Outlining a Process to Manage the Complexity of Enterprise Systems Integration

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Abstract: New service combinations are constantly needed to be created from the array of information systems and technologies, developed in different times for different purposes, crossing the organizational boundaries. Integration is the key matter in organizations, yet it is also an ambiguous and often a misunderstood concept in the field of information systems. In this paper, we construct an integration process from an inductive study in a large manufacturing enterprise, by examining its long-term ERP development endeavour. The process consists of four sub-processes with dedicated actors and activities. Integration Governance is needed to align Integration Realization with the strategic goals of the organization. Integration Housekeeping is dedicated to standardization activities and keeping the architectural description of the enterprise systems' landscape updated, and to aid Realization. By utilizing the assets produced by Governance and Housekeeping Integration Evaluation is done to decide whether it is feasible to set up an integration project or abandon the initiative. The process helps managers to manage the complexity of enterprise systems integration and avoid its pitfalls.

1 INTRODUCTION

"From the IT perspective I state that integration work is the most challenging and it has a great impact on the functionality and quality of the systems." – YCorp, Business-IT Negotiator

To better serve the business and customers, information systems need to be integrated. Enterprise systems integration has remained as a challenge since the early days of business automation (Jacobs and Weston 2007). The advances of integration technologies enabled enterprises to shift from mainframes to distributed systems automating more complex business processes crossing the organizational boundaries. (Alonso 2004). Currently, the information systems landscape of a modern enterprise consists of numerous different systems, like ERPs (Enterprise Resource Planning) and CRMs (Customer Relationship Management), and the integration of these systems is a necessity (Gericke et al. 2010; Vathanophas 2007). However, as the number of systems increases, managing the array of integrated systems become troublesome (Henfridsson and Bygstad 2013). Additionally, the changing dynamics of business increases the need to integrate information systems as the movement towards more collaborative nature of business has taken place. For instance, end users and customers desire to access the enterprise systems with mobile devices (Lozano et al. 2014). This in turn creates a need to provide the enterprise systems' functionality from the back offices to the field of business (Lam and Shankararaman 2004). Firms' interaction with customers, suppliers and employees have changed through mobile services and social networking (Tilson et al. 2010). *Integration* is at the focal point of this change and it calls for means to be systematically managed.

Unfortunately, the term *integration* is generally a misunderstood concept surrounded by a fair amount of confusion (see e.g. (Chowanetz et al. 2012; Gulledge 2006). Even in the field of information systems, there are various understandings of this term (Rodon 2006). In addition, instead of addressing only the management of a single enterprise system, managing the arrays of systems has only recently been addressed by academics (Henfridsson and Bygstad 2013; Tilson et al. 2010). In this study, we aim to increase the understanding of integration and its importance in a complex environment. We examined integration in a large manufacturing enterprise, which was building and renewing its ERP

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system landscape (i.e. the key systems and integration technologies for its business) while wrestling with major organizational and business changes. The integration process is inductively constructed with the Grounded Theory methodology. The following research question has been set: *What constitutes the process when attempting to manage the enterprise systems integration?*

2 BACKGROUND

In general, the concept of integration has been identified as an ambiguous concept, prone to misunderstandings due to its nature (Chowanetz et al. 2012; Rodon 2006). Integration has been studied from different viewpoints, e.g. technological, organizational and strategic perspectives. The technological aspects of integration have been studied widely, but in the context of ERP systems, the studies focus mostly on a specific target system (Kähkönen and Smolander 2013). The organizational perspective has focused on organizational characteristics and intra-organizational factors, such as top management support and cultural fit (Chowanetz et al. 2012). From the management viewpoint, the strategic perspective of integration has mainly focused on the management of integration in mergers and acquisitions (Alaranta and Kautz 2012; Henningsson and Carlsson 2006; Mehta and Hirschheim 2004; Wijnhoven et al. 2006). It has been suggested that the broader context in which integration takes place should be studied more to understand how the arrays of enterprise information systems can be managed (Lee and Myers 2004; Tilson et al. 2010).

