status difference. Whether the transaction is between a for-profit organization and a non-for-profit organization (e.g., Du, 2015)
63	Formalization. The presence of structures, techniques, written procedures and policies to guide the ISI planning (e.g., Alaranta and Henningsson, 2008)
64	Geographical distribution. The extent to which the merging organizations are distributed across different geographical locations (e.g., Mehta and Hirschheim, 2007)
65	Geographical distribution of IS. The placement of IS activities in different locations (e.g., Hsu and Chen, 2015)
66	Geographical distribution of IT. The extent to which IT hardware is located in different locations (e.g., Robbins and Stylianou, 1999)
67	Geographical relatedness. Extent to the merging organizations are present in the same physical locations (e.g., Du, 2015)
68	Habits and practice. The presence of socially resilient pre-M&A practices (e.g., Vieru *et al.*, 2016)
69	High profitability and high-growth firm. The combination of high profitability and growth pre-M&A (e.g., Tanriverdi and Uysal, 2015)
70	High profitability and low-growth firm. The combination of high profitability and low-growth pre-M&A (e.g., Tanriverdi and Uysal, 2015)
71	HR management. The requirements and aspects of human relations management during and after the migration in terms of effective IS usage (e.g., Steininger *et al.*, 2016a)
72	Implementation capability. The ability to deploy IT resources to realize ISI (e.g., Yetton *et al.*, 2013)
73	Inclusion of IT staff. The extent of participation of IS staff in the ISI planning (e.g., Alaranta and Henningsson, 2008)
74	Inclusion of key IT staff in ex-post integration. The assignment of ISI tasks to the most skilled IS employees (e.g., Al Suliman, 2015)
75	Industry characteristics. Features of the industry in which the M&A takes place (e.g., Toppenberg, 2015)
76	Industry relatedness. If the organizations operate in the same industry (e.g., Tanriverdi and Uysal, 2015)
77	Information security management. The degree to which security culture is managed throughout the ISI (e.g., Dhillon *et al.*, 2016)
78	Integration cost. M&A-related restructuring and integration costs (e.g., Tafti, 2009)

Table B1 Continued

#	*Independent master variable*
79	IS configuration fit. The degree of compatibility between IS configurations, drawing on the MIT'90s schema (Scott Morton, 1991) (e.g., Johnston and Yetton, 1996)
80	IS culture integration. The extent to which IS cultures of the combined organizations are integrated (e.g., Baker and Niederman, 2014)
81	IS employee morale. IS employees' spirit and belief in ISI (e.g., Stylianou *et al.*, 1996)
82	ISI area of application. The extent to which applications of the combined organizations are integrated (e.g., Alaranta and Martela, 2012)
83	ISI area of personnel. The extent to which IS personnel of the combined organizations are integrated (e.g., Alaranta and Martela, 2012)
84	ISI process. The quality of the administrative IS supported processes in general and specifically for the M&A project (e.g., Steininger *et al.*, 2016a)
85	IS morale. The extent to which IS staff morale is critical to the project (e.g., Seddon *et al.*, 2010)
86	IS organizational compatibility. The compatibility of organizational structures and cultures within the merging IS functions (e.g., Lin and Chao, 2008)
87	IS perception. The credibility of the IS function among business functions (e.g., Yetton *et al.*, 2013)
88	IS performance. The quality and performance of the pre-M&A IS (e.g., Steininger, 2016a)
89	IS planning. The general approach taken to IS planning (e.g., Robbins and Stylianou, 1999)
90	IS staff motivation. Availability of motivated IS staff (e.g., Kovela and Skok, 2012)
91	IS strategy. General pre-M&A IS strategy (e.g., Gregory *et al.*, 2012)
92	IS strategy compatibility. The compatibility between the merging organizations IS strategies (e.g., Johnston and Yetton, 1996)
93	IS–business collaboration in planning. Degree of IS participation in M&A planning (e.g., Morsell *et al.*, 2009)
94	ISI capability. A higher-order construct determined by IT technical infrastructure integration, IT personnel integration and IT and business processes integration capabilities (e.g., Benitez-Amado and Ray, 2012)
95	ISI expertise. A conceptual framework for interpreting acquisition ISI experiences (e.g., Henningsson, 2015)
96	ISI implementation speed. The time needed to complete integration with the right functionality (e.g., Kovela and Skok, 2012)
97	ISI method. The fundamental approach used to combine the IS of the merging organization (e.g., Henningsson and Kettinger, 2016)

Table B1 Continued

#	*Independent master variable*
98	ISI objectives. The strategic objectives assigned to the IS function in the M&A (e.g., Wijnhoven *et al.*, 2006)
99	ISI proactivity (vs reactivity). The degree to which IS facilitate organizational change or contribute to deal motivation (e.g., McKiernan and Merali, 1995)
100	ISI routines. A coordinated, repetitive set of organizational activities for implementing ISI (Henningsson, 2015)
101	ISI skill. The involved organizations' available skills for addressing ISI (e.g., Kim *et al.*, 2005)
102	ISI speed. The time need for ISI as a decision criterion (e.g., Garcia-Canal *et al.*, 2013)
103	IT communication. Communication between IS function and other organizational units during the ISI (e.g., Morsell *et al.*, 2009)
104	IT culture conflict management. The extent to which the merging organizations effectively manage cultural conflicts between the merging IS functions (e.g., Lin and Chao, 2008)
105	IT extensiveness. The relative scale of IT assets compared to organizational size (e.g., Du, 2015)
106	IT flexibility. The IT assets' ability to support change in use, commonly compatibility, connectivity, modularity (e.g., Benitez-Amado and Ray, 2012)
107	IT governance mode. Whether an acquired unit is allowed to make independent IT investment decisions (e.g., Du, 2015)
108	IT in charge. IT (vs business) in charge of ISI decision (e.g., Kim *et al.*, 2005)
109	IT infrastructure. A general construct for the characteristics of the existing IT infrastructure (e.g., Wijnhoven *et al.*, 2006)
110	ISI team. The qualities of the ISI team (e.g., Alaranta and Kautz, 2012)
111	IT investment at target. The amount invested annually in the target (e.g., Tafti, 2009)
112	IT investment in acquirer. The amount invested annually pre-M&A in the acquirer (e.g., Tafti, 2009)
113	IT leadership in integration project. Quality of the managerial direction during the ISI (e.g., Alaranta and Martela, 2012)
114	IT standardization. The entropy of IT assets (e.g., Du, 2015)
115	Joint sourcing. The decision to source IS through the combined organization (e.g., Seddon *et al.*, 2010)
116	Language support. The pre-M&A IS' ability for multi-language support (e.g., Mehta and Hirschheim, 2007)
117	Leadership. Quality of managerial leadership in the M&A (e.g., Williams *et al.*, 2015)
118	Legislation. The legal framework impacting the ISI (Schonewille and Bouwman, 2012)
119	Level of data sharing pre-M&A. The level of data sharing in the organizations pre-M&A (e.g., Robbins and Stylianou, 1999)

Table B1 Continued

#	*Independent master variable*
120	Level of location integration. The extent to which the merging organization is established in shared physical locations (e.g., Wijnhoven *et al.*, 2006)
121	Leverage of existing teams. The use of preexisting project teams (e.g., Brown *et al.*, 2003)
122	Leverage of increased purchasing power. Use of ability of the combined organization to improve purchasing conditions (e.g., Brown *et al.*, 2003)
123	Long-term integration vision. The extent of long-term considerations influencing ISI decision (e.g., Merali and McKiernan, 1993)
124	Low profitability and high-growth firm. The combination of low profitability and high-growth pre-M&A (e.g., Tanriverdi and Uysal, 2015)
125	M&A context (general). A structural element including ISI method, distribution of decision-making, IS/business alignment and the role of the IS in the M&A (e.g., Alaranta and Kautz, 2012)
126	M&A experience. The organization's previous M&A experiences (e.g., Du, 2015)
127	M&A motivation. The business reasons why the M&A was decided on (e.g., Myers, 2008)
128	M&A type. The nature of the M&A, hostile vs friendly combination (e.g., Schonewille and Bouwman, 2012)
129	MA frequency. How often the merging parties are involved in M&As (e.g., Henningsson, 2015)
130	Management style. The most dominant and accepted way managers act and behave, including how they plan, communicate, prioritize and make their decisions (e.g., Schonewille and Bouwman, 2012)
131	Modularity. The level of modularization of an IT infrastructure (e.g., Henningsson *et al.*, 2007)
132	Need for organizational transformation. Pre-M&A accumulated need to restructure and reengineer the company (e.g., Gregory *et al.*, 2012)
133	Novelty. As opposed to familiarity, the merging organizations' experience and/or access to knowledge of an ISI method (e.g., Henningsson and Kettinger, 2016)
134	Operational uniformity. The way the business operations executed across different units and divisions (e.g., Schonewille and Bouwman, 2012)
135	Organizational integration objectives. The ambition to structurally combine elements from the merging parties (e.g., Henningsson and Carlsson, 2011)
136	Organizational change management. The extent to which the merging organizations effectively manage change (e.g., Baker and Niederman, 2014)
137	Organizational competency fit. The match of performance levels of the organizations (e.g., Glazar-Stavnicky, 2016)
138	Organizational infrastructure. Organizational conditions and priorities (Wijnhoven *et al.*, 2006)

Table B1 Continued

#	*Independent master variable*
139	Organizational M&A planning. Quality of the planning for the organizational integration (e.g., Robbins and Stylianou, 1999)
140	Organizational process fit. The match between organizational process efficiency (e.g., Glazar-Stavnicky, 2016)
141	Organizational structure. The division of the organization into units or functions (e.g., Seddon *et al.*, 2010)
142	Organizational uniformity. The match of organizational characteristics (e.g., Linder, 1989)
143	Outsourcing. Degree of outsourcing in place at the time of the M&A (e.g., Robbins and Stylianou, 1999)
144	Planning style. The way a company and its employees execute plans and undertake scheduling (e.g., Schonewille and Bouwman, 2012)
145	Political considerations. The extent to which political considerations drive ISI decision-making (e.g., Stylianou *et al.*, 1996)
146	Power and politics. Strategizing for control of the M&A process (e.g., Kovela and Skok, 2012)
147	Preexisting business-IT relations. Established working relationships between IS and business functions (e.g., Seddon *et al.*, 2010)
148	Pre-M&A alignment. The way a company positions IT within its organization (e.g., Schonewille and Bouwman, 2012)
149	Pre-M&A organizational performance. The pre-M&A financial performance of the organization (e.g., Schonewille and Bouwman, 2012)
150	Prior ISI experience. The IS-related experiences made from the partners' previous M&As (e.g., Benitez-Amado and Ray, 2012)
151	Prioritization of customer-facing applications. If the prioritization of customer-facing applications is a decision criteria (e.g., Brown *et al.*, 2003)
152	Professional approach. The way a company and its employees approach their jobs and the expertise that is required, the way issues are addressed and what is considered important (e.g., Schonewille and Bouwman, 2012)
153	Project governance approach. The approach used to govern the ISI project (e.g., Henningsson *et al.*, 2016)
154	Project management (of ISI) skills. The ability to manage an ISI project (e.g., Wynne, 2016)
155	Quality of ISI planning. The contribution of IS activities to the overall M&A schedule (e.g., Morsell *et al.*, 2009)
156	Realistic budget and targets. Avoidance of overly aggressive targets (e.g., Kovela and Skok, 2012)

Table B1 Continued

#	*Independent master variable*
157	Related experiences. Activities that have shared subactivities or cognitive proximity with ISI (e.g., Henningsson, 2015)
158	Relative IT capability. The gap between the IT capabilities of the M&A organizations (e.g., Tanriverdi and Uysal, 2015)
159	Relative size. Relative organizational size (e.g., Du, 2015)
160	Relocation cost minimization. Efficiency of measures to avoid costs relating to the move of physical technology assets (e.g., Brown *et al.*, 2003)
161	Reporting and documentation. Documentation of the IS changes (e.g., Kim *et al.*, 2005)
162	Retention packages. The provision of compensation to top talent (e.g., Brown *et al.*, 2003)
163	Risk management. The level of dedicated effort to manage risk (e.g., Henningsson and Kettinger, 2016)
164	Same IT-user organization. M&A partners' participation in the same IT-user organization (e.g., Wijnhoven *et al.*, 2006)
165	Search for similar operational logic. Ambitions to realize standardized operational practices (e.g., Giacomazzi *et al.*, 1997)
166	Shareholder return. Whether or not shareholders benefit from the M&A (e.g., Schonewille and Bouwman, 2012)
167	Short-term considerations. The degree to which short-term considerations override initial management actions (e.g., Robertson and Powell, 2001)
168	Simplicity of integration. The ease through which the ISI between the merging organizations can be accomplished (e.g., Giacomazzi *et al.*, 1997)
169	Slow response to requirements changes. Failure to adapt to changes in demands (e.g., Kim *et al.*, 2005)
170	Social context. The social relations among the project participants; their social infrastructure; history of the ISI, as well as previous procedures, structures and commitments (e.g., Alaranta and Kautz, 2012)
171	Speed. The time characteristics of an ISI method (e.g., Robertson and Powell, 2001)
172	Stakeholder collaboration. Willingness of stakeholders in the M&A to collaborate (e.g., Williams *et al.*, 2015)
173	State of mind. The way a company and its employees feel about their position and value in the market (e.g., Schonewille and Bouwman, 2012)
174	System size/complexity. System size and complexity being drivers for ISI decision-making (e.g., Stylianou *et al.*, 1996)
175	Systems capability fit. The similarity between revenue per IT investment and IT employee (e.g., Glazar-Stavnicky, 2016)

Table B1 Continued

#	*Independent master variable*
176	Systems importance for business. The importance of the system being integrated to business (e.g., Wijnhoven *et al.*, 2006)
177	Systems novelty for users. Unfamiliarity with the post-M&A IS (e.g., Kim *et al.*, 2005)
178	Systems technology fit. The similarity between investment levels in PC, Server, Printer, Storage and Network lines (e.g., Glazar-Stavnicky, 2016)
179	Target age. The number of years since the target was formed (e.g., Du, 2015)
180	Target size. In the hospital context, number of beds covered (e.g., Du, 2015)
181	Target's IT capability. The general IT capability of the acquired firm (e.g., Tanriverdi and Uysal, 2011)
182	Teaching status. If the hospital is a teaching hospital or not (e.g., Du, 2015)
183	Time pressure. Time pressure caused by internal or external sources to complete ISI (e.g., Mehta and Hirschheim, 2007)
184	Top management steering. Top management exertion of power in specific ISI decisions (e.g., Alaranta and Kautz, 2012)
185	Top management support. The extent of top management's commitment to the ISI (e.g., Kim *et al.*, 2005)
186	Use of decision criteria. The application of clear criteria and quantitative evaluations to make decisions (e.g., LeFave *et al.*, 2008)
187	Use of external resources. The extent to which external resources, typically sourced as consultants, contribute to the ISI (e.g., Henningsson and Øhrgaard, 2016)
188	Use of prepackaged solutions. The use of off-the-shelf solutions (e.g., Sumi and Tsuruoka, 2002)
189	User involvement in ISI decisions. The degree to which users are incorporated in ISI decision-making (e.g., Wijnhoven *et al.*, 2006)
190	User resistance. The users' attitude and possible resistance to change (e.g., Alaranta and Kautz, 2012)
191	User skills. The users' abilities to use the post-M&A IS (e.g., Alaranta and Kautz, 2012)
192	User training and support. Means for enabling users to transition to the combined IS (e.g., Alaranta and Kautz, 2012)
193	Vague or changing requirements. Ambiguous or recurrently respecified demands on ISI (e.g., Alaranta and Kautz, 2012)
194	Vendor carve-out strategy. The approach by the vendor to carve out the unit being transacted (e.g., Böhm *et al.*, 2011)
195	Vendor's knowledge. The competence of the suppliers of the merged organization in the selected technologies (e.g., Alaranta and Kautz, 2012)

Table B2 Dependent master variables.

#	*Dependent master variable*
1	Alignment between processes. Fit between the choice of organizational integration process and ISI process (e.g., Baker and Niederman, 2014)
2	Avoidance of M&A problems. The degree to which the IS function manages to avert obstacles in the integration process (e.g., Stylianou *et al.*, 1996)
3	Capability preservation. The extent to which unique and valuable capabilities in the target are preserved post-M&A (e.g., Henningsson and Kettinger, 2016)
4	Cost reduction. Post-M&A cost efficiency (e.g., Holm-Larsen, 2005)
5	Digital resource redeployment. The extent to which the acquirer's software is implemented in the target after the acquisition (e.g., Du, 2015)
6	Enterprise integration. The integration of disparate information systems operated by the companies involved (e.g., Schonewille and Bouwman, 2012)
7	Exploitation of M&A opportunities. The extent to which ISI enables realization of M&A objectives (e.g., Stylianou *et al.*, 1996)
8	Growth opportunities. New possibilities to extend business enabled by the M&A (e.g., Holm-Larsen, 2005)
9	Integrated systems quality. IS and end-user assessment of the quality of the post-M&A IS in the combined organization (e.g., Stylianou *et al.*, 1996)
10	Integration approach. A composite construct including include absorption versus best-of-breed, phasing versus quick wins, investment versus expedience and the degree of integration required (e.g., Robertson and Powell, 2001)
11	Integration architecture. The decision on architecture to implement ISI (e.g., Henningsson and Carlsson, 2011)
12	IS credibility. The organizational perception of the IS function's abilities (e.g., Al Suliman, 2015)
13	IS performance. How well the post-M&A IS function supports the combined organization (e.g., Robbins and Stylianou, 1999)
14	IS quality. The malfunction of computer systems that occurs as a result of a disagreement between the components involved in the ISI (e.g., Kim *et al.*, 2005)
15	IS security culture. The behavior, values and assumptions, which ensure information security (e.g., Dhillon *et al.*, 2016)
16	IS staff. Demoralization and loss of able employees in the IS function (e.g., McKiernan and Merali, 1995)
17	IS structure. The configuration of the IS function and the locus of responsibility for IS management decision (e.g., Mehta and Hirschheim, 2007)
18	IS synergies. Synergies, including reduced cost, realized by consolidating the IS of the merging companies (e.g., Johnston and Yetton, 1996)
19	IS transaction success. The resources needed to carve out and integrate IS in an organizational transaction (e.g., Böhm *et al.*, 2011)
20	IS–business relation. The partnership between business and IS managers in the combined organization (e.g., Main and Short, 1989)

Table B2 Continued

#	*Dependent master variable*
21	ISI area – Offering. The extent to which the particular business area of offering (product) is subject to technological integration (e.g., Toppenberg, 2015)
22	ISI area – R&D. The extent to which the particular business area of R&D is integrated through IS (e.g., Toppenberg, 2015)
23	ISI capabilities. The post-M&A ability for ISI in subsequent M&As (e.g., Henningsson and Øhrgaard, 2016)
24	ISI cost. The resource required to complete ISI (e.g., Holm-Larsen, 2005)
25	ISI degree. The decision on level to which IS are integrated in the M&A (e.g., Weber and Pliskin, 1996)
26	ISI effectiveness. How well the ISI supports the M&A project (e.g., Linder, 1989)
27	ISI efficiency. How well time, personnel and financial resources were used in the ISI (e.g., Morsell *et al.*, 2009)
28	ISI levels. Denotes the levels of systems to be integrated, distinguishing between infrastructural, transactional, informational and strategic IS (e.g., Henningsson and Carlsson, 2011)
29	ISI method. The decision on approach used to combine the IS of the merging organization (e.g., Wijnhoven *et al.*, 2006)
30	ISI process quality. IS and end-user assessment of the process by which IS were integrated (e.g., Stylianou *et al.*, 1996)
31	ISI strategy. A combination of the standardization and centralization in IS aimed at during the M&A (e.g., Giacomazzi *et al.*, 1997)
32	ISI success. A general construct representing the extent to which ISI met objectives and requirements (e.g., Al Suliman, 2015)
33	ISI time. Time used to complete the combination of IS (e.g., Garcia-Canal *et al.*, 2013)
34	IT infrastructure. Characteristics of the post-M&A IT assets that enable or hinder organizational performance (e.g., McKiernan and Merali, 1995)
35	IT spending. The combined firm's IT intensity ratio after the M&A (e.g., Glazar-Stavnicky, 2016)
36	Knowledge coverage. As opposed to knowledge gaps, the consistency of knowledge creation, knowledge storage/retrieval, knowledge transfer and knowledge application (e.g., Alaranta and Martela, 2012)
37	M&A success. A general construct indicating the extent to which ISI supports the M&A ambitions (e.g., Williams *et al.*, 2015)
38	M&A synergies. The post-M&A combination effects including economies of scale and scope, process improvement, growth and renewal (e.g., Busquets, 2015)
39	Migration scenario. Detailed plans for how to combine IS that includes systems selection and vendor offerings to realize them (e.g., Steininger *et al.*, 2016b)
40	Operating performance. Cost efficiency and profitability of the merged organization (e.g., Parada *et al.*, 2009)
41	Organizational integration. The extent to which the combined organization functions as a whole (e.g., Mehta and Hirschheim, 2007)
42	Organizational performance. The long-term performance of the merged organization, including the sustained return on assets (ROA) (e.g., Tafti, 2009)
43	Post-M&A alignment. The level of business-IT alignment after the ISI (e.g., McKiernan and Merali, 1995)
44	Post-M&A IS strategy. The IS strategy employed after the M&A by the combined organization (e.g., Gregory *et al.*, 2012)
45	Post-M&A IS success. Drawing on IS success, the success of IS in the post-M&A organization (e.g., Steininger, 2016a)
46	Sales increase. Revenue enhancements post-M&A (e.g., Holm-Larsen, 2005)
47	Spirit (non-IS). The morale of general employees (not IS) (e.g., Henningsson *et al.*, 2007)
48	Stock-market reaction. The effect on the share price, commonly measured as cumulative abnormal returns (CAR) at the time of M&A announcement (e.g., Tanriverdi and Uysal, 2011)
49	Sustainable growth. The ability for continued organic and acquisition-based growth (e.g., Toppenberg *et al.*, 2015)
50	Systems functionality. The final functionality of the integrated IS (e.g., Vieru and Rivard, 2014)
51	Target's efficiency improvement. The average cost per case-mix–adjusted discharges in a hospital, before and after an acquisition (e.g., Du, 2015)
52	Target's quality improvements. The quality of care delivery process based on 20 process-of-care quality indicators, before and after an acquisition (e.g., Du, 2015)
53	User acceptance and satisfaction. As opposed to user resistance, the extent to which users welcome and support the ISI scenario (e.g., Vieru and Trudel, 2013)

Appendix C: Dependent and independent variables in the review

Dependent variables

We identify 53 different dependent variables (Table C1). Following Lacity *et al.* (2010, 2011, 2016), we distinguish between decision and outcome variables. Decision variables refer to the options to implement ISI. Outcome variables capture the various costs and benefits contingent on the ISI project. Twenty-seven percent of the findings refer to relationships that predict the choice of ISI decisions. Seventy-three percent of relationships concern the outcomes of ISI decisions.

Table C1 Dependent variables used in research on ISI in mergers.