There is a lack of processes or approaches that capture the specific needs of integration (Wing Lam and Shankararaman 2004). Our aim is to better understand the process of integration when aiming to manage the complex array of information systems. To achieve this, we made an inquiry to practice and examined the development of a key information system of the company - a customized information system for sales and logistics. At the time when the interviews were made, this system reached the retirement phase of its life cycle after 20 years of intensive development. The rationale behind this study is that when managers understand the integration process better, they make better decisions to control the arrays of information systems and avoid their unmanaged evolution and undesired outcomes (Ciborra 2001).

3 RESEARCH APPROACH

Since the mid-1990s, qualitative research methods have resonated. They represent a shift away from technological issues to managerial and organizational matters in information systems development (Myers 1997; Myers and Avison 2002; Sarker et al. 2013). Qualitative methods, such as Grounded Theory, have been recognized useful when there is a goal of understanding from the point of view of the practitioners and when the rich social and institutional context is important for understanding (Kaplan and Maxwell 2005). In this paper, we use Grounded Theory, originally developed by Glaser and Strauss in 1967 (Strauss and Corbin 2008), as the research method to investigate integration process from the organizational perspective.

Grounded Theory is especially suitable for approaching complex organizational phenomenon such as enterprise systems integration (Charmaz 2006). This suited to our research interest well, because integration imposes social and organizational issues besides the technical challenges (Welker et al. 2008). Our approach is interpretive, because we aim at making sense of the full complexity of the phenomenon in its social and organizational context (Walsham 1993). Grounded Theory allows developing theory iteratively based on systematically collected and analysed data (Strauss and Corbin 2008). The data is usually collected by interviewing or observing one or several cases, but other sources of evidence, like written documentation or other archive material can be used as well (Urquhart et al. 2010). Grounded Theory is useful for creating context-based and process-oriented descriptions of organizational phenomena. For example, the Corbin and Strauss version of Grounded Theory provides clear guidelines for data analysis (Corbin and Strauss 1990). The main benefit of Grounded Theory is that it allows the researcher to trace back to the original sources of data in order to observe how the theory has been developed and how different instances of data have emerged into concepts and relationships between them (Strauss and Corbin 2008).

3.1 Data Collection

The dataset contained 21 transcribed theme-based interviews addressing ERP development and integration issues encountered in the organization. The interviews, that were selected by snowball sampling, included viewpoints from the organization adopting the ERP system (from now on referred as YCorp), the vendor implementing the system

Table 1: The organizations and roles of the interviewees.

Representatives of YCorp				Representatives of Vendor and Middleware Provider		
ID	Role	R1	R2	ID	Role	R1
YC1	Business-IT negotiator	62	100	V1	Software manager	48
YC2	IT manager of business area	49	65	V2	Service owner	32
YC3	Program manager	32	-	V3	Continuous service manager	56
YC4	Enterprise architect	38	-	V4	Infrastructure manager	56
YC5	Service manager of sales	58	-	V5	Project manager	29
YC 6	IT support manager	32	-	V6	Lead software developer	29
YC 7	Representative of logistics	31	-	V7	Service manager	52
YC 8	Project manager	43	-	MP1	Middleware manager	73
YC9	Manager of E-business and integration	-	83	MP2	Technical consultant	73
YC10	Head of E-business and integration	-	60			
YC11	Business support manager of a business area	-	83			
YC 12	Director of business process development	-	34			
R1, R2 = duration of the first and second round interviews in minutes						

(Vendor) as well as consulting company (Middleware Provider), who all were involved in implementation the key information system of YCorp's infrastructure. The interviews were made in two rounds: the first round (14 interviews, conducted in spring 2013) addressed the general ERP development issues while the second round (6 interviews, conducted in summer 2014) focused more deeply on integration and enterprise architecture issues. The questions were open-ended, and more detailed questions were based on the answers. The positions of interviewees ranged from upper management to mid-level management and developers. The duration of interviews ranged from 29 to 100 minutes, the average being 53 minutes. A list of the interviewees' organizations and roles is presented in Table 1.

3.2 Context Description

YCorp is a large manufacturing enterprise with an annual turnover about 10 billion euros. In the remaining sections of this paper, we refer to the array of information systems and integration technologies described in this section by using a term *ERP System Landscape*. Figure 1 describes the ERP System Landscape of YCorp.

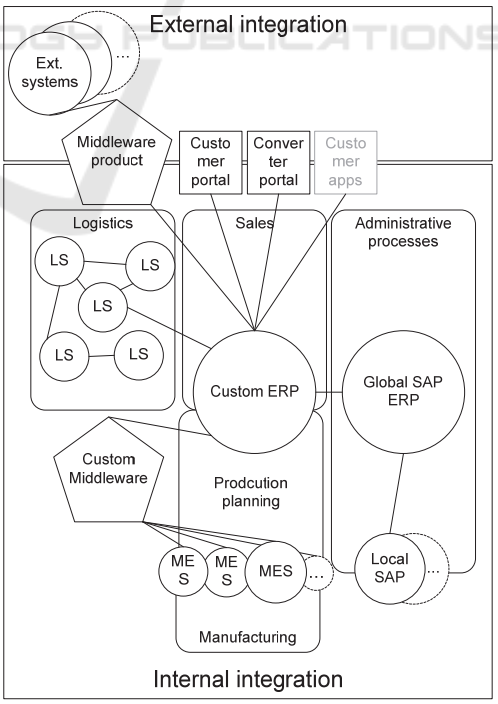

Figure 1: ERP System Landscape, i.e., the key information systems and the related business processes of YCorp.

As a core technology in their ERP System Landscape, the company has a custom-build ERP system (Custom ERP) with a lifespan of 20 years of development and use passed. This system automates the sales processes currently in three of the five business units of the company. It also takes care of the high-level production planning while the detailed production planning is done in Manufacturing Execution Systems (MES) in facilities. Previously automated by the custom ERP, the logistics processes have been automated by several different systems created for this purpose. Custom ERP is used in most of the facilities world-wide, and it is integrated with MESs via a custom middleware. The system has been constantly adjusted according to the drastically changing business conditions. The global SAP ERP is used company-wide to manage the administrative processes in most of the facilities, but some sites have their local configuration of this system. The main instrument for external integration is a middleware product which provides the messaging and allows building of business process logic. This platform is mainly used for external integration with customers' ERP systems and external transportation providers' and warehouse systems. Different interfaces for business partners have been built. The customers and converters whose services YCorp utilized in product modification have their own portals, through which they can access the relevant information in Custom ERP. Customer apps are mobile applications for business partners to access the custom ERP. They have been considered, but not yet implemented due to cost-cutting pressures. Recently, the company has been forced to constantly cut the development costs and make its operations more efficient.

3.3 Data Analysis

The data analysis in the GT consists of three coding procedures: open, axial, and selective coding (Strauss and Corbin 2008). In open coding, the transcribed interview data is first labelled with codes that capture the meaning of the current piece of data. The most important procedure in open coding is constant comparison between the pieces of data in order to find similarities and differences. In axial coding, connections between codes and categories are formed. Basically, this is the interpretation of codes, categories, and properties developed in open coding with the goal of refining the constructs and making them more abstract and theoretical (Urquhart et al. 2010). In selective coding, the goal is to choose a core category, interpret its relationships with other categories and explain it as a theory. When data is collected and analysed iteratively, the main question is when to stop the process. As a theory emerges, more focus is needed on some aspects of it. At the same time, the categories, dimensions, and properties become more refined when more data is collected. The situation when the researcher finds out that a new set of data will not bring significant new codes, categories and/or relationships is called theoretical saturation (Strauss and Corbin 2008). 169 codes and 16 categories were created during open and axial coding. For example, category *Actors* contained all the different sub-organizations and groups, such as *consultants*, *competitors*, and *end users* involved in system development. In addition, a category was created for some of the organizations, such as *adopting organization*, *vendor* and *middleware provider*. Other categories were *Activities* (for example, *maintenance*, *deploying the system* and *business process improvement*) performed by *Actors* and *Assets* (such as, *enterprise architecture*, *ERP strategy* and *standards*). *Integration* was considered as its own category, including codes such as *planning and decision making*, *project characteristics*, and *target*. *Challenge* was a category that contained the notions of encountered problems related to any of the other codes.