ISI decision variables	*Freq.*	*Comment*
ISI method	79	ISI research investigates: *what* to integrate and *how* to integrate (Henningsson and Kettinger, 2016).[a] The what-question of ISI is primarily investigated with variables relating to the degree of integration (Giacomazzi *et al.*, 1997; Wijnhoven *et al.*, 2006), the digital resource redeployment (Du, 2015) and the integration area (Brown *et al.*, 2003; Eckert *et al.*, 2012). The degree of integration refers to the continuum between separated independent IS and fully integrated IS. The digital resource redeployment captures the extent to which software from one organization is implemented in the other organization (Du, 2015). The integration area includes variables referring to specific IS areas that are subject to integration efforts, including applications, infrastructural technology, strategies, personnel and practices ISI method (Wijnhoven *et al.*, 2006) is the most frequently investigated construct. This is also referred to as the integration strategy (Johnston and Yetton, 1996), integration mode (Brunetto, 2006) and integration approach (Schonewille and Bouwman, 2012)
Degree of ISI	30	
Digital resource redeployment	17	
Enterprise integration	15	
ISI strategy	10	
ISI levels	5	
Integration approach	3	
Post-M&A IS strategy	3	
Migration scenario	3	
Integration architecture	2	
Systems functionality	1	
ISI area – R&D	1	
ISI area – offering	1	
Alignment between processes	1	
IS structure	1	
Total ISI decision variables	172	
ISI outcome variables	*Freq.*	*Comment*
ISI project		
ISI success	49	In this category, variables is directly associated with the ISI project. Some articles use a broadly defined ISI success variable (Stylianou *et al.*, 1996), some focus on specific aspects of the project, including time, cost and user satisfaction (Unkan and Thönssen, 2015) and others investigate the IS synergies created by the integration project (Johnston and Yetton, 1996)
ISI process quality	32	
Integrated systems quality	32	
ISI effectiveness	20	
ISI time	18	
IS synergies	11	
ISI efficiency	10	
ISI cost	9	
User acceptance and satisfaction	5	
IS transaction success	1	
M&A project		
M&A synergies	50	A broader perspective on outcome investigates the outcome of ISI in terms of the impact on the integration project as a whole. Here, beyond the frequently employed conceptualization of ISI success, both the impact on general M&A synergies (for example, economies of scale or scope) enabled by ISI, and capability destruction contingent on IS redeployment are studied (Myers, 2008; Henningsson *et al.*, 2016)
M&A success	25	
Exploit M&A opportunities	16	
Avoid M&A problems	16	
Sales increase	1	
Cost reduction	1	
Capability preservation	1	
Growth opportunities	1	
IS organization		
IS quality	18	Research on the effects on the long-term impact on the IS organization beyond the specific M&A project focus on either the long-term impact on the IS organization or on the organization as a whole. Variables used to investigate the performance of the IS organization include general IS capabilities (Robbins and Stylianou, 1999), IT infrastructure (McKiernan and Merali, 1995), IS employee morale (LeFave *et al.*, 2008) and the development of capabilities to conduct subsequent ISI projects (Henningsson and Øhrgaard, 2016)
IS staff	10	
IT infrastructure	9	
Knowledge coverage	7	
IT spending	7	
ISI capabilities	6	
IS credibility	4	
Post-M&A IS success	4	
IS–business relation	3	
IS performance	2	
IS security culture	2	
Post-M&A alignment	1	

Table C1 Continued

ISI outcome variables	*Freq.*	*Comment*
Org. performance		
Organizational performance	20	Dependent variables to capture the long-term effects on the organization include operating performance (Tafti, 2009) and the potential to sustain a growth strategy (Toppenberg *et al.*, 2015)
Stock-market reaction	15	
Sustainable growth	14	
Operating performance	13	
Target's efficiency improvement	6	
Target's quality improvements	6	
Spirit (non-IS)	1	
Organizational integration	1	
Total ISI outcome variables	447	

The 'what,' 'how' and 'when' of ISI in M&A was the subject of a presentation by Carol Brown given in conjunction with ECIS 2011 in Helsinki

Independent variables

Our investigation identified 195 independent variables in the extant literature on ISI. To facilitate the analysis and discussion of this number of variables, we group them into 12 clusters and sort them by frequency of use (Table C2).

Table C2 Independent variables.

Variable	*Freq.*	*Comment*
ISI implementation		
Changes in workforce size	12	The most frequently studied category of variables includes those relating to how ISI methods are implemented. These variables measure how organizations manage ISI. Within this category, 37 independent variables have been studied a total of 117 times. The most frequently studied aspects are changes in workforce size (examined 12 times), IT communication and IS employee morale during the implementation (examined 11 times). Changes in workforce size include both increases and decreases in staffing to implement ISI (Stylianou *et al.*, 1996). IT communication refers to the communication activities between the IT function and other organizational functions (Morsell *et al.*, 2009). IS employee morale includes the spirit and beliefs in the merger among IS employees (Stylianou *et al.*, 1996)
IT communication	11	
IS employee morale	11	
User training and support	10	
Changes in policies and procedures	6	
Decreases in IS staff compensation	6	
IT leadership in integration project	6	
ISI method complexity	4	
ISI method cost	4	
End-user involvement in ISI	4	
Inclusion of key IT staff in ex-post integration	3	Other frequently studied aspects of the implementation process include user training and support (examined ten times) and leadership in ISI project, changes in policies and procedures and decreases in IS staff compensation (each examined six times) (Brown *et al.*, 2003; Kim *et al.*, 2005; Vaniya *et al.*, 2013)
ISI method speed	3	The implementation category also includes variables relating to the properties of the four ISI methods. These have distinct properties that make them more or less effective contingent on the priorities and constraints, which often result in suboptimal outcomes. The method attributes of complexity and cost have been studied four times each. Speed and novelty have been studied twice each (Eckert *et al.*, 2012; Henningsson and Kettinger, 2016). Effort, the overall resources needed to complete an ISI method, has been studied once (Eckert *et al.*, 2012)
ISI method novelty	3	
ISI method effort	1	
ISI implementation speed	2	
Development and testing	2	
Leverage of existing teams	2	
Relocation cost minimization	2	
Leverage of increased purchasing power	2	
User resistance	2	
Burning desire	2	
Retention packages	2	
Vague or changing requirements	2	
Joint sourcing	2	
Realistic budget and targets	1	
Division of integration task	1	
Use of prepackaged solutions	1	
Ex-post evaluation	1	
IT culture conflict management	1	
Organizational change management	1	
Reporting and documentation	1	
Slow response to requirements changes	1	
Systems novelty for users	1	
Boundary consolidation	1	
Information security management	1	
ISI process	1	
Vendor's knowledge	1	
Category total	*117*	

Table C2 Continued

Variable	*Freq.*	*Comment*
Within-firm IS conditions		
IS–business collaboration in planning	14	The 30 variables within the category of within-firm IS conditions capture variables pertaining to IS preconditions beyond ISI capabilities and IT infrastructure. These have been examined 102 times. This category shows that there are many characteristics of the M&A parties' IS that influence the ISI project (Alaranta and Kautz, 2012). The most frequently studied IS condition is the level of annual IT investment (Tafti, 2009), which has been investigated ten times
IT investment at target	10	
Prior ISI experience	8	
Top management support	8	
Level of data sharing pre-M&A	7	
ISI proactivity (vs reactivity)	7	Research has also examined prior ISI experience (Mehta and Hirschheim, 2007; Kovela and Skok, 2012) eight times and the level of premerger data sharing (Robbins and Stylianou, 1999) seven times. In addition, research has investigated the impact of premerger habits and practices (Vieru *et al.*, 2016), governance mode and user skills (Du, 2015)
Communication of M&A activities to IS	5	
IS perception	5	
Attention to IT	3	
IT investment in acquirer	3	Also included in this category are a set of variables that describe how the relationships between business and IT in the two parties to the M&A affect ISI. IS–business collaboration in planning (Morsell *et al.*, 2009) has been studied 14 times. The effect of top management support (Kim *et al.*, 2005) has been studied eight times and ISI proactivity in the merger project seven times. The communication of M&A activities to ISI (Morsell *et al.*, 2009) has been studied five times. The large number of studies that focus on the interaction between business and IT signals the importance of nurturing a collaborative approach to ISI
Habits and practice	3	
IT governance mode	3	
User skills	3	
Outsourcing	2	
IS planning	2	
Geographical distribution of IS/IT	2	
Acquirer's IT capability	2	
Related experiences	2	
Preexisting business-IT relations	2	
Top management steering	1	
Systems importance for business	1	
Business understanding of IS development	1	
Pre-M&A alignment	1	
Business and IT alignment preconditions	1	
IS staff motivation	1	
Cognitive sunk costs	1	
IS strategy	1	
Basic conditions	1	
IS performance	1	
Target's IT capability	1	
Category total	*102*	

Table C2 Continued

Variable	*Freq.*	*Comment*
M&A context		
M&A motivation	10	The ISI project is a component within the overall M&A project. How the general M&A project influences ISI has been studied 68 times through 21 variables. Within this category of variables, the most frequently studied variables are merger motivation and organizational merger planning, which have each been studied ten times. Merger motivation refers to the fundamental business reasons driving the transaction (Myers, 2008). Organizational merger planning refers to the quality of planning, where insufficient planning is assumed to spill over onto the ISI project (Robbins and Stylianou, 1999)
Organizational M&A planning	10	
Power and politics	7	
Culture clashes	7	
Org integration objectives	6	
M&A type (hostile, etc.)	4	
Stakeholder collaboration	4	Other variables that are frequently studied in this category include power and politics (the extent of strategizing for control of the merger process) and culture clashes (the extent of cultural inconsistencies) (Weber and Pliskin, 1996). Both have been studied seven times. The organizational integration objectives variable is examined six times. This variable is typically conceptualized employing the Haspeslagh and Jemison (1991) typology of M&A integration approaches, distinguishing between absorption, symbiosis, preservation and holding approaches (Henningsson and Carlsson, 2011)
Integration cost	3	
M&A context (general)	2	
Leadership	2	
Defined business strategy	2	
Social context	2	
M&A frequency	1	
Same IT-user organization	1	
Experience variation	1	
Business analysis	1	
Search for similar operational logic	1	
Expansion (shrinkage) of target	1	
HR management	1	
Acquiring from another MBO	1	
Acquiring another MBO	1	
Category total	*68*	
ISI design		
Risk management	9	The variable category of ISI diagnosing captures various aspects of how the M&A organization designs its approach to ISI. This has been studied 64 times through 20 variables. The most frequently studied variables in this category are risk management (Unkan and Thönssen, 2015; Henningsson and Kettinger, 2016) and collaboration dynamics (LeFave *et al.*, 2008; Alaranta and Martela, 2012) that are studied nine and eight times, respectively
Collaboration dynamics	8	
Business-based priorities	7	
Political considerations	6	
System size/complexity	6	The ISI design variables also include references to how business priorities drive ISI decision-making (Kovela and Skok, 2012), which are examined seven times. The extent to which political considerations and considerations about systems complexities (Stylianou *et al.*, 1996) influence ISI decision-making have been investigated six times each. The strategic integration objectives assigned to the IS function (Wijnhoven *et al.*, 2006) has been investigated five times
ISI objectives	5	
IS morale	3	
ISI speed	2	
Prioritization of customer-facing applications	2	In addition, research has studied user involvement in ISI decisions, the structure of the decision process, and the presence of a comparative analysis and long-term vision, whether complexity is a decision criterion and whether the IS function is in charge of diagnosing the approach to ISI. Taken together, the variables in the category of ISI diagnosis signal the importance for the output of the task of the many ways in which the task is implemented. This research shows the importance of setting priorities in M&A ISI projects because many different outcomes compete for priority in decision-making. In general, ISI decisions are suboptimal, contingent on multiple trade-offs
Cost focus	2	
User involvement in ISI decisions	2	
Decision process	2	
Comparative analysis	2	

Table C2 Continued

Variable	*Freq.*	*Comment*
Long-term integration vision	2	
Aligned post-M&A state	1	
Alignment of integration objectives	1	
Short-term considerations	1	
Common ISI goals	1	
Complexity a criterion for ISI decision	1	
IT in charge	1	
Category total	*64*	
IT infrastructure		
Geographical distribution of IT	11	The ten variables comprising the IT infrastructure category, which refer to the properties of the premerger IT infrastructure that affect integration decisions or their outcomes, have been studied 45 times in relation to ISI in M&As. Geographical distribution of IT (Stylianou *et al.*, 1996; Robbins and Stylianou, 1999), which has been studied 11 times, is the most frequently studied variable in this category. It refers to whether IT hardware is distributed across multiple locations. This variable was first studied in the 1990s. We speculate that it has gradually decreased in importance as network technologies have matured
IT flexibility	8	
IT standardization	7	
IT extensiveness	5	
Existing IS-IT qualities	5	
IT infrastructure	3	
Modularity	2	Also in the IT infrastructure category, the master variable of IT flexibility draws on Duncan's (1995) definition of IT infrastructure flexibility. IT flexibility and related concepts, including scalability and other loosely defined references to infrastructures that do not permit certain actions (Wijnhoven *et al.*, 2006; Vaniya *et al.*, 2013), have been studied eight times. Other frequently studied aspects of the premerger IT infrastructure include IT standardization and IT extensiveness (Du, 2015) that have been studied seven and five times, respectively. The many variables investigated within the IT infrastructure category signals the importance of considering the capacities of the IT assets that can take several years to develop
Cost-efficient ICT	2	
Enterprise systems (presence of)	1	
Language support	1	
Category total	45	
Organizational characteristics		
M&A experience	9	The organizational context, specifically, different within-organizational characteristics of the two M&A organizations, has been studied 43 times through 22 different variables. Most frequently, research has studied how previous merger experiences (Stylianou *et al.*, 1996) and premerger organizational performance (Du, 2015), which have been examined nine and eight times, respectively, affect ISI. Other related variables include organizational structure (examined four times) and geographical distribution (examined three times). Taken together, the variables in this category contribute to understanding how the wider organizational context influences ISI
Pre-M&A organizational performance	8	
Organizational structure	4	
Geographical distribution	3	
Organizational infrastructure	2	
Need for organizational transformation	1	
Professional approach	1	
Operational uniformity	1	
State of mind	1	
Company scale	1	
Planning style	1	
Company language	1	
Corporate culture	1	
Teaching status	1	
Target size	1	
Target age	1	
Financial slack – target	1	
High profitability and high-growth firm	1	
High profitability and low-growth firm	1	
Low profitability and high-growth firm	1	

Table C2 Continued

Variable	*Freq.*	*Comment*
Management style	1	
Level of location integration	1	
Total	43	
IS relational		
Application and IT compatibility	14	The category labeled IS relational refers to variables covering the relationship between the pre-M&A IS assets and practices of the two parties. The importance of this relationship is highlighted by the pioneering research in the 1990s (Buck-Lew *et al.*, 1992; Merali and McKiernan, 1993). In this category, nine variables frame different aspects of the relationships
IS configuration fit	7	
IS organizational compatibility	5	
Relative IT capability	5	
IS strategy compatibility	3	The most frequently studied construct is application and IT compatibility, referring to the compatibility of technical platforms, programming languages and software (Chang *et al.*, 2014), which is examined 14 times. IS configuration fit, which is based on the MIT'90s organizational configuration schema (Scott Morton, 1991) has been investigated seven times (Johnston and Yetton, 1996). IS organizational compatibility and the organizational structures and cultures within the parties' IS functions (Lin and Chao, 2008) have been examined six and five times, respectively. This category also includes relative IT capability (Du, 2015; Tanriverdi and Uysal, 2015), which treats the difference between IT capabilities as a capability gap. This has been examined five times
Systems capability fit	2	
Systems technology fit	2	
Simplicity of integration	1	
Vendor carve-out strategy	1	
Category total	40	
ISI decision		
ISI method	13	Variables within the category of ISI decision are treated as both independent and dependent variables in different studies. As an independent variable, it has been studied 35 times. When used as an independent variable, researchers investigate how ISI decisions affect ISI outcomes (Giacomazzi *et al.*, 1997; Robertson and Powell, 2001). Specifically, this research focuses on how the choice of integration method or methods affects ISI outcomes. This has been studied 13 times
Data integration	8	
Alignment of integration processes	5	
Degree of ISI	4	
Digital resource redeployment	2	
ISI area – personnel	2	Also in the ISI category, alignment between organizational integration and ISI (Johnston and Yetton, 1996; Baker and Niederman, 2014) have each been studied five times. The basic argument is that post-M&A business and IT strategic alignment is a prerequisite for realizing the business value of IT, and, by extension, alignment would also be an important contributor to IT-based value creation in M&As. The effects of other ISI decision variables on ISI outcomes have rarely been studied
ISI area – application	1	
IS culture integration	1	
Category total	36	
ISI capabilities		
Use of external resources	11	The capabilities required to manage ISI have been studied 33 times. This research takes four forms. The first defines ISI capabilities as unique to the M&A context (Kim *et al.*, 2005; Yetton *et al.*, 2013). The second treats ISI capabilities generally and investigates their applicability in a M&A context (Tanriverdi and Uysal, 2011, 2015). The third examines supportive general capabilities, including EA capabilities and project management capabilities (Labusch *et al.*, 2013; Toppenberg *et al.*, 2015)
EA capability	6	
ISI skill	3	
Implementation capability	2	
Cross-business IT integration capability	2	
Project management (of ISI) skills	2	Finally, the fourth form investigates external capabilities, typically sourced through consultants (Sumi and Tsuruoka, 2002; Henningsson and Øhrgaard, 2016). The use of external capabilities and the effects of EA capabilities have been studied eleven and six times, respectively. All four forms of research into the effects of ISI capabilities investigate high-level capabilities that generally say more about the different subtasks of M&A ISI challenges than they explain what makes some organizations better than others at resolving M&A ISI challenges
ISI team	2	
Boundary spanning versatility	1	
Diagnostic capability	1	
ISI expertise	1	
ISI routines	1	
ISI capability	1	
Category total	33	
ISI planning		

Table C2 Continued

Variable	*Freq.*	*Comment*
Discovery (vs consistency)	10	The variable category of ISI planning captures various aspects of how the M&A organization develops the plan for ISI. This has been studied 32 times through 12 variables. Two of these variables have received substantial attention. The element of discovery in the planning process, defined as the inclusion of emergent variations in ISI plans during the ISI project (Busquets, 2015), has been studied ten times. The overall quality of ISI planning (Morsell *et al.*, 2009) has been studied five times To a lesser extent, research has also examined the inclusion of IS staff in the planning process (Alaranta and Henningsson, 2008), the use of formal decision criteria (LeFave *et al.*, 2008) and how decision authority is structured during the planning process (Brown *et al.*, 2003; Henningsson *et al.*, 2016). Overall, the ISI planning variables relate to how the merging organizations address the complexity and lack of information in ISI decision-making. Two strategic approaches can be discerned among the independent variables: broad inclusion of individuals, each of whom brings a component of understanding to collective decision-making, and emergent decision-making as the picture becomes clearer
Quality of ISI planning	5	
Inclusion of IT staff	4	
Use of decision criteria	3	
Distributed decision authority	2	
Project governance approach	2	
Alignment of vendor and acquirer IT transaction strategies	1	
Comprehensiveness	1	
Focus	1	
Flow	1	
Formalization	1	
Credible deadlines	1	
Category total	32	
External environment		
Time pressure	10	The category of environmental influence captures the sources of influence outside the merging organizations. Among the variables capturing environmental influences, time pressure (Robertson and Powell, 2001; Mehta and Hirschheim, 2007), has been studied ten times, corroborating the emerging understanding that ISI is a search for the best possible solution given the contextual constraints, rather than a search for the optimal solution. Research has also studied industry influence seven times, focusing on how the dynamics (speed of change and possibilities for synergies) influence ISI decisions (Jain and Ramesh, 2015; Toppenberg *et al.*, 2015)
Industry characteristics	7	
Legislation	1	
Shareholder return	1	
Economic climate	1	
Category total	20	
Pre-M&A relation		
Organizational uniformity	6	A second group of organizational context variables includes the pre-M&A relationships between the two organizations. This category of variables, examined 19 times, captures differences and similarities between the organizations and the consequences for ISI. In this category, organizational uniformity (Eckert *et al.*, 2012; Vieru and Rivard, 2015) has been studied six times. The effect of whether or not the parties in the M&A are classified as belonging to the same industries (Tanriverdi and Uysal, 2015) has been studied three times. Other variables, including geographical relatedness, organizational process fit and the presence of competing business models (Giacomazzi *et al.*, 1997; Seddon *et al.*, 2010), have each been studied twice
Industry relatedness	3	
Geographical relatedness	2	
Organizational process fit	2	
Competing business models	2	
Relative size	1	
Differences in management needs	1	
Organizational competency fit	1	
For-profit status difference	1	
Category total	19	
Total	619	

Appendix D: Relational details

See Table D1.

Table D1 Relations between independent and dependent variables.

	ISI decisions					*ISI outcomes*					
	0	*+ 1*	*− 1*	*M*	*Sub tot*	*0*	*+ 1*	*− 1*	*M*	*Sub tot*	*Tot*
ISI implementation											
Changes in workforce size	0	0	0	0	0	10	0	2	0	*12 (0)*	12
IT communication	0	0	0	2	2	0	9	0	0	*9 (++)*	11
IS employee morale	0	0	0	0	0	7	2	2	0	*11 (0)*	11
User training and support	0	0	0	0	0	2	8	0	0	*10 (+)*	10
Changes in policies and procedures	0	0	0	0	0	5	0	1	0	*6 (00)*	6
Decreases in IS staff compensation	0	0	0	0	0	5	0	1	0	*6 (00)*	6
IT leadership in integration project	0	0	0	0	0	0	6	0	0	*6 (++)*	6
ISI method complexity	0	0	0	4	4	0	0	0	0	0	4
ISI method cost	0	0	0	4	4	0	0	0	0	0	4
End-user involvement in ISI	0	0	0	0	0	1	3	0	0	4	4
Inclusion of key IT staff in ex-post integration	0	0	0	0	0	0	3	0	0	3	3
ISI method speed	0	0	0	3	3	0	0	0	0	0	3
ISI method novelty	0	0	0	0	0	0	0	3	0	3	3
ISI method effort	0	0	0	1	1	0	0	0	0	0	1
ISI implementation speed	0	0	0	0	0	0	1	1	0	2	2
Development and testing	0	0	0	0	0	0	2	0	0	2	2
Leverage of existing teams	0	0	0	0	0	0	2	0	0	2	2
Relocation cost minimization	0	0	0	0	0	0	2	0	0	2	2
Leverage of increased purchasing power	0	0	0	0	0	0	2	0	0	2	2
User resistance	0	0	0	2	2	0	0	0	0	0	2
Burning desire	0	0	0	0	0	0	2	0	0	2	2
Retention packages	0	0	0	0	0	0	2	0	0	2	2
Vague or changing requirements	0	0	0	0	0	0	0	2	0	2	2
Joint sourcing	0	0	0	2	2	0	0	0	0	0	2
Realistic budget and targets	0	0	0	0	0	0	1	0	0	1	1
Division of integration task	0	0	0	0	0	0	1	0	0	1	1
Use of prepackaged solutions	0	0	0	0	0	0	1	0	0	1	1
Ex-post evaluation	0	0	0	0	0	0	1	0	0	1	1
IT culture conflict management	0	0	0	0	0	0	1	0	0	1	1
Organizational change management	0	0	0	0	0	0	1	0	0	1	1
Reporting and documentation	0	0	0	0	0	0	1	0	0	1	1
Slow response to requirements changes	0	0	0	0	0	0	0	1	0	1	1
Systems novelty for users	0	0	0	0	0	0	0	1	0	1	1
Boundary consolidation	0	0	0	1	1	0	0	0	0	0	1
Information security management	0	0	0	0	0	0	1	0	0	1	1
ISI process	0	0	0	0	0	0	1	0	0	1	1
Vendors knowledge	0	0	0	0	0	0	1	0	0	1	1
Category total	0	0	0	19	19	30	54	14	0	98	117
Within-firm IS conditions											
IS–business collaboration in planning	0	0	0	0	0	4	10	0	0	*14 (+)*	14
IT investment at target	0	0	1	0	1	7	2	0	0	*9 (0)*	10
Prior ISI experience	0	0	0	4	4	0	4	0	0	4	8
Top management support	0	0	0	2	2	1	5	0	0	*6 (++)*	8
Level of data sharing pre-M&A	0	0	0	0	0	5	2	0	0	*7 (0)*	7
ISI proactivity (vs reactivity)	0	0	0	2	2	0	5	0	0	*5 (++)*	7
Communication of M&A activities to IS	0	0	0	0	0	1	4	0	0	*5 (+)*	5
IS perception	0	0	0	1	1	0	4	0	0	4	5
Attention to IT	0	0	0	0	0	0	3	0	0	3	3
IT investment in acquirer	0	0	0	0	0	0	2	1	0	3	3
Habits and practice	0	0	0	1	1	0	0	2	0	2	3
IT governance mode	1	0	0	0	1	2	0	0	0	2	3
User skills	0	0	0	2	2	0	1	0	0	1	3