As the coding progressed from open to axial coding, we noted that integration process cannot be easily described with a single category, but other categories were tightly coupled with it. We identified 4 sub-*processes* from the data: *Evaluation*, *Realization*, *Housekeeping* and *Governance*. Each sub-process was then further examined by first creating a code for it and identifying the codes and categories that were related to the sub-processes. This revealed, for example, some of the related actors, activities and assets of each sub-process. Axial coding produced also four network diagrams. The creation of new codes was ended when there were indications of theoretical saturation, i.e. it was noticed that no new codes related to integration issues emerged from the data, and already observed phenomena and patterns were repeated. In selective coding, instead of choosing a single core category, we interpreted the relationships between the four identified sub-processes and constructed the integration process, presented at the end of the next section.

4 FINDINGS

In the following we describe the four identified sub-processes of integration (realization, housekeeping, governance and evaluation) identified in the data analysis. The integration process is presented in Figure 2 and summarized at the end of this section.

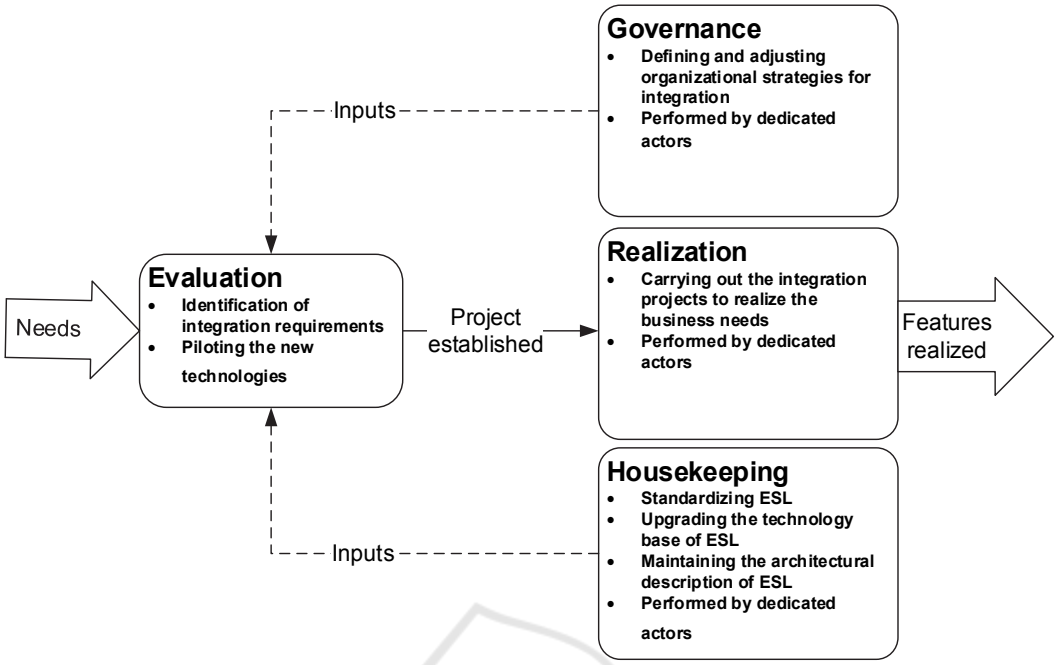

Figure 2: The integration process and its sub-processes.

4.1 Realization

"[The client organization's] business units are customers to their IT department. Our customer is their IT organization. This is the old model that we're stuck with. We would like to be more involved and make better solutions"–Vendor, Service Owner

Realization is a sub-process of integration, during which the development work required by integration to satisfy the business need is carried out after a project for integration initiative has been established. In YCorp, integration had required a significant amount of effort during the entire life cycle of Custom ERP, since the initiation of the project in mid-1990s. Both small and large-scale integration projects had been taken place. An example of a rather small integration effort was a sending of internal invoice from one facility to another. In a large integration project, the system was deployed to a facility and integrated with the MES of the facility.