Table D1 Continued

	ISI decisions					*ISI outcomes*					
	0	*+ 1*	*− 1*	*M*	*Sub tot*	*0*	*+ 1*	*− 1*	*M*	*Sub tot*	*Tot*
Outsourcing	0	0	0	1	1	0	1	0	0	1	2
IS planning	0	0	0	0	0	0	1	1	0	2	2
Geographical distribution of IS/IT	0	0	0	0	0	0	2	0	0	2	2
Acquirer's IT capability	0	0	0	0	0	2	0	0	0	2	2
Related experiences	0	0	0	1	1	0	1	0	0	1	2
Preexisting business-IT relations	0	0	0	0	0	0	2	0	0	2	2
Top management steering	0	0	0	0	0	0	0	1	0	1	1
Systems importance for business	0	0	0	1	1	0	0	0	0	0	1
Business understanding of IS development	0	0	0	0	0	0	1	0	0	1	1
Pre-M&A alignment	0	0	0	1	1	0	0	0	0	0	1
Business and IT alignment preconditions	0	0	0	0	0	0	0	0	1	1	1
IS staff motivation	0	0	0	0	0	0	1	0	0	1	1
Cognitive sunk costs	0	0	0	0	0	0	0	1	0	1	1
IS strategy	0	0	0	1	1	0	0	0	0	0	1
Basic conditions	0	0	0	1	1	0	0	0	0	0	1
IS performance	0	0	0	0	0	0	1	0	0	1	1
Target's IT capability	0	0	0	0	0	0	0	1	0	1	1
Category total	1	0	1	18	20	22	52	7	1	82	102
M&A context											
M&A motivation	0	0	0	10	*10 (MM)*	0	0	0	0	0	10
Organizational M&A planning	0	0	0	0	0	2	7	1	0	*10 (+)*	10
Power and politics	0	0	0	5	*5 (MM)*	0	0	1	1	2	7
Culture clashes	1	0	0	2	3	0	0	4	0	4	7
Org integration objectives	0	0	0	5	*5 (MM)*	0	0	1	0	1	6
M&A type (hostile, etc.)	0	0	0	4	4	0	0	0	0	0	4
Stakeholder collaboration	0	0	0	0	0	0	4	0	0	4	4
Integration cost	0	0	0	0	0	2	0	1	0	3	3
M&A context (general)	0	0	0	2	2	0	0	0	0	0	2
Leadership	0	0	0	0	0	0	2	0	0	2	2
Defined business strategy	0	0	0	0	0	0	2	0	0	2	2
Social context	0	0	0	2	2	0	0	0	0	0	2
MA frequency	0	0	0	0	0	0	1	0	0	1	1
Same IT-user organization	0	0	0	1	1	0	0	0	0	0	1
Experience variation	0	0	0	0	0	0	0	0	1	1	1
Business analysis	0	0	0	0	0	0	1	0	0	1	1
Search for similar operational logic	0	0	0	1	1	0	0	0	0	0	1
Expansion (shrinkage) of target	1	0	0	0	1	0	0	0	0	0	1
HR management	0	0	0	0	0	0	1	0	0	1	1
Acquiring from another MBO	0	1	0	0	1	0	0	0	0	0	1
Acquiring another MBO	0	1	0	0	1	0	0	0	0	0	1
Category total	2	2	0	32	36	4	18	8	2	32	68
ISI design											
Risk management	0	0	0	1	1	0	8	0	0	*8 (++)*	9
Collaboration dynamics	0	0	0	1	1	0	7	0	0	*7 (++)*	8
Business-based priorities	0	0	0	0	0	4	3	0	0	*7*	7
Political considerations	0	0	0	0	0	5	0	1	0	*6 (00)*	6
System size/complexity	0	0	0	0	0	5	1	0	0	*6 (00)*	6
ISI objectives	0	0	0	5	*5 (MM)*	0	0	0	0	0	5
IS morale	0	0	0	2	2	0	1	0	0	1	3
ISI speed	0	0	0	1	1	0	0	0	1	1	2
Prioritization of customer-facing applications	0	0	0	0	0	0	2	0	0	2	2
Cost focus	0	0	0	2	2	0	0	0	0	0	2
User involvement in ISI decisions	0	0	0	1	1	0	0	1	0	1	2
Decision process	0	0	0	0	0	0	1	0	1	2	2
Comparative analysis	0	0	0	2	2	0	0	0	0	0	2
Long-term integration vision	0	0	0	0	0	0	2	0	0	2	2
Aligned post-M&A state	0	0	0	1	1	0	0	0	0	0	1

Table D1 Continued

	ISI decisions					*ISI outcomes*					
	0	*+ 1*	*− 1*	*M*	*Sub tot*	*0*	*+ 1*	*− 1*	*M*	*Sub tot*	*Tot*
Alignment of integration objectives	0	0	0	0	0	0	1	0	0	1	1
Short-term considerations	0	0	0	0	0	0	0	1	0	1	1
Common ISI goals	0	0	0	0	0	0	1	0	0	1	1
Complexity a criterion for ISI decision	0	0	0	0	0	0	1	0	0	1	1
IT in charge	0	0	0	0	0	0	0	1	0	1	1
Category total	0	0	0	16	16	14	28	4	2	48	64
IT infrastructure											
Geographical distribution of IT	0	0	1	1	2	5	1	3	0	*9*	11
IT flexibility	0	0	0	1	1	0	7	0	0	*7 (++)*	8
IT standardization	0	1	0	0	1	1	5	0	0	*6 (++)*	7
IT extensiveness	0	1	0	0	1	2	0	2	0	4	5
Existing IS-IT qualities	0	0	0	4	4	0	1	0	0	1	5
IT infrastructure	0	0	0	3	3	0	0	0	0	0	3
Modularity	0	0	0	0	0	0	2	0		2	2
Cost-efficient ICT	0	0	0	0	0	0	2	0	0	2	2
Enterprise systems (presence of)	0	0	0	0	0	0	1	0	0	1	1
Language support	0	0	0	1	1	0	0	0	0	0	1
Category total	0	2	1	10	13	8	19	5	0	32	45
Organizational characteristics											
M&A experience	0	1	0	1	2	3	4	0	0	*7*	9
Pre-M&A organizational performance	0	0	0	1	1	5	1	0	1	*7 (00)*	8
Organizational structure	0	0	0	3	3	0	0	1	0	1	4
Geographical distribution	0	0	0	2	2	0	0	1	0	1	3
Organizational infrastructure	0	0	0	2	2	0	0	0	0	0	2
Need for organizational transformation	0	0	0	1	1	0	0	0	0	0	1
Professional approach	0	0	0	1	1	0	0	0	0	0	1
Operational uniformity	0	0	0	1	1	0	0	0	0	0	1
State of mind	0	0	0	1	1	0	0	0	0	0	1
Company scale	0	0	0	1	1	0	0	0	0	0	1
Planning style	0	0	0	1	1	0	0	0	0	0	1
Company language	0	0	0	1	1	0	0	0	0	0	1
Corporate culture	0	0	0	1	1	0	0	0	0	0	1
Teaching status	1	0	0	0	1	0	0	0	0	0	1
Target size	1	0	0	0	1	0	0	0	0	0	1
Target age	0	1	0	0	1	0	0	0	0	0	1
Financial slack – target	0	0	1	0	1	0	0	0	0	0	1
High profitability and high-growth firm	0	0	0	0	0	0	1	0	0	1	1
High profitability and low-growth firm	0	0	0	0	0	1	0	0	0	1	1
Low profitability and high-growth firm	0	0	0	0	0	1	0	0	0	1	1
Management style	0	0	0	1	1	0	0	0	0	0	1
Level of location integration	0	0	0	1	1	0	0	0	0	0	1
Category total	2	2	1	19	24	10	6	2	1	19	43
IS relational											
Application and IT compatibility	0	0	0	1	1	3	10	0	0	*13 (+)*	14
IS configuration fit	0	0	0	2	2	0	5	0	0	*5 (++)*	7
IS organizational compatibility	0	0	0	1	1	0	4	0	0	4	5
Relative IT capability	0	1	0	0	1	2	1	1	0	4	5
IS strategy compatibility	0	0	0	1	1	0	2	0	0	2	3
Systems capability fit	0	0	0	0	0	2	0	0	0	2	2
Systems technology fit	0	0	0	0	0	1	1	0	0	2	2
Simplicity of integration	0	0	0	1	1	0	0	0	0	0	1
Vendor carve-out strategy	0	0	0	1	1	0	0	0	0	0	1
Category total	0	1	0	7	8	8	23	1	0	32	40
ISI decision											
ISI method	0	0	0	0	0	0	3	0	10	*13 (+)*	13
Data integration	0	0	0	0	0	3	5	0	0	*8*	8
Integration alignment	0	0	0	0	0	1	4	0	0	*5 (+)*	5

Table D1 Continued

	ISI decisions					*ISI outcomes*					
	0	*+ 1*	*− 1*	*M*	*Sub tot*	*0*	*+ 1*	*− 1*	*M*	*Sub tot*	*Tot*
Degree of ISI	0	0	0	0	0	0	1	3	0	4	4
Digital resource redeployment	0	0	0	0	0	0	2	0	0	2	2
ISI area personnel	0	0	0	0	0	0	2	0	0	2	2
ISI area application	0	0	0	0	0	0	1	0	0	1	1
IS culture integration	0	0	0	0	0	0	1	0	0	1	1
Category total	0	0	0	0	0	4	19	3	10	36	36
ISI capabilities											
Use of external resources	0	0	0	5	*5 (MM)*	0	4	1	1	*6*	11
EA capability	0	0	0	0	0	0	6	0	0	*6 (++)*	6
ISI skill	0	0	0	2	2	0	1	0	0	1	3
Implementation capability	0	0	0	0	0	0	2	0	0	2	2
Cross-business IT integration capability	0	0	0	0	0	0	2	0	0	2	2
Project management (of ISI) skills	0	0	0	1	1	0	1	0	0	1	2
ISI team	0	0	0	2	2	0	0	0	0	0	2
Boundary spanning versatility	0	0	0	0	0	0	1	0	0	1	1
Diagnostic capability	0	0	0	0	0	0	1	0	0	1	1
ISI expertise	0	0	0	0	0	0	1	0	0	1	1
ISI routines	0	0	0	0	0	0	1	0	0	1	1
ISI capability	0	0	0	0	0	0	1	0	0	1	1
Category total	0	0	0	10	10	0	21	1	1	23	33
ISI planning											
Discovery (vs consistency)	1	0	0	1	2	0	8	0	0	*8 (++)*	10
Quality of ISI planning	0	0	0	0	0	0	5	0	0	*5 (++)*	5
Inclusion of IT staff	0	0	0	1	1	0	3	0	0	3	4
Use of decision criteria	0	0	0	0	0	0	3	0	0	3	3
Distributed decision authority	0	0	0	0	0	0	2	0	0	2	2
Project governance approach	0	0	0	0	0	0	2	0	0	2	2
Alignment of vendor and acquirer IT transaction strategies	0	0	0	0	0	0	1	0	0	1	1
Comprehensiveness	0	0	0	1	1	0	0	0	0	0	1
Focus	0	0	0	1	1	0	0	0	0	0	1
Flow	0	0	0	1	1	0	0	0	0	0	1
Formalization	0	0	0	1	1	0	0	0	0	0	1
Credible deadlines	0	0	0	0	0	0	1	0	0	1	1
Category total	1	0	0	6	7	0	25	0	0	25	32
External environment											
Time pressure	0	0	0	5	*5 (MM)*	0	1	4	0	*5 (−)*	10
Industry characteristics	0	0	0	4	4	2	1	0	0	3	7
Legislation	0	0	0	1	1	0	0	0	0	0	1
Shareholder return	0	0	0	1	1	0	0	0	0	0	1
Economic climate	0	0	0	1	1	0	0	0	0	0	1
Category total	0	0	0	12	12	2	2	4	0	8	20
Pre-M&A relation											
Organizational uniformity	0	0	1	1	2	0	3	0	1	4	6
Industry relatedness	0	0	0	0	0	1	2	0	0	3	3
Geographical relatedness	1	0	0	1	2	0	0	0	0	0	2
Organizational process fit	0	0	0	0	0	2	0	0	0	2	2
Relative size	0	0	1	0	1	0	0	0	0	0	1
Competing business models	0	0	0	0	0	0	0	2	0	2	2
Differences in management needs	0	0	0	1	1	0	0	0	0	0	1
Organizational competency fit	0	0	0	0	0	1	0	0	0	1	1
For-profit status difference	1	0	0	0	1	0	0	0	0	0	1

Table D1 Continued

	ISI decisions					*ISI outcomes*					
	0	*+ 1*	*− 1*	*M*	*Sub tot*	*0*	*+ 1*	*− 1*	*M*	*Sub tot*	*Tot*
Category total	2	0	2	3	7	4	5	2	1	12	19
Grand total		0			172					447	619

Notes: This appendix details the relationships between independent variables and ISI decision and ISI outcome variables. Cells show the frequency with which a relationship was found to be a '+ 1' indicating a positive and significant relationship; '− 1' indicating a negative and significant relationship; '0' indicating a not significant relationship; 'M' indicating the independent variable mattered when operationalized as a categorical variable (see Table 2 for detailed explanations). The relationships that were examined at least five times are given in italics. The relationships that were examined at least 5 times and met the criteria for consistent results as described in the text are marked with (++), (+), (−), (−), (00), (0), (MM), (M). No such markings within a shaded cell indicate lack of consistent findings per our criteria.

Research paper #2

The Paradox of Post-Acquisition IS Integration Preparation: Preparing Under Incomplete Information

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The Paradox of Post-acquisition IS Integration Preparation: Preparing Under Incomplete Information

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***Abstract*— In this paper, we propose the paradox of preparation as a salient dilemma facing IT organizations in firms anticipating acquisitions or acquisition activity. The paradox of preparation originates in the need to start preparations for post-acquisition IS integration long before the legal combination is concluded, and the contradictory observation that only after the deal is concluded will it be known to the acquirer what they should have prepared for. Based on an in-depth, explorative study of how a large multi-national company prepared for an anticipated and later enacted acquisition with another large multi-national company, we develop a process theory depicting how this paradoxical tension impacts IS integration preparation activities in the period leading up to the acquisition. Initially, preparations are based on assumptions about the future challenge. As assumptions are confirmed or rejected, focus of preparation activities are recurrently revised. To handle uncertainty of assumptions, the firm actively considered the scope of possibilities and the universality of activities to manage the paradox of preparation.**

Keywords*— *Mergers and acquisitions, Preparation activities, Information Systems Integration, Integration method

I. INTRODUCTION

A rapidly growing body of research has started to emphasize the critical role of Information Systems (IS) in value-creating corporate acquisitions [1], [2]. Issues relating to IS integration (ISI) have been linked to integration process delays, unrealized acquisition potential, overspending, negative staff reactions, temporal business disruption and long-term damage on completeness [3].

To avoid these negative outcomes, research has documented that companies involved in acquisitions need to be able to address two high level ISI challenges: diagnosis and implementation in a mix of ISI methods [4], [5]. The first, diagnosis, is the identification and securing of resources for the integration method that will lead to the successful realization of the acquisition's expected business benefits [5]. The second, implementation, is the enactment of the chosen ISI method [4].

Importantly, both diagnosis and implementation of ISI require extensive preparation and capability-building efforts as both require skills, resources and assets, that are not usually found within an IT organization not involved in acquisitions [6]–[8]. The development of these capabilities takes place through two different processes. One is the dedicated investments in the appropriate skills, resources and assets, for example in a flexible IT platform that can scale up to combined volumes. The other is the accumulation of experiences across a series of acquisitions to establish refined routines. Both processes are measured in years and typically result in a post-acquisition ISI capability that is specifically catered to one or a few types of acquisitions, not a universally applicable capability [6]. This is because ISI diagnosis and implementation capabilities are, in fact, very heterogeneous constructs. The capabilities required to effectively address diagnosis and implementation in one transaction are not necessarily the same as in another acquisition [9]. To identify the need for and secure possibilities to enact a best-of-breed method that combines different systems requires different skills compared to the diagnosis of an absorption method. As the result of the diagnosis will lead to implementation of one or several specific integration methods, the subsequent execution process can be significantly different from one implementation project to the other [4], [10]. In fact, so different that some skills or resources that are developed for some integration methods, are unnecessary for others [6].

Some serial acquirers, such as Siemens and Cisco, have established capacities to handle a diverse range of acquisition types. However, as explained by [11] in their in-depth examination of Cisco, this requires extremely sophisticated acquisition and integration protocols that would be both difficult to obtain as well as over-ambitious for the more typical acquirer.

A significant number of acquirers are not serial acquirers, but novice acquirers [12], however, very little is known about how this group fosters the critical capabilities to address post-acquisition ISI [13]. For the novice acquirer the two observations that post-acquisition ISI capabilities typically are built over years and that these capabilities typically are applicable to one type of acquisition rather than universally applicable to all acquisition types present a dilemma. A potential acquirer must prepare for an unknown challenge, yet once the challenge is known it is too late to prepare. We term this paradoxical tension: the paradox of post-acquisition ISI preparation.

In search of a better theoretical understanding of the post-acquisition ISI challenges facing novice acquirers we investigate the following research question:

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How is the paradox of post-acquisition ISI preparation affecting preparation activities and how does a novice acquirer cope with the paradox?

Given the lack of previous research on the dilemma, we conducted an exploratory case study of ISI preparation in Maersk, the world's largest container shipping company. For the two years leading up to the acquisition of Hamburg Süd, Maersk's IT department prepared for post-acquisition ISI. In conformity with advice from academic literature, preparation began as soon as there was an anticipation of future acquisition activity. In practice, this meant starting the preparation well before knowing who the target was. During the two-year preparation, the approach of the preparation was refined in several minor steps and took several major turns. The first turn was when the ambition for acquisitions became a part of Maersk's goals, the next as the target became clearer. The final refinement came with the revelation of both the specific acquisition target and the anticipated integration method.

We present our findings as a process model of post-acquisition ISI preparation, which we inductively developed from our case. In this process, the paradoxical nature of the preparation is modelled as the gradual uncovering of the challenge that the IT department must solve during an acquisition, which impacts the direction of preparation activities aimed at building the ISI capability. Our process model presents the unfolding challenge of ISI preparation as a series of steps at which the company reassesses the likely goals and redirects preparation efforts. Our process model also covers two strategies to cope with the paradox of planning, iterative scoping and focus on universalism (key resources that should be built because they are transferrable, and an appreciation of the limitations of those that are not).

II. THEORETICAL BACKGROUND AND CONCEPTUAL DEVELOPMENT

As the theoretical background to our study, we review two streams of research on post-acquisition ISI. The first stream focuses on the nature of the post-acquisition ISI challenge and how acquirers effectively cope with it, including which ISI capabilities acquirers needs to possess. The second stream focuses on how acquirers build these capabilities. Combining these streams of research, this section develops the paradox of post-acquisition ISI preparation. Subsequent sections explore how the paradox is affecting preparatory activities and how a prospective acquirer can manage it.

In the research on post-acquisition ISI challenges and solutions, the broad conclusion is that the principal role of the IT function is in the realization of business benefits [4], [10], [14], [15]. As the business benefits are contingent on completed ISI, IT functions are often under stress from both internal and external stakeholders to realize promised synergistic effects [10], [15]. Delaying ISI pushes the recovery of investments, possibly to the extent where the business rational behind the acquisition is challenged [9].

To deliver business-enabling ISI, the IT function needs to be successful in two interrelated tasks: diagnosis and implementation of ISI. Diagnosis refers to the assessment of the acquisition's starting conditions and to-be scenario: what resources exist, what are the dependencies on the target's IT, and what should the eventual solution look like [5], [7], [10], [16]. Implementation begins when the acquirer obtains control of the target and begins integrating the companies [4], [17].

Reference [5] contend that the diagnosis of the ISI method should follow a deep analysis of the synergies expected of the acquisition. The analysis frames the ISI project, suggesting a path to acquisition ISI with specific decisions needs to be made based on the initial conditions. Along similar lines, ISI method and acquisition benefits have been described as an alignment process [4], [10], [14], [15].

Table 1 presents the four post-acquisition ISI methods, appropriate in different situations.

On a high level, all ISI projects are delivered through this two-fold capability of diagnosis and implementation. However, the four methods differ fundamentally in their sets of activities [15]. In concrete terms, IS absorption implies the transfer of customer and operational data from the target's IS to the IS of the acquirer. The acquirer's IS are then expanded to embrace the new physical locations, for example, production facilities or sales offices that are the result of absorbing the target's operations [4], [14], [18]. In contrast, IS co-existence means extending functionality of the acquirer's IS and is associated with different options of how to carry out the activity, for example, architecture and intensity for the bridges between systems in IS co-existence [19].

TABLE I. POST-ACQUISITION ISI METHODS

Method	Description
IS absorption	All data from one company's systems (usually the target) is migrated to the other's, and all IT systems are retired [4], [8].
IS co-existence	IT systems of both companies are retained and no data migration or system's consolidation occurs [15].
IS best of breed	Through a process of comparison and evaluation, the companies agree on which systems to retain for the combined organization [14], [15].
IS renewal	New IT systems are developed to be used by the combined company, and systems of both the target and acquirer are retired [4], [10].

In addition, best-of-breed and renewal require a unique set of activities, which means the ISI capability is a very heterogeneous construct that needs to apply different qualities in each situation where it is used.

In the second stream of research relevant to this paper, authors have investigated how firms come to possess the capabilities required to successfully enact post-acquisition ISI. Studying the case of a siloed conglomerate that commenced a series of acquisitions to transform the company into a modern business focusing on food ingredients, [8] analyzed what it took Danisco to become "IT-ready to acquire". The authors describe a process that spanned several years and although they call this a preparatory activity, what they refer to is an ongoing task that subsequently unfolded over a series of acquisitions where the acquirer gradually improved its capabilities.

In another study, [20] investigate to what extent the required capabilities can be sourced from the external of the firm when needed, through the enlistment of specialized

consultants and other external agents. They find that doing so may contribute some critical resources to the ISI team, but that to large extent the IT assets and skillsets required to diagnose and implement ISI is so contextually dependent that the capabilities largely must be built within the acquiring organization.

Along similar lines, [6] investigates how an acquirer develops ISI capabilities. His conclusion is that these abilities must be built over a series of heterogeneous acquisitions. Repeating the same type of acquisition over and over may teach the acquirer how to implement ISI that suits this particular type of acquisition, but experience variance is required to build the expertise to appropriately design ISI for a range of different scenarios. According to [6], the knowledge necessary to do so is highly tacit and requires in-depth knowledge of the acquirers IT resources and organizational context. Importantly, [6] with reference to the task heterogeneity of ISI, concludes that it is relatively easy for a serial acquirer to become skillful in delivering on a type of ISI method corresponding to one type of acquisition benefit. However, as soon as the firm attempts a different type of acquisition the ISI capability is severely challenged.

This observation also puts the light on the paradoxical tension facing a novice acquirer approaching the ISI challenge for the first time. On one hand, the stream of literature on how acquirers come to possess ISI capabilities contend that this is done internally over several years. It can be eased by hiring external resources, but not fully resolved by engaging. Furthermore, it is very specific to the type of acquisition being enacted by the acquirer.

III. METHOD

This research follows an in-depth case study of Maersk, the world's largest container shipping company as it prepared for the ISI of Hamburg Süd, another large container shipping company. Recognizing the paucity of studies on how novice acquirers approach the ISI challenge in general, and specifically around the dilemma pertaining to the post-acquisition ISI paradox, the research followed a fundamentally inductive study design with process theory ambitions. The intent was to develop a concrete mid-range theory rather than an abstract grand theory [21].