Vendor had a major role in integration realization, especially when deploying the system to facilities and integrating it with a MES. While the most intensive roll-out phase had been completed during the time of interviews, deployments were still ongoing in remote locations as the business expanded to new areas. The Vendor had provided some of the facility systems and had the inside knowledge of them. Therefore, the deployments were carried out in close cooperation and systematic manner between YCorp and Vendor. Supportive practices depending on the characteristics of the facility system in question were used as assets in integration. However, currently the vendor felt that the current way of carrying out the development work in integration was not optimal. The constant cost saving pressures due to the drastic changes in YCorp's business performance had forced YCorp to cut down the development costs. Because of this, the development work was offshored to lower cost countries by the vendor. This slowed down the development process. The time that it took to realize a new feature request as a feature to the ERP system increased. This also prevented the rapid reaction to integration needs. Additionally, the representative of Vendor (V2) stated that the development process was not fully utilizing the expertise of Vendor. Vendor wanted to be more involved in the early phases of the development and affect the development decision making to utilize its domain knowledge accumulated during the years of collaboration. To speed up the development process, agile development approaches that enable better cooperation between the client organization and the vendor were suggested.

4.2 Housekeeping

"[It] is a separate messaging standard which has been built for [our] industry. [Our company] is one of the companies developing that. There are also all our biggest competitors involved in that work." – YCorp, Manager of e-business and integration

Standardization, making technology upgrades to ERP System Landscape and maintaining its architectural description were identified as activities of the housekeeping process, because they facilitate the integration realization but do not directly transfer the business needs to the system features. The actors performing this process can be different than those who deal with realization. For example, YCorp and Vendor both had dedicated teams responsible of supportive activities ensuring the fluent operation of the ERP System Landscape.

To facilitate message exchange with external systems, YCorp participated activities with standardization agencies and other companies, including competitors in the same industry. Standardization activities enabled the integration with external systems, including raw material suppliers', transportation companies' and warehouse operators' systems. Standards development had been an ongoing activity since the early phases of the Custom ERP. In addition, technical upgrades, such as changing the database platform from one vendor to another and upgrading the application servers had been conducted. These were done due to performance issues encountered as the scope of the Custom ERP grew larger.

Previously automated by the Custom ERP, the logistic processes were later automated by acquiring numerous different systems for this purpose. This created a need for managing the interfaces between the systems and achieving transparency of the business processes. YCorp faced a problem of not being able to reliably trace the customer orders because of the increased complexity of the ERP System Landscape. To manage the complexity of the ERP System Landscape, the role of architectural descriptions in facilitating the identification of integration requirements was discussed. While having a small team responsible for dealing with architectural issues, for example, ensuring that a new technology fits well with the current technology portfolio of the organization, it appeared that no detailed description of the architecture of the ERP System Landscape existed. It was also suggested that by forming the architectural description of the ERP System Landscape was considered difficult because of its complexity and there cannot be a single person to manage it. Instead, an interviewee (YCorp10) suggested that a virtual enterprise architecture team consisting on application experts should be formed. Currently, architecting was not the responsibility of application experts. The virtual enterprise architecture team was predicted to better enable the knowledge sharing between the organizational units to tackle with complexity.

4.3 Governance

"But then the question is that who will pay what and who can decide what? Can a single division decide something which will have big effects on other divisions, without asking for their acceptance? These are questions which are not yet clear. –YCorp, IT Manager of a business area