Our approach was based on a positivist case study methodology [22]. The positivist approach [22], [23] contrasts critical or interpretive case study research, where the objective is social critique or understanding the social construction of reality [24]. Although we agree that the capabilities created by a novice acquirer can ultimately be seen as constructed and embedded in a social context, this study frames capability creation as progression in abilities from a simplified, modest foundationalist [25] view of unmediated experiences of a real world. In modest foundationalism, assumptions are made about the existence of certain key elements that allows for theory building, until reasons to challenge these assumptions are found. For this study, we are thus assuming that the preparation activities in question do exist and that their influence on ISI capabilities can be captured by regarding them as real-world objects. Taking this position, we adhere to a stream of acquisition research that seeks to balance the study of behavioral mechanisms and cognitive processes [26], [27].

Three reasons made Maersk and its preparatory work a suitable case setting to explore the post-acquisition ISI paradox. First, Maersk are a novice acquirer. They had not done an acquisition in over ten years, and most of the knowledge and experience from that had left the company. Furthermore, they had no formal ISI process; this had to be built from scratch. Second, they were preparing for an acquisition well in advance of an actual acquisition. Studying their preparation process longitudinally would provide valuable insights and allow us to build on the literature that already recommends preparing in advance. Finally, Maersk are an appropriate case because they did not have a target company when preparing for the acquisition. As is known from the literature, preparation involves preparing for methods in ways that may not be complementary towards other integration methods. Studying this case allowed us to evaluate how not knowing either the acquisition target, and in turn the acquisition integration method, effected the ISI preparation.

To understand the preparation process, interviews with key persons involved in the development of the ISI capabilities were the primary data source. These include Maersk IT's CIO, heads of M&A, project and program leaders, head of the Hamburg Süd business integration team, many business analysts, and all members in the IT M&A team. In total, 73 in-depth interviews were conducted with over 40 people involved with the program. Interviews were recorded and transcribed. The interviews started at a stage when Maersk had aired an initial idea that acquisitions could become a means to grow the business in the future. Eventually, the interviews come to cover a 30-month period before the formal take-over of Hamburg Süd took place. In addition, researchers were invited to join preparatory meetings and workshops as observers during the preparation period. These were documented through field notes. The research team also had full access to documentation, including the integration playbook, internal reports, presentation material, and external reports.

Coding of the data was done through Nvivo and followed a two-phased process. The first phase of coding aimed to capture the event time series of the preparation. Coding categories were generic process codes [28], including events, actions, decisions, outcomes, and states. To determine concepts (such as invention, capacity and frustration, and network) and their properties (e.g. efficient/inefficient, success/failure) in events, actions, decisions, outcomes, and states, we applied an open coding procedure. Because of our pre-understanding and focused attention on the preparation paradox, we paid attention to two kinds of items in the coded material. One was preparatory activities. The other was expressions of the foreseen ISI challenges and the capabilities needed to address them (the assumed end-state of preparations). In the end, we identified 31 preparatory activities aimed at building the ISI capability (presented in Table 2). We could also infer four different end-states expressed in the material. The authors jointly coded the data, identifying initial concepts and higher-level categories using a constant comparative method [29] and resolving any disagreements through discussion [30]. The outcome of this coding phase was an event sequence outlining

the unfolding of the preparation with an unstructured list of concepts that seemed to be relevant in the process.

In the second phase of the coding, we coded the relations between codes. Once again, attention was given to the preparatory activities and the objectives of the preparatory work. In this analysis, we could assign the 31 preparatory activities to the four objectivities and define four distinct phases in the preparatory work. We also traced the underlying drivers of the objectives as well as the impact of activities. We uncovered the dynamics between elements that impacted the assumptions about the end-state, the effects on the preparation activities and the impact on the preparation activities in shaping the emerging post-acquisition ISI capabilities. Our understanding of this process was abstracted to form a process model (Figure 1) with an associated granular description of the sequence of events in an extended narrative. The process model and narrative were shared with representatives from Maersk who largely agreed to the representation of the process and the state of the ISI capability at the closure of the acquisition.

IV. Case analysis

Our case analysis presents the preparation process and activities Maersk IT went through to develop from novice acquirers to possessing post-acquisition ISI capabilities. Table 2 presents the outcomes of our analysis, presenting the coded activities in chronological order. Aligned with those are explanations of the expected acquisition target and expect acquisition integration method. Plotting these chronologically reveals insights to the relationships between the work that was being done (the activity) and the expect goals that needed to be achieved. After presenting the case study in the section titled *Preparatory Activities*, we proceed to discuss the process model in section titled *Process Interpretation*.

A. Preparatory activities

In this section, we present the story of Maersk's preparation for the eventual post-acquisition ISI of Hamburg Süd. As shown in Table 2, we identified four distinct phases which mark a significant shift in Maersk IT's idea of who they would acquire. We use these four phases as a means to present their story of their preparatory activities to build the post-acquisition ISI capability.

1) Pre-acquisition

During this phase, Maersk IT were not considering an acquisition, and any work done at this time was not done for the explicit purpose of becoming ready to carry out ISI. However, we observed activities completed then which contributed to the ISI capability, these can be seen in Table 2.

Rationalizing the estate (A1) was a process run over several years that resulted in a reduction in the IT landscape. The purpose of rationalizing was largely cost focus, however a side benefit, as acknowledge by their CIO, was that it had made it easier for them to acquire another company and absorb them.

The other activity was to Record the IT landscape (A2). Again, this was not specifically a preparation activity, but would pay off greatly as a stepping stone for enabling acquisition readiness. During this pre-acquisition phase, Maersk had created enterprise architecture and business process diagrams which were later used as tools to prepare for acquisitions.

"So it really started with a lot of the work... about understanding the landscape and rationalizing the landscape." (CIO, Maersk)

This phase shows that, although they were not considering acquisitions, having gone through this period of developing good IT governance made it easier to begin the preparation work in the next phase.

2) Speculation

The next phase was initiated when the CIO created an IT M&A team, responsible for developing the IT departments ISI capability. At the time, there was no acquisition anticipated, so the team speculated on what the most likely acquisition scenario would be. Early on, it seemed likely they would buy another shipping company, however, there are over 100 shipping companies ranging drastically in size, geographic location, and other attributes. Initially it was assumed that there would be a series of small acquisitions, rather than a large one.

This changed in late 2015 when the dramatic decrease in the profitability of the container shipping sector lead to many private and public shipping line owners looking to divest their holding. At the end of 2015, Maersk missed acquiring one of the top 20 carriers APL and it became clear that large shipping companies were up for sale. As such, the IT M&A team began speculating that this could eventuate. Still though, they had been given no information as to how they would integrate an acquired company. Reflecting on lessons learned (A5) from a previous acquisition over 10 years earlier, they decided that the best approach would be to absorb an acquired shipping line.

"If you look at our core initiatives that was one of them: that you will come to the Maersk operating system." (Senior IT Manager, Maersk)

The team used this information and their own speculation to inform their preparation plans. Initial activities in this phase focused on acquiring and quickly absorbing. The IT M&A team was formed (A3), and straight away they began to develop data migration plans (A4), conduct scalability assessments (A7), and even execute a mock acquisition of a subsidiary (A6). As new leadership joined the team in 2016 the team refocused its efforts to first learn about acquisitions (A10) and build the relationships (A9, 14, 15, 16) within the company they needed to build the ISI capability. Once they had these, they developed a playbook (A12) that would be used to guide them through an acquisition.

By the end of this phase, the team had established themselves well within Maersk and Maersk IT and had a broad plan for action when an acquisition hit. They had speculated that Maersk would likely buy shipping line and that they would absorb them, but they were not completely closed off to other possibilities.

TABLE II. PREPARATION ACTIVITIES, ACQUISITION TARGETS AND ANTICIPATED INTEGRATION METHODS

Phase	Activity	Year	Acquisition target	Integration method
Pre-acquisition	Rationalize the estate (A1)	Pre-2015	No planned acquisition targets.	No planned acquisition integration method.
	Record the IT landscape (A2)			
Speculation	Form IT M&A Team (A3)	2015	Assumed to be acquiring another shipping line. First small ones, then one large line.	IT M&A team speculated the most likely integration method was absorption. They were aware of limitations in completely committing to one approach. Therefore, they constantly considered how their preparation may or may not support other integration methods. Receiving an instruction to be capable of integrating a company 25% the size reinforced their thinking that they would follow the absorption method.
	Develop Data Migration plan (A4)			
	Conduct Lessons Learned (A5)			
	Execute integration drill (A6)			
	Assess application scalability (A7)			
	Develop Guiding Principles (A8)			
	Management presentations (A9)	2016		
	Learn fundamentals of acquisition process (A10)			
	Develop agreed terminology (A11)			
	Create Playbook (A12)			
	Create a Due Diligence approach (A13)			
	Build a relationship with the Maersk strategy team (A14)			
	Form strong relationships with IT (A15)			
	Build relationships with other throughout Maersk businesses (A16)			
Supposition	Identify critical path/ core applications (A17)		IT M&A team were instructed to be ready to accommodate a 25% volume increase. As other shipping companies became involved in M&A, the list of potential acquisition targets shrunk.	
	Assess critical application scalability (A18)			
	Increase size of permanent team (A19)			
	Execute Day One connectivity drill (A20)			
	Develop communications strategy and techniques (A21)			
	Develop digital due diligence plan (A22)			
	Create on boarding program for new recruits (A23)			
	Present roadshow to IT organization (A24)			
	Execute due diligence (A25)			
Direction	Join a bigger team (A26)	2017	On December 1st 2016, it was announced that Maersk would acquire Hamburg Süd	Direction came that Hamburg Süd would continue to operate independently of Maersk, except for operations which the two companies would integrate. The IT strategy was to support co-existence and minimal absorption.
	Align IT M&A team to integration work streams (A27)			
	Adopt project manager roles (A28)			
	Capture business requirements (A29)			
	Manage delivery of IT solutions (A30)			
	Increase size of team with temporary agents (A31)			

3) Supposition

As 2016 continued, it was becoming clearer that an acquisition was becoming more likely. Senior management at Maersk were talking publicly that they were looking to acquire and the strategy team looking at potential targets were engaging the IT M&A team. The effect this had on the IT M&A team was to focus their attention on large carriers, and that IT would need to be ready to absorb a 25% volume increase. This began to narrow down the likely target, and also increased the urgency to be prepared.

As well as looking at carriers that would add 25%, the likely list of candidates was shrinking due to many mergers and acquisition occurring within the shipping industry, and significant financial problems plaguing others with one major carrier going bankrupt in August 2016. Sensing an acquisition was becoming more likely and getting clearer picture of who it could be influenced the preparation activities. Furthermore, after the instruction to be ready to increase by 25%, the IT M&A team supposed with more certainty that they would need to absorb the acquired company.

"In my head that left us with Hapag Lloyd, Hamburg Süd, and Evergreen that fulfilled the requirements that the deal team had told us, ...but I always thought that culturally it would be easier for Maersk to absorb a western company." (IT Manager, Maersk)

The phase ended just after due diligence (A25) was completed on the acquisition target Hamburg Süd at the end of 2016. At this time, the company was known however, the integration method was still unclear. Despite that, some information about the goal of the acquisition was becoming available, and this information informed activities undertaken by the IT M&A team.

Early in this phase, the activities focused on getting the IT department ready for the anticipated acquisition. Supposing the acquisition would be an absorption, the team returned to the scalability assessments (A18) initiated, although not completed in mid-2015. They came at this with a specific target (increase by 25%), which was important to guide discussions with application owners.

Other activities were the Day One connectivity planning, and the execution of another drill (A20) to test their readiness.

This drill focused on the important matter of ensuring the two IT landscapes could talk to each other on Day One. Although the IT M&A team were working towards an absorption, this drill took an acquisition agnostic approach, assuming connectivity would be needed no matter the integration. However, this drill was based on very specific information about real shipping companies. Information such as locations, number of staff, number of ships, and IT systems, about the most likely acquisition targets was gathered from publicly available sources and combined to make a new simulated company. In doing so, they were able to test their Day One integration approach on what ended up being a very close representation of the company they ended up acquiring; Hamburg Süd.

During this phase, the team increased in personnel (A19). First by bringing on an IT specialist to fill a technical skills shortage within the team. By the time the Hamburg Süd due diligence was executed, the team had some idea of why they were bought and that they would remain a strong independent brand. Due to the upcoming acquisition and integration, two more people were brought on. One for project coordination, who spoke German. The other was an expert in Maersk Operations, the department leading the integration efforts.

4) Direction

The final phase in the preparation and building of the capability is direction, which is characterized by the ongoing evolution of unknowns becoming knowns. This started with Maersk identifying both their acquisition target and appointing an overarching integration team to direct the integration project. The goal for the IT M&A team was to follow a mostly co-existence integration method, with limited absorption in the operations area. This was a very different execution than what the IT M&A team had planned for, and preparation activities such as the scalability assessment (A18) were no longer required.

"I think the milestone was the setup of the coordination and integration team. This was the first time we got marching orders in terms of how this integration would be approached." (Senior IT Manager, Maersk)

During this phase, the team were told what the business expects to have happen as a result of the acquisition and helped identify how IT would support it (A27). They joined the larger integration group (A26) and become part of the company wide effort to prepare for the integration of Hamburg Süd.

The team members aligned with business leads and worked together to capture business requirements (A29) and manage the delivery of project sized IT solutions (A30). Furthermore, the team significantly increased in size. The team recruited many temporary agents from the internal Maersk talent pool, all specifically chosen for their unique skillsets to contribute to the specific integration (A31).

Despite a difference between the anticipated integration method and the one applied in the integration of Hamburg Süd, many of the preparation activities were applied. For example, the templates developed as part of Day One connectivity planning (A20), the communications materials and strategy (A21), and the due diligence checklists and report (A13) were used. The key characteristic of these materials was they were not specific to an acquisition. They were generic tools that would be used irrespective of the acquisition type.

B. Process interpretation

In this section we present a process model of post-acquisition ISI preparation, Figure 1. It details the four-phase process Maersk went through to build their ISI capability and how this was influenced by what they considered to be the most likely acquisition integration method. As can be seen in the model, each phase ends when new information on a potential acquisition arrives, forcing the IT M&A team to redirect their preparatory efforts. This results in turning points at which time they also reprioritize their activities based on whether they are still useful. In this section we detail three findings related to how Maersk looked to the future and the capability needed for integration to inform their preparation activities, and how the changing target affected these preparations.

1) The gradual uncovering of the capability requirements

Our analysis of the case revealed how, as the process of preparation unfolded, Maersk IT went through a gradual uncovering of the capability's requirements. This finding describes an ongoing process to both identify what they needed to do to be ready for post-acquisition ISI and carry out the readiness activities. Within this stream, we found two ways through which the capability requirements were gradually uncovered.

The first came from executing the activities and learning lessons and gaining insights from them. An example was when the IT M&A team carried out a mock acquisition on their subsidiary company (A6). They executed a drill to test their ability to carry out an absorption. However, the drill revealed that there was not a one to one relationship of business processes between the two companies. Because of this, Maersk was unable to absorb the entire subsidiary's business processes into their IT application landscape. From this Maersk learned that if they were to do an absorption, there will be some co-existence as well, and that they must be ready to also support this integration method.

The second way the capability requirements were gradually uncovered was from the evolving idea of what the anticipated integration method was. As the specifics of which company would be acquired and the likely integration method became clearer, so too did the understanding of what would be needed to successfully carry that out. An example of this was the ongoing work on application scalability (A7, 18). At the point when the acquisition was to be of another shipping line, and IT would need to increase by 25%, the IT M&A team began to focus on key applications that would be affected by growing 25%. However, when an acquisition did materialize, and the integration type was co-existence, the work done on scalability was no longer required.

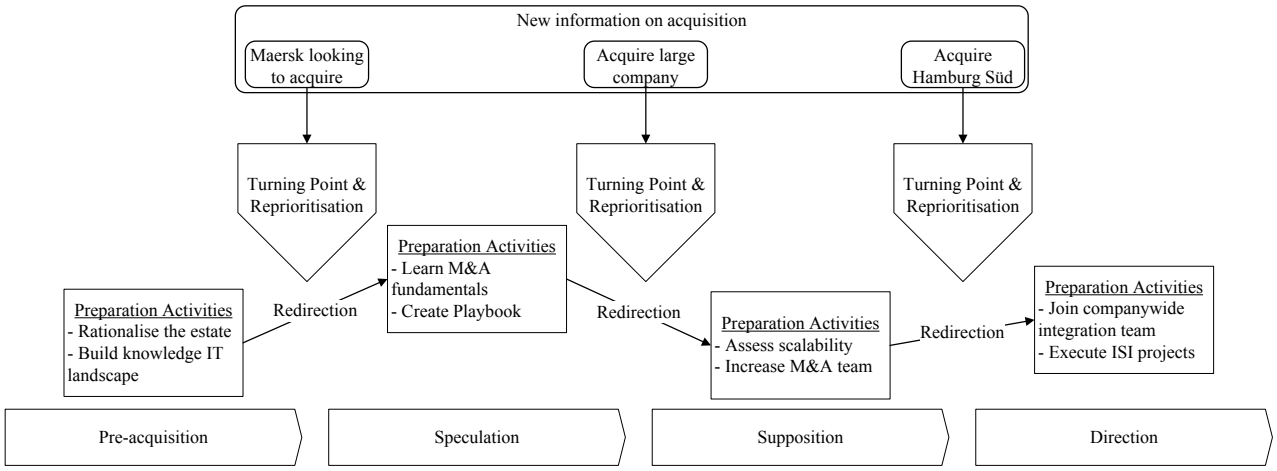

Fig. 1. Process model detailing how Maersk built their post-acquisition ISI capability

These examples show how, over time, Maersk gradually discovered what they needed to do to be ready to acquire. Although we observed two different ways they learned this, it always had the same effect, that something they learned about the capabilities influenced their preparation direction.

The notion that there is a gradual uncovering of the requirements for the ISI capability are captured in the process model by the liner progression of activities. By showing that activities are the result of those that come before them, we highlight the developing nature of the preparation process and the gradual unfolding of what is known.

2) Turning points and redirection

When earlier presenting our case, we framed it as four distinct periods of preparation, differentiated by the understanding of both the anticipated target and the integration method. At each point we observed a shift in Maersk IT's preparation behavior; a shift we term a turning point. What they were preparing for changed so they redirected their preparation efforts to towards the new challenge.

At the time of the first turning point in the process model, the focus of the IT department turned to acquisitions, this began the speculation phase, and the IT department redirected its resources to focus on building the ISI capability. During this time, the IT M&A team decided what the likely acquisition target and integration type would be and used that to guide their preparation activities. However, they were mindful of the limitations of completely following one approach. Therefore, when creating tools like the playbook (A12), they made it in a way so it would be useful to other types of acquisitions or if the integration was not a full absorption.

In the next phase, supposition, when the target began to become clearer, the IT M&A team began fine-tuning their preparations, based on a firmer intention to absorb a specific type of company of a particular size. Furthermore, as this period progressed, the specific company that could be bought progressively became clearer. Due to these insights, they redirected their efforts to prepare for absorbing a shipping line of a specific size. Examples of activities influence by this knowledge were identifying critical applications (A17), scalability work (A18), and the second drill (A20) that focused on acquiring a company with very specific detail. It should be noted, that they were not 100% committed to absorption. The second drill was actually integration method agnostic. This showed that while the IT M&A team were focusing on absorption, and being guided by that, they weren't committing to it at the expense of preparing for all possible eventualities.

The final phase, direction, began once both the target company and the integration approach were stipulated to them. Again, this was a turning point in so far as what the team would now need to do; moving from an expected absorption approach to a co-existence. The plans and preparations for absorbing a company 25% of their size were put aside to work with the rest of the company (A26) on the specific integration approach.

Each phase started with a turning point in the preparation that caused a redirection in the focus of the activities. Our process model presents these turning points as breaks and a change in direction in the preparation activities. At the end of each phase, due to additional information, the understanding of the expected integration changed (a turning point) which again caused redirection in preparation activities.

3) The changing relevance of preparatory activities

As seen in the case description, there were many preparatory activities undertaken by IT to build their ISI capability. Furthermore, as presented in the literature review, not all of these activities are relevant for all acquisitions. In analyzing this case, we found that Maersk also prioritized or deprioritized preparation activities as they built their ISI capability, and that this was due to what they considered the most likely type of acquisition and integration method that would be followed.

The matter of applications and their ability to scale with an acquisition was one example of a capability that's relevance changed during the preparations. Initially, it was flagged a high

priority and it was one of the first matters addressed by the IT M&A team (A7). However, it was put on hold for a short while, as they focused on learning the fundamentals of post-acquisition ISI (A10) something deemed more important. Once this was in order, application scalability quickly became relevant again, especially after they received instructions that IT must be able to handle a 25% volume increase. As such, identifying core applications (A18) and understanding their ability to scale or limitations around scaling (A19) became a priority again. However, work to overcome scaling issues was not done. It would wait until there was visibility to exactly what would happen in the acquisition (i.e. the integration method). When the acquisition was announced, and the plan dictated to them, they did not need to absorb Hamburg Süd, rather enable their co-existence. As such, the scalability program was again deprioritized.

Another activity that changed in priority was the focus on enabling IT solutions for Day One and enabling connectivity between the two organizations (A20). This was something that received little attention at the start but increased in relevance as the target and likelihood of an acquisition increased. When it was addressed, it was addressed in a generic way and kept integration method agnostic. In this way it focused on key connectivity challenges that would apply in any acquisition. In this way they prioritized the solution over the method. To make it relevant though, they used specific information to the three companies they considered most likely to be bought. Using real data helped to reinforce its importance and made the exercise a priority of others involved. From there on, the principle of connectivity, especially for Day One continued to increase in priority. As the acquisition was announced, and the planning for integration proceeded under the direction of co-existence the connectivity piece received much attention and priority (A30).

The changes in priority of activities is presented in the process model, at the stopping and starting of preparation activities in each phase. At the time of change, the relevance of each activities' output is revaluated considering the new conditions. At this time, activities are reprioritized.

V. DISCUSSION AND CONCLUSIONS

With a starting point in the observation of a managerial dilemma pertaining to the post-acquisition ISI preparation paradox, this paper set out to answer the question:

How is the paradox of post-acquisition ISI preparation impacting preparation activities and how does a novice acquirer cope with the paradox?

Through our revelatory investigation of Maersk and its preparation activities leading up to the ISI of Hamburg Süd, we find that the paradox affects Maersk's preparation activities in three ways. First, by forcing Maersk to prepare under a gradual uncovering of the final requirements of the capability being built. Second, the prevalence of turning points in which the direction of preparation is significantly adjusted. Finally, through the evolving focus on preparatory activities as the relative importance of specific activities are increased or decreased. Our investigation revealed that Maersk successfully coped with the initial lack of information about the end state by engaging in iterative scoping of the foreseen challenge and focus on universalism in early preparatory work. This meant a recognition of the key resources that should be built because they are transferrable and, conversely to that, an appreciation of the limitations of those that are not able to dynamically adjust.

A. Theoretical contributions

Previous literature on post-acquisition ISI, research has outlined an ideal model for how an acquirer builds the capabilities needed to address the post-acquisition ISI challenge. In this model, the acquirer spent several years leading up to the acquisition preparing the company in order to be IT-ready to acquire [8] and to 'hit the ground running' in the event of an acquisition [11]. The acquirer then subsequently used the initial acquisitions to build and refine the initially very limited ISI capabilities. Its argued that, "A failed acquisition may create valuable learning effects that can enhance the performance of subsequent acquisitions more than its direct negative influence" [6]. It is also noted that to a large extent the skills needed for acquisition ISI cannot be sourced, the have to learned by the acquirer itself [20].

However, this ideal model of how critical ISI capabilities are built is based on and developed to guide serial acquirers that complete many minor acquisitions every year. This paper was motivated by the argument that limited research exists on the ISI challenges facing novice acquirers. To this point, we can note that there are several important boundary conditions that mean the ideal model of capability building have low explanatory power in the case of a novice acquire. These include the assumption that a failed ISI project can have value by leading to an improved ISI capability. For one-off acquirers, there is no such value to be captured. The other assumption is that the acquirer knows what it prepares for in the process leading up to the acquisition. For a serial acquirer such as Danisco [8] the likely acquisition scenario was well-known as the company sets out to make itself IT-ready to acquire. However, for a novice acquirer, we show that this may not be the case. In this situation, the acquirer must wrestle with the challenge of not knowing what to prepare for while preparing, knowing that once it is known what it must prepare for it is too late to prepare – this we define as the post-acquisition ISI preparation paradox.

This paradox is a salient feature of the challenge affecting novice acquirers in the area of ISI. Outlining its causes and mechanisms in the preparation process consists an important piece of understanding of the ISI challenges and its solutions for novice acquirers. The paradox's critical boundary condition is that the acquisition target is not known at the time preparation begins. In the rare event that the acquirer knows the target already several years before the deal is implemented, the paradox will not be a salient feature.

Beyond the insights gained pertaining to ISI in novice acquirers, the contributions of this paper also have two important implications on the acquisition ISI literature in general. First, our study puts emphasis on the issues of time in acquisition ISI. In post-acquisition ISI time pressure seems to be a unique and very powerful driver. The fundamental reason

why the novice acquirer is pushed to prepare not knowing the end state is that pushing the integration timeline will have serious negative effects on the net-present value of the acquisition.

The pressure to integrate rapidly takes several forms, including market pressure to realize the expected benefits [10] and legal pressure to report and govern risk [10], [15]. Maersk is challenged to accommodate complex multi-business decisions that are frequently the subject of competing and inconsistent business objectives within a short and tight time frame. In previous research, these aspects of time pressure in ISI projects is typically noted in passing, while focusing on other parts of the explanation of ISI outcomes [6], [15]. In the acquisition ISI literature, theoretical explanations that focus on the influence of time pressures are lacking but, as this paper shows, should be an important theme moving forward.

The second general implication for acquisition ISI research that is relevant beyond the specific context of the novice acquirer, pertains to the ongoing discussion of whether ISI can be understood as one single capability [18], [31] or if it in fact is a set of different capabilities each applicable to different type of acquisition [6], [32]. As illustrated by our process model in Figure 1, our finding is that the capability has one universal and one specific component. The universal component is evidenced by that some preparation activities are evaluated and found to have sustained relevance even after the anticipated acquisition is revised. This includes such activities as the roadshow (A24) to build working relations to other departments that are going to be collaborators in the ISI projects. Other activities such as the drills (A6, 20) are revised significantly content-wise to best reflect the future acquisition scenario. Yet others are started or stopped depending on their increasing/decreasing relevance. This indicates that there is also a specific component that will be tied to the specific acquisition that eventually materials. Specific and general *knowledge* has been discussed in literature, the distinction based on the cost to transfer from one source to another [33]. This is like our distinction between specific and universal in that the component must be usefully transferrable from one context to the next. As the anticipated acquisition changes, if the activity continues to usefully contribute towards the goal then it remains relevant and continued. The implication for research is that future studies that seek to model the ISI capability must work with multi-level constructs that caters both for universalism and specificity in ISI capabilities.

B. Practical implications

Our findings have valuable practical implications for novice acquirers, as they begin to prepare for post-acquisition ISI. In this section we present three practical implications from our study.

First, we highlight the need for foundational understanding of post-acquisition ISI and to use this to develop a broad plan. By starting broad and generic in preparation activities, the team builds a proper understanding of what is expected and an understanding of the limitations to each approach. In having this understanding, they will be aware of when focusing on a approach is resulting in the exclusion of preparation for another. They will also be more competent at deciding when to follow an integration agnostic approach, as Maersk did with their playbook (A12) and Day One connectivity drill (A20).

Second, we identify the need to have an anticipated integration target and work towards it. At all points, Maersk had an idea of what they were preparing for. This was necessary as it assisted in identifying the activities they should undertake and defining the output of the activities. As we saw in the case, it was this idea of what they were preparing for that inspired the preparation activities and led to turning points and redirection. Without these, there is a risk that preparations are made for unknown reasons or aren't aligned with likely integration scenarios. However, as we stated above, we recognize the need to develop universal ISI capabilities, but these should be done purposefully within the context of an anticipated acquisition.

Finally, the case highlights the likelihood that a final acquisition method will be a hybrid model. In both the acquisition of Hamburg Süd and their simulated absorption of their subsidiary (A6), Maersk did not perform a clean co-existence or absorption. Instead, they had to follow a primary integration method with some exceptions. This finding highlights the need to, as the IT department prepares, be aware of the limitations of each integration approach and find ways to bridge these.

Although this paper is grounded in the challenge of ISI, its findings may be applicable beyond this scope. Other large IT initiatives are also begun without full knowledge of the end state, and ongoing work influenced by preceding decisions. A good example is the deployment and continued development of ERP systems. The paradox of preparation could be expanded into this context and be combined with concepts such as self-reinforcement to understand these challenges better [34]. Expanding on this idea further, task dependency theory could be explored to understand how decisions made during the pre-preparation period enable or limit the opportunities for specific preparation activities [35]. This could reveal how decisions made and actions taken long before an acquisition is considered have significant influence over preparation possibilities. This is especially relevant for core IT infrastructure such as networking or ERP systems which once put in place are inherently difficult to change.

As with all studies, there are limitations. As a single case study, it is difficult to generalize these findings. Similarly, the outcome is the application of one of the possible integration approaches. Understanding how the paradox of preparation unfolds in other cases and through alternative integration methods will improve the validity of these findings.

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Research paper #3

Building IT Resources for Post-Acquisition IS Integration in Novice Acquirers

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Completed Research Paper

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Abstract

Despite much attention and research, mergers and acquisitions generally fail to deliver their anticipated value. One of the main causes of failure is ineffective post-acquisition IS integration. Research into this problem, has largely over looked the challenges novice acquirers face when developing their post-acquisition IS integration capability. This paper addresses this research gap by analyzing a novice acquirer's preparation through a two-and-a-half-year case study informed by 81 in-depth interviews. Applying the resource-based theory of acquisitions, the study identifies five components consisting of 28 resources the novice acquirer developed and applied during the successful IS integration of an acquired company.

Keywords: IT Resources, Mergers and acquisitions, Novice acquirer

Introduction

Mergers and acquisitions (sometimes referred to as M&A, in this paper shorted to acquisitions) are powerful strategic tools for organizational growth and change. According to Hershorn and Thomson Reuters (2017), 2017 was a record year for worldwide deals, recording 49,448 deals worth over $3.6 trillion. Two high profile deals were Amazon's acquisition of Whole Foods for $13 billion and CVS's merger with Aetna worth a staggering $69 billion (Amazon 2017; CVS Health 2017). As this shows, acquisitions are a significant investment for companies which garner much public attention. Unfortunately, statistics for acquisition success are shockingly poor, with reports claiming up to 70% of deals fail to deliver on the anticipated deal value (Cartwright 2002; Christensen et al. 2011; Marks and Mirvis 2011). With so much at stake, and yet such a high failure rate, research has a unique opportunity and responsibility to help understand this challenge and contribute meaningful solutions.

The causes of failure in acquisitions has been the subject of many studies. Factors contributing to this unfortunate outcome include, CEO hubris, overpaying, and inadequate due diligence (Haleblian et al. 2009; Lovallo et al. 2007). A common attribute of these three factors is they all occur up to the point a company commits to an acquisition. While they are important, there is another significant challenge that is faced only once the deal is done – post-acquisition integration (also known as post-merger integration). Post-acquisition integration is the act of bringing the two companies together to form one, and it impacts most parts of the companies involved. One of the major challenges in post-acquisition integration is bringing together the two firms' Information Systems (IS) (Posnick and Schenborn 2007). Today, all organizations are massively dependent on their IS, and failure to integration effectively can be catastrophic. There would be disruption to 'business as usual', a waste of expenditure, and the lost potential of the acquisition. Up to 60% of a deal's value is dependent on IT effectively supporting the business processes of the combined organization and in IT related synergies, and yet failure to integrate IT is one of the most common causes of failed acquisitions (Curtis and Chanmugam 2005; Posnick and

Schenborn 2007; Sarrazin and West 2011). Avoiding this problem and the realization of acquisition value is dependent on successful post-acquisition IS integration.

Fortunately, research has been looking into this challenge, and is contributing to an understanding of the challenges faced. One of the key lessons known from the experiences of past acquirers, is that acquiring IT departments typically do not possess the capabilities needed for carrying out post-acquisition IS integration (Yetton et al. 2013). This process is unlike other projects, and it is therefore imperative that companies commit to building the post-acquisition IS integration capability. Ideally this build up initiated well in advance of an acquisition (many months or years), and led by an internal IT M&A team who will ultimately be responsible for executing the post-acquisition IS integration (Yetton et al. 2013).

Literature on the topic often reports stories of successful acquirers, who have honed their IS integration capability over many acquisitions, and focuses on serial acquirers such as Cisco, Danisco, or Trelleborg (Henningsson and Kettinger 2016; Toppenberg et al. 2015; Yetton et al. 2013). However, most acquirers are *not* serial acquirers (Kengelbach et al. 2011). Instead most acquirers make one or a few isolated deals, which are so infrequent that learning by experience accumulation is not an option. For such *novice acquirers*, acquisitions represents one-off strategic opportunities (Finkelstein and Haleblian 2002; Laamanen and Keil 2008). The core principle when defining a novice acquirer is their lack of experience. Lees (1991) highlights the relative disadvantage of novice acquirers as ones who have no experience to draw on. On the other hand, Henningsson (2015) distinguishes serial acquirers as those who have developed and internalized routines to implement IS integration over many acquisitions. Novice acquirers are those without experience in acquisitions who have not built any internal processes or capabilities for handing one. They carry out only a single transaction or acquire so infrequently that the knowledge and processes of past acquisitions are not retained. The IS challenges faced by novice acquirers have not been explicitly studied.

This paper addresses this niche by studying the IT M&A team of a novice acquirer through the theoretical lens of the resource-based theory of acquisitions. Specifically, the paper is driven by the research question: *what resources does the IT organization of a novice acquirer need to develop to enable successful post-acquisition IS integration?*

The rest of the paper is as follows. First it discusses the state of the IS Integration literature positioning the paper within the field and justifying the choice of theoretical lens. Following that, it gives an overview of the case study, detailing the case company and the research methodology. Next the findings from the study are presented, and finally implications of the research are discussed, and the paper concluded.

Theoretical Approach

Post-acquisition IS Integration

Post-acquisition IS integration has been the subject of study for nearly 30 years. Early work focused on understanding how IT fit into the overall corporate acquisition process, using alignment theory to explain how it created (or in many instances, failed to create) value in acquisitions (McKiernan and Merali 1995; Wijnhoven et al. 2006). Over the years, the scope of investigation expanded, revealing a greater understanding of the challenge, and began providing insights of how IT organizations were dealing with them.

Based on their review of 30 years of literature on post-acquisition IS integration, Henningsson et al. (2018) identified 248 variables that have been shown to contribute to IS integration outcomes. From these, five overarching IS integration research themes were derived. These five themes identified were:

- Theme A: The M&A context
- Theme B: Relational fit
- Theme C: The human side
- Theme D: Pre-conditions for IS Integration
- Theme E: Time pressures

As can be seen from just the theme titles, the literature on the topic is broad, revealing a great insight into the challenge of post-acquisition IS integration.

Due to length limitations of this paper, I cannot discuss all five themes, rather I take my point of departure from the studies contributing to Theme D: Pre-Conditions for IS Integration (Henningsson et al. 2018). Within Theme D, studies have explored conditions for success in post-acquisition IS integration. It highlights ways an IT organization configures itself, so it may apply that configuration to overcoming the challenge of post-acquisition IS integration. The dominant theory used throughout this theme is the resource-based theory of acquisitions. Importantly, Theme D's findings call for more research into the pre-conditions needed for the delivery of IS Integration (Henningsson et al. 2018). Furthermore, it recognizes the need for more research into the resources and capabilities of both novice and serial acquirers.

The resource-based theory of acquisitions

Throughout Theme D, the dominant theory applied is the resource-based theory of acquisitions. This theory states that acquisition value is created through the arrangement of the two firms' resources, as they combine to generate new value (Henningsson and Øhrgaard 2016; Yetton et al. 2013; Zollo and Singh 2004). It states that this new value is a source of competitive advantage for companies, although is dependent on successful post-acquisition IS integration. A challenge to this is the understanding that the resources needed to execute post-acquisition IS integration do not exist naturally within firms, and that they must be built before an acquisition is announced (Yetton et al. 2013). Therefore, to realize the resource-based value of acquisitions, the resources and capabilities for post-acquisition IS integration must be known and built. A need to understand what should be built forms the basis of this paper's research question.

Within literature there are many definitions and categorizations of resources (Bharadwaj 2000; Grant 1991; Wernerfelt 1984). This paper adopts the definition put forward by Barney (1991), that resources are *"all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness"* (Barney 1991, p.101). To better understand the resources used by acquirer's in post-acquisition IS integration, this paper also adopts Barney's (1991) three classifications of resources, as listed in table 1.

Table 1 - Barney's (1991, p.101) resource classifications

Resource	Definition
Physical	*...include the physical technology used in a firm, a firm's plant and equipment, its geographic location and its access to raw materials.*
Human	*...include the training, experience, judgment, intelligence, relationships and insight of individual managers and workers in a firm.*
Organizational	*...include a firm's formal reporting structure, its formal and informal planning, controlling and coordinating systems, as well as informal relations among groups within a firm and between a firm and those in its environment.*

The resource-based theory of acquisitions, and its extension into capability and knowledge-based views have been applied extensively throughout the post-acquisition IS integration literature, and frame the pre-conditions for post-acquisition IS integration success (Henningsson et al. 2018). This includes research into Cisco examining how their internal resource 'Enterprise Architecture' was deployed to govern their acquisition and integration process (Toppenberg et al. 2015). Similarly, Yetton et al. (2013) discussed how Danisco, over a series of acquisitions, honed their IT resources to become "ready to acquire". The resources identified included scalable IT systems, and a dedicated IT M&A team.

Beyond these resources, other studies have explored the way alternative capabilities contribute to successful post-acquisition IS integration. For example, Tanriverdi and Uysal (2011) showed how strong existing IT resources and capabilities increased the likelihood of success in acquisitions. They

found those companies with an IT organization, experienced in general IT integrations were better prepared for the challenges of post-acquisition IS integration than those without.

Additionally, employing the knowledge-based theory of acquisitions, Henningsson (2015) shows that organizations learn to be successful at acquisitions over subsequent acquisitions. It was found that acquirers who repeat the same acquisition type, become better at IS integration after internalizing the experiences in their IT organization (Henningsson 2015; Zollo and Singh 2004).

From these studies, it can be seen that post-acquisition IS integration requires the unique deployment of a combination of specific resources, capabilities, and knowledge, that IT departments do not generally possess. Those successful at post-acquisition IS integration have taken the time to build, and iteratively improve them over many acquisitions. As this paper adopts Barney's (1991) definition, all three requirements, resources, capabilities, and knowledge are discussed as resources.

A key gap in this research field exists due to its focus on those who acquire regularly, known as serial acquirers. While these may be some of the more interesting cases, as the statistic shows, many deals exist outside of this threshold. Of specific interest are novice acquirers. From an IT perspective, these are companies who do not possess the IT knowledge or processes to carry out post-acquisition IS integration. This could be because this is their first acquisition, alternatively they may acquire so infrequently that the capabilities built for the previous acquisition were not retained. For many companies, acquisitions are significant, one off events, and for many participating in it, this may be the only time they are involved in a post-acquisition IS integration. Another important dimension for IT, is that there are a variety of integration methods: absorption, co-existence, renewal, and best of breed (Merali and McKiernan 1993; Wijnhoven et al. 2006; Yetton et al. 2013). Due to the variance of resources needed for each integration method, a novice acquirer could also be one without the resources to carry out an alternative integration method.

Drawing on the finding that for successful post-acquisition IS integration an internal IT team be setup (Yetton et al. 2013), this research focus' on the novice acquirer to identify the resources to be built for their first acquisition. It is known that companies should invest in this development process early, and that it takes many months, even years to build (Yetton et al. 2013). To guide this, it is important research investigate how successful novice acquirers prepare for their first acquisition. They do not have the many years and dozens of acquisitions to experience post-acquisition IS integration to get it right, it must be done right the first time. This paper looks at the IT M&A team as a resource needed for post-acquisition IS integration and asks what should be built prior to executing an acquisition that will enable its success.

To answer this question, a two-and-a-half-year case study was conducted of a novice acquirer's IT M&A team as they prepared for post-acquisition IS integration. Next, the paper describes the methodological approach of this research, then moves onto detailing the specific case.

Methodology

Research Context

This case study examines Maersk, the world's largest container shipping company as they prepared for, and executed, their acquisition of Hamburg Süd (Wagner 2017). Although Maersk had acquired before, it had been over a decade since their previous acquisition and there were no existing processes or knowledge in place from which to build upon. This qualifies them as a novice acquirer. This was one of the key selection criteria for choosing Maersk, in that studying them would give new insights to understanding how novice acquirers prepare for acquisitions. Another reason was that they were preparing in advance of their acquisition, even prior to an acquisition target being identified. They were investing the time to build the resources needed for post-acquisition IS integration, which were not already held by the company. In doing so, the findings from this study contribute to the understanding of how to prepare for the first acquisition.

The research followed a single case study approach, a suitable choice as it allows for the close investigation into a real world phenomenon (Yin 2009). It was conducted over an extended period as

the author was embedded as an industrial researcher within the IT M&A team for over 2 years. The result was a thorough understanding of how a large novice acquirer's IT M&A team had prepared themselves, and the company's IT department, for their first post-acquisition IS integration.

Data collection and analysis

Qualitative data for this case was collected through a series of interviews conducted over a two-and-a-half-year period. Interviews were held with a range of participants within Maersk. This included interviewees from the IT M&A team, IT leadership, the broader IT organization, and key staff from outside IT. Table 2 provides a brief overview of the groups, and the types of positions interviewed in each. In total 81 interviews were conducted recording the progress from preparing for an acquisition, to the eventual outcomes of the post-acquisition IS integration of Hamburg Süd.

Table 2. Summary of interviews

Group	Interviews	Example positions
IT M&A team	37	Project Managers, Business Analysts, Technical Analysts
IT leadership	19	CIO, Head of M&A, Senior IT Managers
Broader IT organization	15	Heads of department, Program Managers, Delivery Managers
Non-IT staff	10	Head of integration, Integration workstream leads, Legal Counsel

Interviews followed a semi-structured approach, following prepared interview guides. Semi-structured interviews are favored by case study researchers as they offer the researcher the tools to investigate and some freedom explore an under researched topic (Saunders 2011; Yin 2009). In this study, they allowed for a consistent approach to investigating the IT M&A team of a novice acquirer, while also offering the flexibility to identify and discuss new insights as they arose during interviews. All interviews were recorded and transcribed into Microsoft Word format, by either the author or a third party, promptly after the interview. Upon completion of a transcription, the author reviewed each transcription against the original recording to ensure accuracy.

Each interview transcription was loaded into the digital analysis tool Nvivo so to be coded against other interviews. Within Nvivo, interviews were coded using the incident to incident variation of the constant comparison method (Charmaz 2006; Corbin and Strauss 2008; Glaser and Strauss 1967). Specifically, applying a deductive approach, within each incident the author was looking to identify what resources, aligning with Barney's (1991) three categorizations, were developed and used by the IT M&A team. Coding followed a systematic approach of reading a transcription and identifying incidents. Within incidents the author identified any resources that had been developed. As resources were identified, they were compared to those that had already been coded. If their description aligned with a pre-existing code, it was assigned the same code. If it did not, a new descriptive code was created. The author used memos to support their coding process as a means of recording thoughts and logic for assigning codes (Glaser and Strauss 1967). After the initial coding had been completed a second round was undertaken to ensure consistency by ensuring the incidents coded first were also coded against the full list of codes.

This round of coding identified 28 resources which were grouped into Barney's (1991) three categories. At this stage, each resource was treated independently of each other. However, as they were all being built to for a single overarching purpose, it seemed useful to look for relationships between them. As such as a second round of coding was done. Again, following the constant comparison method, however adopting an inductive approach. Looking at the full resource list, and comparing them to each other, this round of coding identified five resource groupings, that were termed components. Taking the five components together provides a holistic understanding of the resources needed by a novice acquirer. Doing this built a detailed understanding of, not just what was done, but also why the resources were being developed. This additional layer of analysis found overarching requirements for building the resources. This three-tiered topology, creates an IT resource-based view of the novice acquirer,

revealing the IT resources needed for successful post-acquisition IS integration. I present these findings in Table 3. After briefly describing the case, the rest of the paper will present the five components and the resources within them.

Table 3 – The IT resources built by the novice acquirer

Resource	Resource Category	Component
Relationships throughout Maersk businesses	Organizational	Component A: Organizational Engagement
Relationship with the Maersk strategy team	Organizational	
Relationships throughout IT	Organizational	
Management presentations	Organizational/ Human	
IT M&A roadshow	Human	
Recorded IT landscape	Physical	Component B: IS Infrastructure Management
Critical path/ core applications	Physical	
Know application adaptability	Physical	
Knowledge from other experiences	Human	Component C: Learning
Hired acquisition experience	Human	
Fundamentals of acquisitions	Human	
Agreed terminology	Human	
Due Diligence Plan and Report	Physical	Component D: Planning
Data Migration Plan	Physical	
Guiding Principles	Physical/ Human	
IT M&A Playbook	Physical	
Communications Plan	Physical	
Stakeholder Matrix	Physical	
Digital Due Diligence Plan	Physical	
IT Deliverables	Physical	
IT M&A Team	Human/ Organizational	Component E: Team Development
Right sized permanent team	Organizational	
Staff with different specializations	Human	
Staff with variable skills	Human	
Formalized onboarding program for new recruits	Physical	
Expand team with temporary agents	Human	
Integrated with central integration function	Organizational	
Aligned to integration work streams	Organizational	

Case description

In early 2015, foreseeing that acquisitions would become a key part of growth for the container shipping business, Maersk's CIO instructed one of his senior IT leaders to prepare the IT organization for acquisitions. One of his first initiatives, executed in mid-2015, was to build Maersk's IT M&A team. This team would be responsible for preparing and executing post-acquisition IS integration. Between then and 1st December 2016 the IT M&A team worked on this objective. Some actions taken during

that period were to build their knowledge of acquisitions, hiring (or recruiting internally) a variety of expertise, developing integration plans, creating a unique understanding of the IT landscape and people, educating and preparing the broader IT organization, and validating their readiness with drills. On the 1st December 2016 Maersk announced its intention to acquire its competitor Hamburg Süd and almost overnight the team went from preparing to executing (Maersk 2016).

Findings

This section presents the five components, identified after the analysis of 81 interviews conducted at Maersk, and their corresponding resources. This combined view creates the resource-based view of the novice acquirer's IT M&A team, as shown in Table 3.

Component A: Organizational Engagement

Organizational engagement is the first component identified and within this component are five resources. The IT M&A team were formed within IT and responsible for preparing IT for an eventual acquisition. An important factor to post-acquisition IS integration is alignment between businesses objectives and IT integration deliverables. The Organizational Engagement component contributes to this realization by describing how the IT M&A team developed its organization relationships, as the point of responsibility for post-acquisition IS integration.

Relationships throughout Maersk businesses were built to create an understanding of how other functions anticipated the likely approach to integration. This gave insight to what the business expected, and therefore informed what IT would need to do to align with that. Additionally, and this runs true for the first three resources, it included building a professional relationship with people likely involved in an integration. In this way, this resource is an organizational one, in that it was used to develop formal and informal structures, that did not already exist, that would be used in an acquisition.

The Maersk strategy team were the group scouting for potential acquisition targets. The IT M&A team built a relationship with them early, informing them of IT's preparation activities and providing input and suggestions on how IT would carry out an integration. This regular communication and sharing of an IT plan, created a strong rapport between the two teams. It is known that IT managers should be part of due diligence and that they must earn the right to participate in it (Henningsson and Kettinger 2016; Yetton et al. 2013). By coming up with a plan, and actively engaging those who would drive due diligence, the IT M&A team ensured they were receiving timely information on potential deals and, by coming with their own proposals for integration earned the right to be part of due diligence.

Building relationships throughout the IT organization took a different approach to engaging with people outside of IT. IT needed to be prepared for post-acquisition IS integration, and the responsibility of preparing them fell to the IT M&A team. This was done by actively reaching out to key IT staff and explaining to them what an acquisition was, and how it would impact the IT organization. Building on that, the IT M&A team helped team leaders and managers identify what they should do before and during an acquisition. This approach of preparing together created a strong relationship between the team and IT.

Other resources in this component centered around presentations given to different groups at different times of the preparation process. The first presentation was by senior IT M&A management, presenting to other senior IT and business leaders. This management presentation introduced leaders to acquisitions, and explained how acquisitions would likely affect the company and IT. The purpose of the presentation was to educate the leadership and obtain their permission for the IT M&A team to engage their parts of the organization for preparation. In this sense, Management Presentations can be considered both a human resource, in that it developed the skills and awareness of individuals, and an organizational resource, in that enabled a new way for the organization to engage with itself. It is often stated that having senior management buy in is vital for successful post-acquisition IS integration (Robbins and Stylianou 1999), this is one resource that achieves this.

The last resource was the IT M&A roadshow. This is a human resource as it resulted in an increase in the understanding of acquisitions, and of people's specific roles within one. It is a tool for building and enhancing knowledge. This presentation was aimed at all of IT, however sessions purposefully targeted grouped audiences, such as bringing project managers or solution architects into a session together. The purpose of these was to educate the staff on what would happen in the acquisition, the process that would be followed, and the milestones that would occur. Additionally, it prompted participants to consider how an acquisition would affect them and how they would contribute. These were held late in the acquisition preparation, around the time of the announcement to acquire Hamburg Süd. As such participants felt a sense of urgency to take on the knowledge and start planning.

Component B: IS Infrastructure Management

Literature on post-acquisition IS integration has focused on IS Infrastructure Management, and the prerequisites for enabling its success. This section builds on this knowledge, by identifying the IS resources novice acquirers should focus their preparation on to be ready for executing post-acquisition IS integration. Three physical resources are included within this component.

The first is to have a complete and detailed record of the IT landscape, including the IT estate (hardware and software), its interconnectedness, and the business processes it supports. Enterprise Architecture has been identified as a contributor to successful M&A when applied by Cisco as a tool in their serial acquisition program (Toppenberg et al. 2015). This is a capability built over an extended period. In the case of Maersk, they were able to substitute a formalized Enterprise Architecture function with process maps and enterprise system landscapes as a first step. In addition to these, IT processes and application ownership were also recorded against the landscape.

The second resource is the identification of systems that are most critical to business operations and will likely be affected by post-acquisition IS integration. These are the ones the business relies on the most and includes the applications which support those applications. These critical systems are the ones the IT M&A team prioritized and focused their attention on. In the case of acquisition preparation where time is limited, it is vital to focus attention on ensuring the most critical applications can handle the changes brought about by an acquisition.

The final resource is the knowledge of the Information Systems' ability to adapt to the changes imposed by an acquisition. In this case, Maersk considered they would likely absorb an acquired company, therefore the requirement was for the applications to scale. However, this should not be considered the only requirement. If, for example, the goal was to maintain separate IS in a co-existence model, then systems may need to be integrated. This could be a software package integrated with another, or the two companies' networks being linked. Ensuring that existing IS resources are capable of adapting is a key physical resource of the IS estate. This resource was discussed by Yetton et al. (2013) as the need for IT capabilities to be capable of both extending and expanding. This paper's finding based on the experiences of the novice acquirer continues this understanding by acknowledging a need to spend time first understanding the limitations of the current Information Systems before embarking on programs to overcome limitations. This is especially relevant when there is limited time for preparation.

Component C: Learning

This component, Learning, identified four human resources Maersk used to learn how to do post-acquisition IS integration. As noted, the knowledge of executing post-acquisition IS integration is generally non-existent in a novice acquirer (that is what makes them a novice acquirer), this was the case with Maersk and a limitation they successfully overcame.

The first resource is to build knowledge of other experiences. In the case of Maersk, while not having the inhouse capabilities of post-acquisition IS integration, they had acquired several companies over a decade prior. So initially, they held interviews with those who had been involved in them to understand what had or had not gone well. Similarly, they drew on contacts from other companies and publications

on acquisitions for preparation insight. This began to give them an understanding of the challenges ahead as told by others.

In addition to listening to experiences from others, Maersk, as part of their proactive approach, recruited (from outside of Maersk) two members to the IT M&A team with acquisition experience. This knowledge being brought to the team on a full-time basis proved vital. They were able to direct the preparation in line with best M&A practice, prioritizing the preparation approach based on their past experiences. Importantly they were able to prepare the team for what would happen, while at the same time making them aware of the uncertainly around acquisitions.

Both resources contributed to the human resource of fundamentals of acquisitions. During the early period of preparation, the lack of fundamental understanding of acquisitions meant the team was largely guessing what they should or shouldn't do. While many would say every acquisition is different, there is a lot of similarity between them, and because of that, there are fundamentals that can be learned. Knowing and agreeing on these, provided the framework from which Maersk began preparing.

The final resource in this component was agreed terminology. The team agreed on what an acquisition was, the phases it would run through, key people roles and importantly, what they would call all of these. Once these were in place, they were speaking one language and moving in the same direction. This learning phase was vital to being able to engage with others about acquisition preparation.

Component D: Planning

The Planning component encapsulates those resources related to the creation of a plan for post-acquisition IS integration. Found in this component are mostly physical resources developed by the IT M&A team, often in conjunction with the wider IT organization. They are considered physical resources as they are developed as plans that are written down or saved as files to be retrieved and followed in an acquisition.

Planning is a key concept studied in post-acquisition IS integration literature (Alaranta and Henningsson 2008). This study contributes to this literature by providing specific examples of plans created as part of the preparation, as well as discussing how those were used by the IT M&A team in execution. It is worth recognizing the link between the physical resources that fit under the planning component and the human resources developed as part of the Learning component. Two critical resources built in the Learning component were agreeing on terminology and fundamentals of acquisitions. These resources were used extensively to guide the development of the physical planning resources found in this component.

The first resource built for planning was a due diligence plan, including a questionnaire, and report. This was built by the team as one of the first artifacts, driven by the fact it would be one of the first tools applied by IT after the identification of an acquisition target. This was successfully used early in the acquisition of Hamburg Süd along with the report template.

Another plan built early was the data migration plan, which detailed how the acquired company's data would be brought into Maersk's systems. It is important to note, that during much of the preparation, the IT M&A team worked with an assumption that they would absorb an acquired company. Therefore, they required a resource to facilitate that migration to Maersk's systems.

Other plans were developed in advance of the acquisition, as can be seen in Table 3. However, the main Planning resource built during preparation was the Maersk IT M&A Playbook. This resource was the "guide to acquisitions" describing both what an acquisition was, specifically in a Maersk IT context, and what Maersk IT would do in the case of an acquisition. It was authored by the IT M&A team, however extensively based on input from key IT stakeholders. Tens of IT staff contributed to its content, to build the plan of what IT would do in the event of an acquisition.

These resources are highly dependent on other resources that were developed. The agreed terminology and fundamentals of acquisitions were vital to have established before the playbook could be built. These were required so that when the IT M&A team engaged with the rest of IT, they could all talk about the same acquisition process, using the same language, and could advise what needed to be done.

A technique Maersk's IT M&A team used in ensuring their plans were sound, was to test them using drills. During preparation, they executed two distinctly different drills testing their plans in realistic scenarios. These drills showed the effectiveness of their plans, the overall IT readiness, and any limitations and assumptions.

When the acquisition's planning phase began, starting December 2016 with Due Diligence and moving quickly into pre-integration planning, the preconceived plans were put into action, however were adapted to fit the specific case of the integration of Hamburg Süd.

The adaption of the plans was particularly noticeable with respect to the Playbook. While it had specific action plans, the IT organization had to adapt those to deliver on the specific business goals of the acquisition. As such, a new resource was created, IT deliverables, which aligned the post-acquisition IS integration actions with the business's needs. This is the alignment of goals regularly discussed in this domain's literature (Merali and McKiernan 1993; Wijnhoven et al. 2006). This resource aligns with other findings in the literature. For example, that it is important to have plans, but that plans need to dynamically respond to the situation (Alaranta and Henningsson 2008; Busquets 2015; Robbins and Stylianou 1999). This paper shows how a novice acquirer did so, by preparing for their assumed integration approach, then adapting to the specific acquisition.

Component E: Team Development

The final component contains resources which encapsulate the development of the IT M&A team. Contributing resources to this maturation process of the IT M&A team are important to recognize, as this is the preparation other novice acquirers should undertake to build their team.

This component builds on the existing recommendation that companies use an internally staffed IT M&A team to manage the post-acquisition IS integration program from Due Diligence to post-integration (Yetton et al. 2013). It builds on this understanding by identifying specific resources that make-up the novice acquirer's IT M&A team. It also furthers the understanding by highlighting the organizational relationships developed by the team to enable them to carry out their first integration.

Present in this component were all three categories of resource. Interestingly, there is a natural split in this component into two sub-components. The first has to do with the staffing of the IT M&A team, the second is to do with their relationships and roles within the company and post-acquisition IS integration process.

The IT M&A team as a resource was created in 2015 and was initially staffed with IT business analysts who had done work deemed similar to an integration, the carving out of a brand. Over time, the size of the permanent team increased, as more skills were needed. One of the earliest specializations recruited to the team was experience in post-acquisition IS integration, a skill the team was lacking. Later, more specializations were added, such as IT knowledge, project coordination, and shipping knowledge. This was done in reaction to both the amount of work and the type of preparation work.

During the development, the team were taught additional skills to apply during the integration. Most notably all members of the team needed to vary between IT business analyst roles and project manager roles at different times, as the integration unfolded. It was vital these, and other skills were held by the team members, and that they were able to apply them in different situations as needed.

As more members were recruited to the team, a key physical resource was an onboarding kit, which quickly brought new recruits up to speed with what the team had done and what was important to know in this role. Much of the ability of the team to carry out post-acquisition IS integration was held in tacit knowledge built while preparing. It was necessary to have a tool that conveyed to new joiners, as much knowledge as possible as quickly as possible. This resource achieved this.

Critical to the execution was the onboarding of temporary agents to expand the size of the IT M&A team as the post-acquisition IS integration ramped up. The increase in staff has been discussed in past literature, notably in the context of external consultants (Henningsson and Øhrgaard 2016). In the case of Maersk's IT M&A team, they did not recruit external consultants to fill the void, instead sourcing temporary talent inside the company. Individuals were recruited based on their deep knowledge of how

Maersk ran. At this time (while planning the integration of Hamburg Süd), the team had the knowledge of acquisitions and how this one would play out, what they needed were people who could work effectively within the company. Additionally, they had to have an adaptable mindset, whereby they could work outside of the usual corporate project management methodology to get the work done in the short timeframe allowed for an acquisition.

The second grouping of resources under Team Development is the IT M&A team's working relationships with the rest of the company. It reveals the evolution of the organizational resource (the IT M&A team) from preparation to execution. The first resource in this group (also in the first group) is the is the organizational resource of the IT M&A team. This organizational resource was created by the then CIO, but also supported by IT leadership and corporate leadership as well. It birthed a new department, new organizational reporting lines, and relationships within the company tasked with preparing IT for post-acquisition IS integration.

During the preparation stage, most of the direction and requirements for preparation came from within IT. Although the team worked and built relationships with other groups at Maersk, they reported into IT. This changed when the acquisition of Hamburg Süd was announced and a central corporate integration team was setup. This team was made up of individuals representing key areas of the business who were responsible for coordinating the overall integration. One function represented was IT, and a senior IT Manager, who had been heading up the IT M&A team, was recruited to be IT's representative. At this time, the organizational resource of the IT M&A team became integrated into the central coordinating team via their leader's position in it. They were now part of a larger team responsible for integrating the acquired company. This was a significant change for the team as now a new group were setting goals and objectives which effectively created a new organizational resource.

The final organizational resource of the IT M&A team was to create direct relationships to each of the leaders within the integration team. This was done by aligning individual team members to integration work streams. After this change, the resource of the IT M&A team adopted a functional alignment structure, whereby team members partnered with the different integration business leaders. This alignment occurred once the integration had been designed by the overall integration team. This functional structure had been expected, and some of the human resources described above were specifically developed to address this. As discussed earlier, IT M&A team members had to adopt both IT business analyst and project manager roles in working with their functional counterparts. This was perceived during preparation and as such the human resources in the team were trained with these skills.

Contribution and conclusion

The findings make a significant contribution to the literature on post-acquisition IS integration. From the outset this paper sought to address a specific gap in the research: what are the resources that a novice acquirer should develop to prepare for an acquisition. First of all, that question is answered by the list of resources identified as part of this novice acquirer's preparation. Additionally, it shows that the overall requirement can be broken into five components consisting of the resources.

Of interest, is the extended understanding of the resources required for an IT M&A team. This study showed they must develop acquisition specific knowledge and skills to be able to manage this type of project. Previous studies talking about an IT M&A team had emphasized their importance, however not discussed the critical resources underpinning this team.

Additionally, the paper extends the resource-based theory of acquisitions. The literature on post-acquisition IS integration had not previously applied the resource-based view in the context of novice acquirers. This study shows that the novice acquirer must build specialist resources to apply in post-acquisition IS integration. Building these resources, enables them to successfully carry out the overall integration, leading to value creation and competitive advantage. This study shows that this is enabled by the newly created IT resources.

Furthermore, the study identified five components, which grouped the resources into areas of focus for an IT M&A team's preparation. By presenting the resource findings as five components, the elements contributing to the broad task of preparing for post-acquisition IS integration are identified. The

components give a holistic view of the preparation. They reveal there are overarching requirements for preparation which resources collectively contribute to. The use of components shows the dimensions to enabling post-acquisition IS integration in novice acquirers and the resources required to enable them.

These findings address other gaps in the literature. Additional research had been called for into the capabilities and assets relevant for post-acquisition IS integration (Henningsson et al. 2018). This paper specifically addresses this point, identifying those used by a novice acquirer as they carried out a hybrid co-existence - absorption integration. Furthermore, it does so by organizing them into Barney's (1991) resource categories of physical, human, and organizational, and five components, providing additional depth and structure.

Additionally, Henningsson et al. (2018) call for a better understanding of the differences between serial and novice acquirers. This paper lays the foundation for such a study, by providing a rich description of the resources built by a novice acquirer to prepare for an acquisition. Previously, little attention has been paid to this group of acquirers. Future studies can build on this, by comparing these findings to those of a serial acquirer's resources for post-acquisition IS integration.

From a practical standpoint, this paper contributes greatly to the practice of post-acquisition IS integration. It has identified key resources that do not exist prior to an acquisition, which were used as part of the preparation and execution of IS integration. For the IT departments of novice acquirers, these findings can be used as a guide on how to prepare for their first acquisition. By collating the resources as components, practitioners can easily identify areas most lacking in post-acquisition IS integration resources and focus on building them. They can also use the components to manage the building of the overall IS integration capability.

There are limitations to this study. First, it is a single case study, and therefore difficult to generalize findings. Also, as this study does not investigate all integration types, it does not address the full scope of potential challenges to successful post-acquisition IS integration. To overcome these limitations, it is recommended to conduct additional studies on a range of novice acquirers and their first acquisitions.

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Research paper #4

Developing Acquisition IS Integration Capabilities: The Learning Processes of Novice Acquirers

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Developing Acquisition IS Integration Capabilities: The Learning Processes of Novice Acquirers

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Abstract

An under researched, yet critical challenge of Mergers and Acquisitions (M&A), is what to do with the two organisations' information systems (IS) post-acquisition. Commonly referred to as acquisition IS integration, existing theory suggests that to integrate the information systems successfully, an acquiring company must leverage two high level capabilities: diagnosis and integration execution. Through a case study, this paper identifies how a novice acquirer develops these capabilities in anticipation of an acquisition by examining its use of learning processes. The study finds the novice acquirer applies trial and error, experimental, and vicarious learning processes, while actively avoiding improvisational learning. The results of the study contribute to the acquisition IS integration literature specifically by exploring it from a new perspective: the learning processes used by novice acquirers. Furthermore, the findings contribute several important implications for practice.

Keywords (acquisition IS integration, mergers and acquisitions, learning processes, novice acquirer)

1 Introduction

After retreating considerably in the wake of the Global Financial Crisis, Mergers and Acquisitions (M&As) in 2015 had reached new heights in terms of both dollars spent and deals done (Rehm and West 2015). In 2015 over 42,300 M&A deals were entered into worldwide; worth over US $4.5 trillion – the highest ever annual M&A spend (Massoudi and Fontanella-Khan 2015; Rehm and West 2015; Thomson Reuters 2016). However, despite their growing popularity as a tool by which to generate corporate growth, over 70% of M&As reportedly failed to deliver expected value (Cartwright 2002; Cartwright and McCarthy 2005; Christensen, et al. 2011; Harding and Rouse 2007; King et al. 2004; Marks and Mirvis 2011). This failure to deliver value can be caused by a variety of reasons, including: paying too much for the acquired company, over estimating synergy benefits, or failing to integrate the acquired company effectively (Marks and Mirvis 2011; Toppenberg et al. 2015; Vaniya et al. 2013). Successful information systems (IS) integration is a significant contributor to the realisation of M&A value, with up to 60% of a deal's anticipated benefits being directly dependent on this process (Curtis and Chanmugam 2005; Lin et al. 2010; Sarrazin and West 2011; Tanriverdi and Uysal 2011). Yet, despite its importance, acquisition IS integration is cited as one of the most difficult challenges and a common cause for M&A failure (Curtis and Chanmugam 2005; Posnick and Schoenborn 2007).

Extant literature on the acquisition IS integration challenge has identified two high level tasks the acquiring IT organisation must complete. Each task focuses on a specific challenge of the integration, and requires different capabilities to complete. First, the IT organisation must be able to diagnose the purpose of the deal and select the integration strategy most appropriate to realise the anticipated business benefits (Giacomazzi et al. 1997; Henningsson and Carlsson 2011; Johnston and Yetton 1996; Mehta and Hirschheim 2007; Tanriverdi and Uysal 2015; Wijnhoven et al. 2006). This is known as the diagnosis capability. Following that, the IT organisation must be able to execute the IS integration as per the intended integration strategy (known as the integration execution capability). Collectively, what a company requires to complete these high level tasks are referred to as the acquisition IS integration capabilities. This term encompasses all of the skills, resources, capabilities, and processes that when used correctly result in the acquiring company successfully integrating the acquired. Research has shown that companies with better IS integration capabilities create more value from M&A transactions than those who do not (Tanriverdi and Uysal 2011). However, it has also found these capabilities take a long time (many months or years) to develop, and must be developed prior to an acquisition (Yetton et al. 2013).

While much is known about the two high level acquisition IS integration capabilities, much less is known about how they are developed. The major exceptions to this being Henningsson (2015), who researched how serial acquirers build organisational knowledge from multiple acquisitions, and Henningsson and Øhrgaard (2016) who studied how acquirers learn from the experiences of temporary agency workers. Furthermore, the literature describing these acquisition IS integration capabilities has largely been derived from studying very experienced acquirers (known as serial acquirers) who buy more than three companies every three years (Henningsson 2015; Kengelbach et al. 2011; Toppenberg et al. 2015).

In focusing almost exclusively on serial acquirers, and overlooking how organisations learn these capabilities, a knowledge gap has opened around understanding how the 40% of acquirers who are not serial acquirers learn these important acquisition IS integration capabilities (Henningsson 2015). This paper focuses on novice acquirers, those who have either never acquired a company or acquire them so infrequently, that the company must re-establish the acquisition IS integration capabilities each time they undertake an acquisition.

Building on the existing IS integration literature, this paper investigates the learning processes of a novice acquirer as they develop the acquisition IS integration capabilities of diagnoses and integration execution. Specifically, this paper asks:

How does a novice acquirer develop the critical capabilities for acquisition IS integration in anticipation of an acquisition?

To answer this question, this paper reports the findings of a case study that investigated a novice acquirer as they develop these critical acquisition IS integration capabilities. The case is analysed from an organisational learning perspective, using four learning processes (trial and error, experimental, improvisational, and vicarious) as a broad frame through which to understand how the acquirer learns the capabilities (Bingham and Davis 2012). A broad framework was intentionally selected as it will enable this exploratory research to more freely explore the under researched topic.

2 Literature and Theoretical Positioning

2.1 Acquisition IS integration

The consensus among scholars is IT creates value in an acquisition by enabling anticipated business benefits (Henningsson 2015; Johnston and Yetton 1996; Mehta and Hirschheim 2007; Wijnhoven 2006). Therefore, the issues of what to do with the two IT organisations in an M&A, and how to do it, are at the core of the acquisition IS integration challenge. A challenge that must be solved by the acquiring company. Extant literature has identified two high level but critical capabilities an IT organisation must possess to effectively integrate the acquired company: the capability to diagnose the acquisition benefits and identify the most useful integration strategy, and the capability to execute the integration (Giacomazzi et al. 1997; Henningsson and Carlsson 2011; Johnston and Yetton 1996; Mehta and Hirschheim 2007; Tanriverdi and Uysal 2015; Wijnhoven et al. 2006).

The diagnosis challenge lies in the fact that the IT organisation must enable the realisation of the expected business benefits, yet there are a variety of ways to integrate the acquired company's IT. As such, it is critical that the IT organisation understands the rationale behind the deal and applies the correct mix of IS integration strategies. There are four strategies for IS integration which promote different business outcomes. Table 1 describes the four integration strategies.

IS Integration Strategy	Description
Absorption	The newly acquired company is migrated to the acquiring company's IS platform, and their IS is retired (Johnston and Yetton 1996).
Co-existence	Some or all of the IS of the acquired company are kept, and operated alongside the acquirer's. The remainder of the IS is retired (Johnston and Yetton 1996).
Best of Breed	The two companies' systems that perform the same function are compared, and the best system is chosen to be retained (Johnston and Yetton 1996).
Renewal	After the acquisition, the company moves onto a new IT platform, retiring the IS of both companies (Giacomazzi et al. 1997).

Table 1. IS Integration Strategies

As each IS integration strategy will result in a different post-acquisition IS landscape, it is vital that the IT organisation select the appropriate strategy to realise the anticipated acquisition business benefits. The need for the diagnosis capability has been shown time and time again in the acquisition IS integration literature. It was demonstrated by Johnston and Yetton (1996) in their paper that described how the wrong choice of integration strategy led to anticipated business benefits failing to be realised. This resulted in the need to change integration strategy after the integration had begun. Similarly, Alaranta and Henningsson (2008) report how an incorrect integration strategy selection led to a failed integration.

Following the diagnosis of the acquisition IS integration strategy, the IT organisation must also be able to execute the integration. Past research has recommended resources to use during the IS integration execution. For example, Yetton et al. (2013) recommend**,** based on the experiences of Danisco (a serial acquirer), IT resources such as a scalable IT platform and an internally staffed acquisition integration team. Complementing that, Toppenberg et al. (2015) demonstrate how CISCO, another prominent serial acquirer, uses its enterprise architecture function to manage the integration execution of newly acquired companies. These studies point to the configurations of successful serial acquirers that enable the integration execution to realise the expected business benefits.

However, while knowing the finely tuned resource configurations of serial acquirers is useful, knowing what is needed doesn't tell one how to build them. Furthermore, it is well known that the process of developing the IS integration capabilities takes a significant amount of time (Yetton et al. 2013). Therefore, it is important that literature on IS integration not only studies what the successful serial acquirer looks like, but also helps to guide novice acquirers to get there. One way of doing this is to study the processes a novice acquirer goes through to learn the acquisition IS integration capabilities.

2.2 Learning to Integrate

There has been much research into the field of organisational learning (for a summary review refer to Dodgson 1993; Levitt and March 1988; Tynjälä 2013). Consequently, many different theoretical perspectives of organisational learning have been embraced by academia. Cangelosi and Dill (1965) identified a holistic learning process made up of four broad phases: initial, searching, comprehending, and consolidating. Over the decades since their paper, additional explanations of how organisations learn have been proposed; however, the literature is divided between those seeking to explain discrete learning processes versus those seeking to craft holistic organisational learning frameworks.

Gnyawali and Stewart (2003) applied a contingency perspective to organisational learning, grouping over 30 different learning processes together under one of four key types of organisational learning: reinventive, formative, adjustive, and operative. This approach sought to provide a holistic answer to the question of how organisations learn. Similarly, Tynjälä (2013) presented their model of workplace learning to explain holistically the variety of factors, contexts, interpretations, activities, and outcomes within the organisational learning process.

Instead of seeking holistic learning frameworks, many scholars have researched discrete learning processes to understand, in detail, the ways organisations learn. Some examples include Weick et al. (2005) who discussed learning through sensemaking, Senge (1990) who identified learning through adaptive and generative approaches, and Bandura (1965) who wrote extensively on the process of vicarious learning. These discrete learning processes represent only a subset of the multitude of them studied in academia.

Despite much of the research into organisational learning and its subsequent discrete learning processes, only two studies have specifically addressed how organisations learn to perform IS integration. Henningsson (2015) observed how serial acquirers honed their IS integration skills over a series of successive acquisitions. He developed a knowledge-based model of IS integration underlined by five learning processes and he highlighted potential risks organisations faced when deviating from experienced integration strategies. However, in his paper he focused exclusively on the learning of serial acquirers, over an extended period of time, and across multiple acquisitions. In researching this niche, his findings do not address the challenges faced by novice acquirers as they learn the acquisition IS integration capabilities necessary to undertake an initial acquisition. Henningsson and Øhrgaard (2016) identify consultants as a source of a specific type of organisational learning: vicarious learning. They found that consultants bring with them the knowledge from their experiences of acquisition IS integration gained from other firms. Their paper makes a significant contribution to the acquisition IS integration learning literature; however, this contribution is narrow as the paper focuses on a small niche. The paper specifically discusses one learning process, vicarious learning, via consultants, and again, exclusively about serial acquirers. Such a narrow focus leaves much still to be studied in this area.

Although they do not specifically research IS Integration, Bingham and Davis (2012) studied how organisations learn via a combination of learning processes when internationalising (which included acquisitions) for the first time. They use four learning processes, trial and error, experimental, improvisational, and vicarious (see table 2 for a full description), as a frame through which to study how novice firms learn to internationalise.

Learning process	Description
Trial and error	Learning based on the outcomes of previous actions (Baum and Dahlin 2007; Bingham and Davis 2012)
Experimental	Learning based on the outcomes of small purposeful tests (Bingham and Davis 2012; Cook and Campbell 1979)
Improvisational	Learning from the results of changing behaviour 'on the fly to' overcome new challenges (Bingham and Davis 2012; Miner et al. 2001)
Vicarious	Learning via the experiences of others (Bandura 1965; Bingham and Davis 2012)

Table 2. Learning Processes

Acknowledging that they are only a subset of the known discrete learning processes, Bingham and Davis (2012) elect to conduct their study using the learning processes listed above as the processes have

recognised importance and prevalence within literature. Based on their findings, their selection proved suitable for understanding the ways that firms learn to internationalise for the first time. Similarly, this paper explores the notion of how firms learn to do something for the first time – acquisition IS integration. As such, the same learning processes should be a suitable frame through which to study this phenomenon. Using the four learning processes as a theoretical lens, this study seeks to understand how a novice acquirer can build the acquisition IS integration capabilities in anticipation of an acquisition.

3 Methodology

This research is exploratory, as it seeks to understand a topic that has, to date, been under researched (Yin 2013). As such, this research follows the case study methodology, which is a suitable methodological choice when conducting exploratory research or seeking to answer a "how" research question (Yin 2013).

3.1 Case Selection

This research follows the single-case study design, observing one organisation as it learnt the critical acquisition IS integration capabilities. This research design was selected for two reasons. First, the case company can be considered representative or typical of others like it, therefore the single-case study is an acceptable approach (Yin 2013). Additionally, focusing on a single case meant the researcher was able to spend more time at the one company, studying it in more depth. The specific case was selected for several reasons. First, the case company's IT organisation would be considered an average factory IT organisation, setup to support a range of operationally vital IT systems that hold low strategic importance (McFarlane 1984). Second, although they had executed M&As in the past, the case company is considered a novice acquirer. Their most recent acquisition had been over a decade earlier, and there was very little residual knowledge still remaining within the company about M&As. Finally, they had taken the initiative to begin preparing for an acquisition, before one was announced. Specifically, within IT, the management had recognised the need to learn the required acquisition IS integration capabilities, and that this would take a considerable amount of time. As such, an IT M&A team was setup within the IT department to begin learning the acquisition IS integration capabilities. Their unique situation, and their willingness to be involved in the research, made them ideal subjects for this case study.

3.2 Data Collection

Twelve interviews were conducted with staff members that were selected due to their direct involvement in IT M&A preparation activities. They held a variety of roles, including the head of the IT M&A team, the IT M&A program leader, members of the IT M&A team, and staff of the broader IT organisation. Semi-structured interviews, following an interview guide, were used as they are considered the most appropriate for conducting exploratory investigations and they are one of the preferred methods of data collection when undertaking case studies (Saunders et al. 2009; Yin 2013). The twelve interviews were conducted either in person or over the phone and lasted approximately 1 hour each. Each interview was transcribed and reviewed by the author to ensure the transcription's accuracy.

Additionally, the author observed the work done by the IT M&A team over a period of nine months including: the development of plans and tools, workshops and meetings that were held with key stakeholders, and presentations to the organisation. During this time, they recorded observations in a research diary as is recommended during a research project (Nadin and Cassell 2006). As such, their recorded observations, and the raw data accessible through this relationship (such as PowerPoint presentations, consultant reports, and emails), were also used as data for analysis. For example, reflections of how decisions were deferred in meetings was seen as supporting evidence of how the company did not use improvisational learning (this is explained further in section 4.3). Additionally, these data sources were useful for increasing the accuracy and efficiency of the interviews. For example, due to the history that had been recorded in the diary, the author was able to challenge the timeline reported by an interviewee. After being challenged, the interviewee corrected their recollection (which was further verified by other interviews).

3.3 Data Analysis

The collected data was analysed so as to identify instances when the novice acquirer used the four learning types (trial and error, experimental, improvisational, or vicarious) to develop their acquisition IS integration capabilities. To do so, the data was read and coded using the incident to incident variation of Glaser and Strauss' Constant Comparison Method (Glaser and Strauss 1967; Charmaz 2006; Corbin and Strauss 2008). However, as opposed to coding for the purpose of discovering information and then

developing grounded theory, this process was used as a means by which to identify occurrences of the four learning types (Charmaz 2006).

To accomplish this, a data source was read by the author, and upon identifying an incident they considered whether or not it aligned with the definition of one of the learning types. In the majority of cases, the incident did not, and no code was assigned. However, when an identified incident could be categorised as one of the four learning types, it was coded as such. This process continued, analysing all incidents from all data sources, constantly comparing them to both the definitions of the four learning types, and other coded incidents. This ensured consistency in the coding. After coding an incident, it was then categorised as either a part of learning the diagnosis capability or a part of learning the integration execution capability. This was done by considering how the learnt skill contributed to the success of the overall acquisition IS integration.

Analysing the data revealed how the case company developed their acquisition IS integration capabilities by using a combination of the learning types. The result of the data analysis was a series of incidents that were each coded as one of the four learning types and categorised as contributing to the development of either the diagnosis or the integration execution capabilities. The following section presents the findings of the analysis.

4 Case Description and Analysis

The case study researches a large European shipping company, ShippingCo, as its IT department learns the two critical capabilities required for acquisition IS integration in anticipation of an acquisition.

The year 2015 saw the beginning of a major round of consolidation throughout the shipping industry. In the nine months prior to June 2016 three major shipping M&A deals had been entered into, redefining who the top players in global shipping were. Foreseeing the pending industry wide consolidation, ShippingCo's CIO, in early 2015, made a conscious decision to prepare for a possible acquisition. Although ShippingCo had been through M&As before, their latest one was more than a decade prior and they had not retained the acquisition IS integration capabilities.

Concerned about acquisition readiness, the CIO tasked one of his senior IT managers with heading up a new IT M&A team. The selected senior manager had extensive M&A experience from many companies and industries prior to joining ShippingCo. From here the new head of IT M&A oversaw the creation of a team specifically tasked with developing the critical acquisition IS integration capabilities at ShippingCo. Some of the activities undertaken to achieve this were the hiring of new personnel, developing integration plans and tools, creating an IT M&A playbook, and building relationships throughout the IT organisation. In addition to those activities the IT M&A team executed a mock acquisition of an internal subsidiary to test their IS integration techniques. During this time, ShippingCo's IT organisation, most of whom had never been involved in an acquisition, began learning about acquisition IS integration.

The following sections discuss how ShippingCo learned the two acquisition IS integration capabilities by analysing their actions through the four learning processes of trial and error, experimental, improvisational, and vicarious.

4.1 Trial and Error Learning

Organisations learn through trial and error by applying knowledge gained from previous experiences to new circumstances (Bingham and Davis 2012). During their preparation, ShippingCo used trial and error learning as a means to develop both their diagnoses and integration execution capabilities. ShippingCo learned through previous M&A experience, and applied this to their preparations. Despite their most recent acquisition occurring over a decade prior, through questionnaires, interviews, and a documentation review, lessons learned were obtained that provided an initial learning experience.

One of the main pieces of knowledge from this exercise was an understanding of how the choice of integration strategy negatively affected a previous acquisition. That is, how a poorly performing diagnosis capability can negatively impact the acquisition. During this previous acquisition, the renewal strategy had been applied, however, problems with the new system meant the company's IS platform was not able to handle the combined business volume and significant problems ensued. These included the issuing of bad invoices and lost cargo. From this experience, ShippingCo learned not to follow a renewal strategy when undertaking an acquisition. For systems not included in the renewal, ShippingCo spent a considerable amount of resources investigating which IS systems were better and should be retained and used by the company. In the end though, the process of making a decision consumed too many resources, and the choice was made to just go with the systems of the larger company. In both

examples, to realise the expected business benefits, the combined company had to get onto one stable IT platform as soon as possible. Instead, a prolonged period was experienced where more IT than necessary was operating, resulting in IT preventing ShippingCo from realising the deal's expected value. ShippingCo already knew that any upcoming acquisition would be of a smaller shipping company, and the purpose of the deal would be to increase their existing operations. Therefore, based on this knowledge, and combined with the knowledge from their previous experiences, ShippingCo decided to follow an absorption strategy, and therefore began preparing exclusively for that. Trial and error learning helped ShippingCo develop its diagnosis capability, so it could select the most useful integration strategy based on the deal rationale.

In addition to learning the diagnosis capability, ShippingCo also used trial and error learning to develop their execution integration capability. Prior to the CIO's decision to setup an M&A team, a group within IT had been responsible for a project to carve out a regional brand from the parent, ShippingCo, and configure it as a separate company. The act of carving out a brand was seen as somewhat similar to that of integrating an acquired company (albeit the other way around). Their experiences with this process gave them a good understanding of the IS landscape at ShippingCo, the people responsible for the IS, and how the IS correlated with business processes. With that knowledge in hand, the IT M&A team was setup with the same staff who had previously worked on the brand carve out. The knowledge gained from the carve out contributed significantly to their understanding of integration execution and the types of challenges they may encounter.

4.2 Experimental Learning

Experimental learning occurs when organisations specifically execute small tests to experience outcomes and learn from them (Bingham and Davis 2012; Cook and Campbell 1979). ShippingCo used experimental learning to refine both of their diagnosis and integration execution capabilities when they did a mock acquisition of one of their subsidiaries. From an IS perspective, the subsidiary operated independently of the parent company, and as such, was a fairly realistic integration experiment. One of the tools tested was a framework to compare the acquiring and target companies' IS landscapes. The tool mapped, at a high level, the companies' core business processes and aligned them to their enabling IS. By comparing the tool's output of one company against the other, it was possible to easily identify which of the target's systems would be absorbed by the acquirer's. Furthermore, using this tool in the experiment revealed the subsidiary was operating business processes not operated by ShippingCo, and that ShippingCo's IS could not support. Learning about this unique business operated by the subsidiary resulted in further development of both the diagnosis and integration capabilities.

ShippingCo learned that their previous plan to absorb the acquired company would not be possible, if they identify unique business processes that their IS could not support. In an acquisition, this unique business process could be a key value driver of the acquisition. In this instance, the IT organisation's diagnosis capability must identify this requirement and elect to perform a partial co-existence integration instead of a pure absorption. The learnings from the experiment also impacted the integration capability, as it reframed the scope of their work. Prior to this discovery, based on the assumption that an acquired company would be absorbed, the IT M&A team's area of focus was ensuring that the existing IS was scalable, and that they had plans for migrating the acquired company to their systems. However, with this new learning, they also had to consider, as part of the IS integration, how they would transition and on-board newly acquired systems that support newly acquired business processes.

4.3 Improvisational Learning

Improvisational learning occurs when, during live events, the organisation changes its behaviour in response to external influence (Bingham and Davis 2012; Miner et al. 2001). The results of this 'on the fly' change in behaviour go on to have lasting effects on how the organisation operates. In the case of ShippingCo, there was no evidence of improvisational learning in the development of the diagnosis, or the integration execution capabilities. When asked about this, interviewees cited the lack of urgency as the main reason for actively avoiding improvisational learning. Due to the preparation being in anticipation of a non-existent acquisition, when an issue came up that had not been considered previously, there was the opportunity to pause and find the best solution. If finding the best solution required consulting more stakeholders or escalating the problem to management, it was possible in this situation to defer a decision until after that had been done. Essentially, there was no need to alter behaviour 'on the fly'.

Two observations can be made from this. First, ShippingCo considers improvisational learning as a suboptimal process. It shows when a new problem is encountered, ShippingCo has a preferred method

to resolve it that does not favour improvisational learning. Second, if this preparation process was happening during the lead up to an actual acquisition, that one might expect improvisational learning to occur. This would be due to the element of urgency being introduced.

4.4 Vicarious Learning

Vicarious learning occurs when an organisation learns via the experiences of other firms (Bingham and Davis 2012; Haunschild and Miner 1997). In the case of ShippingCo, as they learned the two IS integration capabilities, vicarious learning played a substantial role. What is notable about how ShippingCo used vicarious learning was its use as a means to quickly learn generic integration knowledge. However, it then needed to be further developed by people with company and industry specific knowledge to make the information useful for ShippingCo. Examples of this follow below.

One of the first sources of vicarious learning was the head of the M&A team. He was chosen due to his many years of experience overseeing M&As in different industries, and he brought that external knowledge to ShippingCo. His previous experience had proven to him that when acquiring a smaller, similar company, IT's role was to enable the realisation of scale based benefits, and therefore an absorption strategy was the right choice. Therefore, he directed his team to prepare for absorption and shared his knowledge of how to prepare for that. However, after conducting an experiment, and gaining a deeper understanding of the company and the industry, it became clear that an acquired company could quite likely be carrying out business that could not be supported by ShippingCo's existing IS. In this case, a co-existence strategy would need to be applied. As this demonstrates, the vicarious learning had initially contributed to the direction of ShippingCo's diagnosis capability. However, once they began to apply that knowledge to their specific industry, they discovered the need to tailor the approach towards a co-existence strategy that could accommodate exceptions to ShippingCo's business processes.

Another instance of vicarious learning came from the hiring of a project manager with significant M&A experience from outside of ShippingCo. This person brought with them decades of M&A experience, which quickly elevated ShippingCo's knowledge of IS integration. However, again the vicarious knowledge had to be tailored to work within ShippingCo. An example of this is the development of an IT M&A playbook, which described the activities to be executed by the IT organisation in the event of an acquisition. Had it not been for the hiring of the project manager, ShippingCo would have had to learn to make an IT M&A playbook from scratch. Instead, he bought to ShippingCo the knowledge of how to build it, and the rest of the IT team built on that vicarious knowledge to tailor it to the needs of ShippingCo.

A final example of vicarious learning occurred when ShippingCo hired consultants for advice on how to develop the acquisition IS integration capabilities. The vicarious learning from the consultants was useful for building a generic understanding of IS integration activities such as generic system scalability assessments, or generic data migration principles. However, when it came to tailoring the generic approaches into specific actions, the vicarious learning needed to be supplemented with industry and company knowledge from ShippingCo's experienced IT staff. At which point, the IT M&A team, with their experiences in ShippingCo and the vicarious learnings from the consultants, took over the development of ShippingCo specific acquisition IS integration capabilities from the consultants.

The examples above show how vicarious learning played a crucial role in teaching both the diagnosis and integration execution capabilities. However, it also reveals a major limitation of vicarious learning. It shows its usefulness at teaching generic acquisition IS integration knowledge, however it also shows its limitation at developing company or industry specific capabilities.

5 Discussion and Conclusion

This paper sought to explain how a novice acquirer learns the two broad acquisition IS integration capabilities of diagnosis and integration execution in anticipation of an acquisition. To do this, an exploratory case study of a novice acquirer, ShippingCo, was conducted studying their IT organisation's development of a dedicated IT M&A team. To understand how they learned, four discrete learning processes (trial and error, experimental, improvisational, and vicarious) were used as a framework for analysis.

The study found that ShippingCo used three of the four learning processes to develop their IS integration capabilities. Of particular interest was the identification of the way in which vicarious learning seemed to have a limit to its usefulness. In this case, vicarious learning enabled ShippingCo to learn a generic approach to solving a problem; however, the solution had to then be further developed by knowledge specific to the company and industry before it was useful. Another interesting finding was ShippingCo's

avoidance of improvisational learning. Due to the lack of a pending acquisition, they considered it more beneficial to make decisions after an appropriate amount of consideration and consultation as opposed to 'on the fly'.

The main theoretical contribution of this paper is its extension of the understanding of acquisition IS integration by approaching it from a learning perspective. To date, very little research into how organisations learn the acquisition IS integration capabilities exists, and none have studied novice organisations learning them in anticipation of an acquisition.

Several important implications for practice can also be concluded on from this study. First, it gives examples of some of the key activities novice acquirers should undertake when developing their IS integration capabilities. Activities such as developing a playbook, executing tests, or hiring M&A experts were considered by ShippingCo to be absolutely critical. Without them, the IT team would not have had the knowledge and experience necessary to build the acquisition IS integration capabilities, nor the mechanism to coordinate their efforts throughout the IT department. Second, when developing the acquisition IS integration capabilities in anticipation of an acquisition, considering how a team can learn is an important decision for managers to make. The findings of this paper help to guide them by identifying good sources of learning for novice acquirers (such as internal experiences or conducting experiments) and acknowledges the practical limitations of vicarious learning. Finally, identifying ShippingCo's avoidance of improvisational learning reinforces the existing understanding that the critical IS integration capabilities must be built in advance and cannot be effectively developed 'on the fly' during an acquisition (Yetton et al. 2013). If the capabilities could be built effectively on the fly, then one would expect to see some evidence of it occurring. Instead, the evidence shows that it is actively avoided. Therefore, this case should be seen as yet another call to action for CIOs to begin developing their acquisition IS integration capabilities, well before an acquisition is announced.

The limitations of this study provide opportunities for others to continue this stream of research. First, although ShippingCo is representative of a novice acquirer, this research has only studied one company, therefore the findings cannot be generalised. Continuing this study with multiple organisations, within and outside of the shipping industry, and on different continents may further develop this paper's preliminary understanding in new ways. Furthermore, a longitudinal study to research how the learning types used by novice acquirers change as they evolve into serial acquirers would contribute significantly to closing the current knowledge gap.

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Research paper #5

Validating Acquisition IS Integration Readiness with Drills

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Validating acquisition IS integration readiness with drills

Full Paper

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Abstract

To companies, mergers and acquisitions are important strategic tools, yet they often fail to deliver their expected value. Studies have shown the integration of information systems is a significant roadblock to the realisation of acquisition benefits, and for an IT department to be ready to integrate they must begin preparations many months or years in advance. While the need for preparation is well understood, there is limited understanding as to how an IT department can become ready to acquire. This paper begins to address this gap by drawing on drills (usually associated with emergencies), to understand how an IT department can use them to validate their integration plans. The paper presents a case study of two drills used to validate an IT department's readiness to carry out acquisition IS integration, and suggests seven acquisition IS integration drill characteristics others could utilise when designing their own drills.

Keywords (Required)

Acquisition IS integration, Drills, Mergers and Acquisitions, Information Technology.

Introduction

Mergers and acquisitions (shortened to 'acquisitions') are strategic tools used by companies for many reasons including gaining new customers, attaining new technologies, or corporate evolution (Carayannis 2008; Pradhan and Abraham 2004; Toppenberg et al. 2015). Acquisitions represent a significant investment for companies with over $4.5 trillion spent on deals in 2015 (Rehm and West 2015). Despite the large investments, acquisitions generally fail to deliver their anticipated value, with reports putting the failure rate around 70% (Cartwright 2002; Christensen et al. 2011; Marks and Mirvis 2011).

Contributing significantly to both the expected benefits of an acquisition and the high failure rate are the company's Information Systems (IS). IS benefits acquisitions through 1) cost savings resulting from organisational synergies, and 2) the enablement of business practices. These contributions in sum can account for up to 60% of a deal's value (Sarrazin and West 2011). However, despite its high contribution to the overall value of the deal, integration of the two companies' IS is cited as one of the most common causes of acquisition failure (Curtis and Chanmugam 2005; Posnick and Schenborn 2007). Considering the value dependent on IS, and the low acquisition success rate caused by IS integration failure, it is vital that research finds ways to prevent these problems in the future.

To successfully carry out an acquisition IS integration project, an Information Technology (IT) department, must dedicate a significant amount of time (measured in many months or years) to getting their systems, people, and processes 'ready to acquire' (Yetton et al. 2013). It is too late to begin this preparation work after an acquisition is announced; it must be started well in advance. While this is known, there is a lack of research into how to establish the necessary readiness. The problem of readiness is especially relevant for novice acquirers, to whom acquisitions are a one off strategic event that cannot be fully experienced until the acquisition is finished. Unlike serial acquirers, who hone their acquisition IS integration capabilities over many acquisitions, novice acquirers cannot continually learn from their past.

Considering the upfront investment and (for novice acquirers) inexperience in executing an acquisition IS integration project, it is important that an IT department validate their IS integration plans and capabilities before an acquisition arrives. This paper seeks to address this by answering the research question: *How can an IT department validate their readiness to carry out an acquisition IS integration?*

This paper addresses this question through an embedded case study of a company who used drills as a means to validate their readiness. Similar to a fire drill, the company used two different approaches to simulate different acquisition conditions to gauge their IT department's ability for handling such events.

Believing an acquisition was likely in the near future, in early 2015 ShippingCo's[1] CIO instructed a senior IT manager to oversee the creation of a dedicated IT mergers and acquisition team (IT M&A team), who would prepare ShippingCo's IT department for carrying out an acquisition IS integration. After months of preparation, the IT M&A team had developed plans to follow, tools to use, and identified key stakeholders to work with to carry out such a project. Furthermore, they had assessed ShippingCo's IS's scalability levels, and staffing skills and capacities in the broader IT department.

After so much preparation, the IT M&A team needed to validate their readiness. This would entail testing their plans to ensure key IT people could perform their duties, and the IS could handle any changes an acquisition would introduce. Some of their preparation work had been theoretically validated through audits, reports, and formal agreements from IS owners. However, the IT M&A team needed a more rigorous validation method that would assess their acquisition IS integration plans and discover any gaps.

To achieve this, ShippingCo carried out two different drills. The drills were executed by different members of the team, involved different organisational stakeholders, and tested different dimensions of the IS integration. Although different, both drills validated the readiness of the plans, people, and IT resources through simulating the events of an acquisition.

By analysing this case, this paper contributes to the research into acquisition IS integration by introducing drills as a lens through which to assess readiness. Furthermore, it provides practical learnings that IT departments and project managers can follow to better prepare themselves for an integration.

Literature Review

Acquisition IS integration

Research has studied the challenge of acquisition IS integration since the late 1980's. Early work explored the concept, and sought to understand how the relationship between the business and the IT department influenced acquisition IS integration (Johnston and Yetton 1996). A key contribution was the identification of four IS integration methods and the business rational behind each other them (Buck-Lew et al. 1992; Henningsson and Øhrgaard 2016; Yetton et al. 2013). At one extreme is *absorption* whereby one company's IS are maintained and the others' are decommissioned. At the other end of the spectrum is *co-existence*, where both companies' IS are left as they were before the acquisition. In between is a *best of breed* approach, where both companies adopt one overall IS landscape, but a selection process determines which system will be retained in cases where two systems support the same process. Finally, companies following the *renewal* method deploy a new IS landscape to the combined company, discarding both companies' legacy systems. These four methods are distinctly different approaches to IS integration, used in different acquisition contexts; readiness to perform one, does not indicate readiness to perform others.

Irrespective of the method for IS integration, the literature agrees on a high level approach, shown in Figure 1 (Henningsson 2015; Henningsson and Kettinger 2016; Toppenberg et al. 2015). Research shows there is insufficient time for an IT department to prepare for an acquisition after one has been announced; the preparation work must be done during the *pre-acquisition preparation* phase (Yetton et al. 2013). However, the information that informs the decision of which IS integration approach to follow is usually not attained before due diligence. Furthermore, research has shown that IT departments can use different resource configurations to manage the IS integration (Henningsson and Øhrgaard 2016).

Considering these conditions: preparation takes a long time, there are different acquisition IS integration methods to prepare for, and there are different ways to handle integrations, how can a company know if their preparations have led them to be ready to acquire? This question is especially important for novice acquirers. Research shows that serial acquires, those who acquire more than two companies every three years, compound their learning over many acquisitions, improving their readiness (Henningsson 2015;

[1] ShippingCo is a pseudonym for a global container shipping company

Kengelbach et al. 2011). However, novice acquirers, those who do not acquire regularly, cannot learn from their recent past to improve their acquisition IS integration plans.

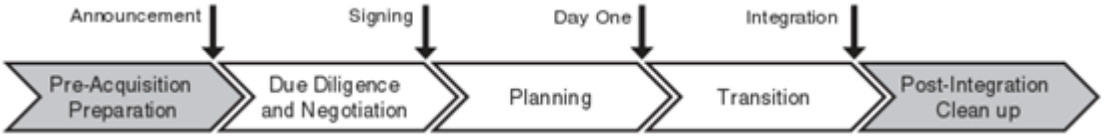

Figure 1 – Generic acquisition integration approach. Adapted from: (Henningsson 2015)

An acquisition, and the subsequent IS integration project, are significant and unique events that can be prepared for, but not truly experienced until a real one happens. In this way, they are similar to events requiring formalised drills to test readiness for, such as a building fire evacuation. In these cases, it is likely, although not known when, an event will occur. However, when it does those affected must respond by carrying out a predefined plan, not improvise a response. This matches the case of acquisition IS integration. When an acquisition will occur is unknown, but when it does the group responsible for responding must be ready with the plans and resources for action. Due to this similarity, this paper investigates the contribution drills can make, as a tool to evaluate an IT department's readiness to carry out acquisition IS integration.

Validating readiness with drills

Many events are rare, unique, and cannot be experienced until the real thing occurs. While some of these may be considered positive (e.g. winning the lottery), many are not and result in negative consequences, such as natural or man-made disasters, or (within the field of IS) catastrophic IT failure (Kendall et al. 2005; Martincic and Obrentz 2008; Simpson 2002). In anticipation of such events, stakeholders such as governments, emergency services, communities, and IT departments prepare by devising response plans. However, they do so without knowing when such an event will occur, nor its magnitude when it strikes.

Despite these challenges, not preparing for such events is not an option; therefore, these groups create response plans, and validate them using drills. A drill is a scenario-based test of a plan, and the people and resources involved in its execution (Anderson et al. 2005; Perry and Lindell 2003; Simpson 2002). Drills potentially contribute three key benefits. One, a drill evaluates the effectiveness of a group's preparation in a controlled situation, with the expectation that they learn from their experiences to be more ready when faced with the real situation (Simpson 2002; Zigmont et al. 2011). Two, drills test theoretical knowledge gained during preparations in a bid to identify weaknesses prior to an actual event (Alexander 2000; Martincic and Obrentz 2008). Three, through participant selection, the group can ensure all involved have experienced the simulation and know their duties (Anderson et al. 2005).

However, the effectiveness of drills is subject to a number of limitations. They can be costly and time consuming to hold, and if people are aware it is a drill, they may not participate as they would in a real event (Smith and Trenholme 2009; Zigmont et al. 2011).

Despite the challenges, drills are a widely accepted mechanism for validating preparedness. Applications include training doctors in operating theatres, preparing businesses for severe interruptions, and ensuring critical infrastructure sites (such as nuclear power plants) can quickly respond to disasters (Anderson et al. 2005; Epich and Persson 1994; Martincic and Obrentz 2008). In these examples, drills validate a group's readiness to respond to a foreseeable event that will not be truly experienced until the actual event occurs.

The literature on drills discusses two types, tabletop and functional, which are differentiated based on the degree of participant involvement (Simpson 2002). During a tabletop drill, participants talk through a scenario, evaluating their responses in a relatively safe place, such as a classroom (Simpson 2002). Tabletop drills remove the pressure of real-time decision making, and are instead often used to train leaders in what to expect, and how to respond (Hsu et al. 2004). By contrast, functional drills involve playing out designed, real-time scenarios, usually with actors to augment the unfolding of the events (Simpson 2002). These two drill types demonstrate how different a drill can be. It could be as informal as managers discussing a disaster recovery plan, through to an inter-governmental response to a man-made catastrophe. Despite their differences, both drills are scenario-based tests of a plan, and the people and resources involved in its execution (Anderson et al. 2005; Perry and Lindell 2003; Simpson 2002).

Based on the literature, Figure 2 shows a high level timeline for a drill (Alexander 2000; Epich and Persson 1994; Perry and Lindell 2003). Prior to a drill beginning, a plan is developed for a specific group to follow in the event of a foreseeable event. The drill begins with the occurrence of a simulated event, triggering a reaction from specific people. Next, they carry out their response to the foreseeable event by executing their predefined plan. Finally, the drill ends and participants review what occurred to validate their plan and actions, and learn from the events that unfolded.

Figure 2 – Timeline for a drill.

Similar to the events described in the drill literature, an acquisition is an event that cannot be truly experienced until a real one occurs. Although not as physically dangerous as a natural disaster, it is still unique, unpredictable, and requires advance preparation. Considering these similarities, it seems pertinent to investigate the contribution that drills could make to validating an IT department" readiness for acquisition IS integration. This paper begins this investigation through the analysis of a case study whereby an IT department undertakes preparation activities to ready themselves for an acquisition, and then executes two drills to validate their plans. It uses the framings of acquisition IS integration and drills presented in this section to describe the case and analyse the findings.

Methodology

Case context

The research followed the case study method, as it sought to understand how a real world phenomena, that the researcher had little control over, worked (Yin 2009). It observed ShippingCo's IT department over 18-months as they installed a dedicated IT M&A team to prepare IT for an acquisition. There were two key reasons for the selection of ShippingCo. First, their IT department was actively preparing for an acquisition without an identified acquisition target. This means that the study could observe their preparation in real time. Second, although they had made acquisitions previously, their last acquisition was 10 years earlier, and few processes and little knowledge remained from that event. This made ShippingCo an ideal case study; they were a large company, actively preparing for an acquisition that may not happen, and they were developing their acquisition IS integration plan more or less from scratch.

Data collection and analysis

Qualitative data was obtained through 25 semi-structured interviews conducted over 12-months. Selected interviewees were either part of the IT M&A team, or directly involved in the drills. Interviewees were representative of the roles involved in the drills and preparations including the CIO, IT M&A team members, and drill participants. An interview guide was developed to ensure interviews followed a similar approach. Based on that, semi-structured interviews were used as they allow for an in depth investigation of an under researched topic, and are one of the recommended data collection methods for strong case studies (Saunders 2011; Yin 2009). The interviews were between the author and the interviewee, and the audio of the conversation was recorded. Additionally, the author maintained a continued presence as a member of the IT M&A team during this time, which gave access to supporting documentation.

Each recording was transcribed, and then the transcription was verified against its original recording to ensure its accuracy. Transcriptions were added to the analysis software, NVivo, to be coded against others. They were analysed using the incident-to-incident variation of the constant comparison method, utilising memos to support coding decisions (Charmaz 2006; Corbin and Strauss 2008; Glaser and Strauss 1967). The process for coding was to read the transcripts to identify incidents describing the characteristics of the drills. Incidents were compared to previously coded incidents and their supporting memos. If an incident matched an existing code, the new incident was coded the same, if not a new code was created. This process of incident-to-incident constant comparison continued throughout the analysis for all interview transcripts. After coding all transcripts once, the author repeated the process to code all transcripts a second time, ensuring all codes had been compared thoroughly and were correctly assigned. The extrapolated codes revealed characteristics of acquisition IS integration drills.

Case description

Using the timeline for a drill (Figure 2) as a guide, this section details the two drills ShippingCo executed to validate their IT department's readiness to carry out an acquisition IS integration project.

Drill 1

In Drill 1, the IT M&A team used a functional drill to validate their ability to absorb a similar company onto their IT landscape. They did this by simulating an acquisition of their sister company (SisterCo).

Developing a plan for a foreseeable event

ShippingCo's IT M&A team had prepared to carry out an absorption IS integration, as they believed any acquisition would be of a smaller shipping company who would adopt their IT systems.

During their pre-acquisition preparation, the IT department mapped ShippingCo's core business processes to the IS supporting them, creating a IS/business capability landscape map. One of the first planned steps to carrying out an absorption would be to go to the target company and replicate this model. Doing so would allow the two IS landscapes to be compared, enabling the absorption IS integration approach as it would reveal which of ShippingCo's IS would replace each of SisterCo's IS.

> *"If you buy a containership company the goal would be to integrate it fully… We said in the principles that we will move to our systems."* (Former) Head of IT M&A

Starting the simulation

Drill 1 was initiated by the former Head of IT M&A who instructed the IT M&A team to validate their absorption approach by integrating SisterCo through a mock acquisition. SisterCo were already on ShippingCo's IS infrastructure, however were using a different suite of software. The overall objective of the project was to migrate SisterCo onto ShippingCo's IS and decommission their legacy systems, just as they would when following the IS integration absorption method. However, the first step was to create an IS/business capability landscape map of SisterCo that could be used to direct the absorption.

Executing the drill

Over two weeks the IT M&A team carried out the first step to absorbing SisterCo, mapping their IS/business capability landscape. Involved were the IT M&A team, ShippingCo's IT organisation, external consultants, and SisterCo staff. The IT M&A team coordinated the drill, and owned the tools and plans being validated. ShippingCo IT analysed SisterCo's IS and business processes, generating the knowledge for the model. The external consultants were brought in to offer acquisition IS integration guidance. Finally, the staff from SisterCo provided insights to their business processes and IT landscape, retrieving documentation, and answering questions. After two weeks they had successfully created a IS/business capability landscape map for SisterCo, which they compared to ShippingCo's.

> *"We got through the whole process of looking at their business capabilities, comparing that to our mapping on top of our applications and their applications, identifying the gaps."* IT M&A Programme Leader

Reviewing the drill

Although the overall project of integrating SisterCo was put on hold due to budget constraints, Drill 1 successfully proved that ShippingCo's initial plan to compare the two landscapes worked. It validated the first stage of their planned absorption integration. Through Drill 1 the IT M&A team identified where the two company's business processes overlapped, and thereby where they could directly apply the absorption IS integration method. However, they also found some businesses processes that were not executed by ShippingCo that could not be supported by their existing IS; these processes could not be 'absorbed'.

Furthermore, Drill 1 validated staffing requirements. The IT M&A team, the IT staff, and SisterCo employees, performed as expected during Drill 1; the external consultants however, failed to deliver the

anticipated value. They were lacking sufficient knowledge of the industry and acquisitions to assist. To compensate, the IT M&A team deferred to their theoretical knowledge on acquisitions to fill this void.

In a relatively short time, the IT M&A team had analysed a foreign company's IS and developed a comparable IS/ business capability landscape map. Drill 1 validated the usefulness of the analysis tool, refined the execution process, and revealed limitations to the effectiveness of the chosen consultants.

> *"So we didn't get to bring them on the systems, but for us it was as good an exercise as if we'd bought somebody."* IT M&A Programme Leader

Drill 2

Using an enhanced tabletop drill, ShippingCo's IT M&A team used Drill 2 to validate whether the IT department was ready to provide the IS infrastructure to enable selected connectivity for Day One.

Developing a plan for a foreseeable event

Day One (as shown in Figure 1) is the day the acquisition transaction is complete, and the two companies legally become one. On this day, there is an expectation that some IS infrastructure is in place, connecting the companies. With a well-rounded understanding of the technical possibilities, the business operations, and newly hired employees with acquisition experience, the IT M&A team developed a plan for what IS infrastructure would be required on Day One. These included access to certain applications, video conferencing facilities, and ShippingCo laptops for some employees. These were identified as necessary Day One IS infrastructure services irrespective of the target or the acquisition IS integration method.

To install these infrastructure services, ShippingCo's IT needed sufficient lead-time and resources. As such, the purpose of Drill 2 was to validate the readiness of the IT department to deliver them.

> *"There is an order to this… you get the base, the foundation which is the infrastructure and the connectivity.*
>
> *So what we did first was, within the team, a few of us went and we developed what we thought we could and should do, and what we thought the business would want for Day One."* IT M&A Project Manager

Starting the simulation

To validate the IT department's readiness, the IT M&A team believed they needed more than a simple tabletop drill. They were concerned that a request for a full day meeting with key stakeholders would be rejected, as IT staff were too busy to commit so much time in the absence of a real acquisition. To overcome this, the IT M&A team created a realistic simulation upon which to carry out the drill.

Drawing inspiration from fire drills, and the story of the First Army Group[2], the IT M&A team created a new company. They identified likely acquisition targets and based on publically available information on them (e.g. fleet sizes, staff numbers, and IT systems and vendors) created NewShippingCo.

The IT M&A team launched the simulation by reaching out to IT staff required for the drill. However, instead of openly inviting them to a meeting, they approached participants individually and discretely, asking them to keep the day free for a 'special workshop'. The discretion gave the participants the impression they were being brought into something secret.

> *"So we literally built this company NewShippingCo from the ground up.*
>
> *Another big part of this was the way that we engaged the stakeholders… initially we carved them all away from the desk so that they can speak privately via their mobile phones. So just like we will bring somebody in under NDA…"* IT Business Analyst

[2] The First United States Army Group was a fictitious Army Group of World War II, created to deceive the German army https://en.wikipedia.org/wiki/First_United_States_Army_Group

Executing the drill

On the day of Drill 2, three IT M&A team members and six IT staff met in a quiet, discrete room. Without telling participants it was a drill, the IT M&A team introduced the IT staff to NewShippingCo, handing out individually numbered information packs that participants signed out for and returned at the end of the day. After introducing NewShippingCo, the IT M&A team presented the date for Day One and the IS infrastructure requirements. Based on these goals, the IT staff began evaluating their path to delivering the IS connectivity. Working backwards from the date, the participants evaluated whether the outcome was achievable, and then determined actions and dependencies.

> *"We went into [Drill 2] with a defined list of outcomes wanted from our stakeholders."* IT Business Analyst

Reviewing the drill

By the end of the day, Drill 2 had achieved three things. First, it validated the IT department's level of preparedness to provide Day One connectivity. They had the technical solutions to enable the desired connectivity; however, dependencies on suppliers and other departments prevented them from starting. Second, in having their IS connectivity plan validated, the IT M&A team could confirm with the business, what IS services were possible for Day One, as well as how changes to Day One timelines affected those options. Third, they had a validated template for Day One integration that could be reused once a real acquisition target had been identified and real data could replace the simulated NewShippingCo data.

> *"I think what [Drill 2] did for us, that session, that workshop, confirmed that what we wanted to do we could do."* IT M&A Project Manager

Findings and Discussion

Both Drills evaluated a plan, and the people and resources used in its execution, resulting in a better understanding of how acquisition IS integration should be done at ShippingCo. Emphasised through a discussion of their similarities and differences, this section presents findings drawn from the analysis. The study identified seven characteristics of acquisition IS integration drills, which are summarised in Table 1.

Characteristics of acquisition IS integration drills
Tailor drills to the different phases of the acquisition IS integration project
Business rationale is a requirement for post-Day One IS integration planning
Functional acquisition IS integration drills can be derived from like experiences
Augment tabletop drills with functional elements to make them more effective
Increase the realism of the acquisition IS integration drill to increase participation
Include the right mix of IT, business, and acquisition participants and skills
Ensure the desired outcome (new IS state) is clear and communicated

Table 1 - Characteristics of acquisition IS integration drills

Tailor Drills to the acquisition phases

The two drills differed in goal definition, personnel involved, and tools used. This was because Drills 1 and 2 validated different phases of the acquisition (Figure 1). Drill 1 validated a plan for application consolidation during the transition phase, while Drill 2 validated IT's readiness to deliver specific a IS infrastructure configuration for Day One. Thus, validating the different plans required two different simulations and drills. Drawing on this, the first characteristic of acquisition IS integration drills is that they should be tailored towards the different phases of the acquisition IS integration project. Applying the specific details or the approach developed for Drill 1, would not have yielded results if used in Drill 2.

Business rationale is required for post-Day One planning

Further analysis of the two drills revealed how the IS integration method affected each drill differently. In the case of a real acquisition, the decision as to which IS integration method to follow would be driven by the purpose of the deal. In Drill 1, the IT M&A team decided to follow the absorption approach; they needed that decision in order to know what to do with SisterCo's IS. Conversely, in Drill 2, the IT M&A team did not select an IS integration method to follow, as it was not required for them to achieve their goal; the planned IS connectivity would be required on Day One irrespective of the IS integration method.

Based on this, after enabling Day One connectivity, the acquisition IS integration project requires business input to guide the selection of the IS integration method. Prior to Day One, though the approach is mostly standard for all methods. From this, the characteristic of, acquisition business rationale is required to drive post-Day One acquisition IS integration method selection and planning, is derived.

Use like experiences as functional drills

One of the criticisms of functional drills was their high expense. In Drill 1, ShippingCo found a way to carry out a functional drill while at the same time delivering a practical, value driven outcome. The drill to integrate a similar company onto their IS suite not only validated their integration approach, it was also to give a subsidiary company better technologies to operate with. As it was not an acquisition, ShippingCo had to simulate their approach to make it like an acquisition; they even hired external consultants to help hone their acquisition mindset. In this way, Drill 1 aligns with the definition of a drill; however, this case shows how a drill can add more value than just validating plans. This shows that functional drills can be derived from organisational changes, and additional benefits can be gained. Unfortunately, as SisterCo was connected to ShippingCo's IS infrastructure, they could not carry out a similar simulation for Drill 2.

Enhance the tabletop drills to make them more functional

Although not a functional drill, Drill 2 was more detailed and realistic than the earlier description of a tabletop drill. The formalisation of the simulation and amount of detail that went into creating a realistic acquisition target, NewShippingCo, added a functional dimension. Drill 2 was an extended tabletop drill, as it simulated the realistic approach key IT stakeholders would follow to initiate their IS integration project; however did so in a safe environment without affecting ShippingCo's IS. Blending the drill resulted in a more rigorous validation of the IT department's readiness. Coming from this, is the characteristic that tabletop drills can be more effective when augmented with functional elements.

Increase the realism of drills

Building on the previous characteristic, the creators of Drill 2's scenario set out to make it as real as possible, as such the participants believed they were working on a real acquisition and acted accordingly. Similarly, when executing the integration of SisterCo, the IT M&A team treated the event as a real acquisition. This degree of realism is a departure from the literature on drills. The drill literature focuses on fabricated simulations where people knew they were drilling, such as for a surgical operation. In the drills performed by ShippingCo, those involved participated in 'real events', either integrating another company or believing they were working on a real Day One plan. Due to this, the participation level was high, and those involved in the drills took them seriously. This leads to another characteristic: to increase the level of participation, drill organisers should create a high level of realism in their simulations.

Right mix of people and skills

A key objective of a drill is to test the response of the people involved in the plan, therefore the right respondents must be involved. In Drill 1, the participant groups were the IT M&A team, IT staff, staff at SisterCo, and external consultants. At the end of the drill the people and their ability to execute the plan was validated for the first three participant groups, however unfortunately not for the consultants. There were two participant groups involved in Drill 2 whose roles and skillsets were validated. In both cases, specific skills were identified as being required for the drill, and people matching those roles were selected. As was seen from these drills, it is imperative that the right people and skills be selected.

Building on this, the case showed there are three key skillsets that contribute to the drills for IS integration: IT, business, and acquisition skills. Drawing on these two points comes another characteristic, that there must be the right mix of people adequately skilled in business, IT, and acquisitions to carry out the drill as though it is a real acquisition IS integration project.

Clear drill goals

To execute the drill, organisers must have a clear vision of the drill's purpose, that is what the drill is validating and what should be the outcome. For Drill 1 the purpose was to absorb SisterCo onto their IS software suite. The first step of this was to analyse SisterCo and create a business/ IS landscape model. The plan was validated against the simulation, and most people involved were able to execute their jobs. Likewise, in Drill 2 the IT M&A team defined a clear purpose for executing the drill, to validate the IT department's readiness to enable Day One IS connectivity, which the simulation validated.

A difference between drills presented in the broader drills literature, and the drills in this study is the desired end state or goal. In literature, the goal is usually to validate a plan that overcomes adversity to return to a 'normal' state. However, in this study, the goal is to validate a plan that will enact significant organisational change, resulting in a new IS state. In both Drills 1 and 2, all involved were aware of the intended new IS state as part of the triggering of the drill. Derived from this is the characteristic of having and clearly communicating the goal of the acquisition IS integration drill, the desired IS state.

Conclusion

Acquisitions are great opportunities for companies, however are notoriously difficult to do well, especially the integration of the two firm's IS. To carry out an acquisition IS integration project successfully; IT must prepare in advance of an acquisition announcement. This study analysed how ShippingCo's IT M&A team used drills to validate their IT department's readiness. The analysis revealed seven characteristics of acquisition IS integration drills that others can apply when developing their own validation drills.

The paper contributes to the literature on acquisition IS integration, as it demonstrates a novel approach to preparing for acquisition IS integration. Previous literature had shown the importance of IT departments preparing in advance, but had provided little guidance as to how. These findings contribute to solving this puzzle by providing insights in to how to validate the IT readiness. Additionally, the paper contributes to the practice of acquisition IS integration (particularly for novice acquirers) by describing two drills that test different phases of the acquisition IS integration process, and by presenting drill characteristics practitioners can include in their own IS integration validation drills.

As a limitation, this is a single case study, therefore generalising the findings should be done cautiously. Furthermore, ShippingCo was preparing for a particular integration method (absorption), and this mindset may have influenced their actions. Additionally, Drill 1 was executed on a subsidiary company, so cultural challenges (usually associated with acquisitions) may have been limited. Despite these, the case reveals useful and novel insights into how an IT department can use drills to validate their readiness to carry out acquisition IS integration.

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