YCorp had a process to govern integration efforts. The top management of YCorp had a major role in governance. For example, ongoing integration projects with biggest customers were terminated for two years of time by a new CEO who joined the organization, because the new CEO did not emphasize e-business. The company aimed to align its integration efforts with organizational strategies and constantly considering the future state of its ERP System Landscape. This was especially relevant due to the drastic changes taking place in YCorp's field of business. For example, YCorp had established a company-wide strategy for its ERP systems utilization. When a new organization joined the company, it was supposed to use a SAP template defined for the organization. However, this did not always happen. The new organizations continued using their own configuration instead. This resulted to additional, local SAP ERP configurations, increasing the complexity of the ERP System Landscape. Moreover, in the early phases of development managers in facilities could impact on the decisions about the business process coverage in MES and the Custom ERP. Later, this caused data quality issues when retrieving data from the MESs. The company was also creating a roadmap for its ERP systems by figuring out the future needs of these systems. Establishing a unified strategy for the system landscape turned out to be difficult due to the different interest of business units using Custom ERP, but having differing strategic interests. Eventually, this led to a situation in which a single division initiated a massive architectural reconstruction process majorly affecting the future state of Custom ERP without first getting acceptance from other business units. In addition, a lack of integration governance increased the complexity and caused other issues, such as a need for renew the ERP System Landscape. For example, YCorp was looking for an option to fix the fragmentation and complexity caused by multiple logistics systems by introducing yet another system to integrate them.

4.4 Evaluation

"When investing tens of millions of euros [to the system development] I think it is weird if there is no funding for an extra validation round in the

beginning. […] To implementing one part of the system fast […] to ensure that, when talking about new technologies, will they work at all? –Middleware Provider, Manager

An evaluation process for investigating the feasibility of integration initiatives was identified from the data. The interviewee (Y4) stated that before taking the business initiatives further, an architectural evaluation is performed. However, this kind of evaluation was not always performed. For example, YCorp encountered difficulties due to insufficient piloting and validation when choosing the integration technologies to be used in Custom ERP. The non-scalable architectural design led to a major architectural redesign. According to the consultants, the selected technologies were not analysed comprehensively enough, and scalability issues were 'outsourced' to a technology provider. As further stated by (E2), companies *"should not believe the sales speeches, but instead have sangfroid to test the options"*. Furthermore, YCorp faced difficulties in identifying the integration needs and technical requirements. It was pointed out by (Y1) that a critical issue causing resourcing problems was to either underestimating the integration needs or not to establish a separate project for integration. Moreover, some of the integration projects were 'disguised' as other projects and carried out rapidly, until to a point where it was realized that interconnections to other systems were needed. Similarly, the need for testing was often underestimated or sometimes even omitted. This caused project management problems and resourcing issues:

> *"The biggest challenge is to evaluate the size and complexity of the project. I state that the significance of integration is mainly underestimated […] it is just stated that the technology and tools are clear, this cannot be a big issue. […] but then it is not noted that it requires a lot of testing […] the resources that are then used, they are not specifically allocated for the project but are internal resources instead. But then, what are their skills and motivation, and how is it documented that something has been tested?" –YCorp, Business-IT negotiator*

The evaluation process had connections to governance and housekeeping. On the one hand, YCorp had a hard time defining an organizational integration strategy. The custom ERP was used by three differently operating business units, each of which had their own development needs regarding Custom ERP. Collaboration between the business units, which would have been necessary for determining the direction and the area of emphasis in the development, was not sufficient. This led to coordination issues, and eventually, wasted resources due to duplicate development efforts. This way, the benefits for the whole organizations were not always emphasized in integration initiatives, but the benefits of individual business units were preferred instead. On the other hand, lack of detailed architectural descriptions hindered and internal cooperation hindered the identification of integration requirements. The company had only a high-level architectural description of systems and technologies and a dedicated team responsible for maintaining this description. This description was only used as guidance to ensure that the technologies of the new solutions should be compatible with the existing technologies. There were no systematic means to evaluate the integration needs in early phases of development, leading to situations in which they were discovered in later phases of development.

4.5 Summary of the Integration Process

Based on the data analysis, we could distinguish four sub-processes of integration: Integration Evaluation (IE), Integration Realization (IR), Integration Governance (IG), and Integration Housekeeping (IH). In addition, the relationships between these processes were revealed. Dedicated actors need to take responsibility of Integration Governance, Integration Realization and Integration Housekeeping while Integration Evaluation requires collaboration between all the actors of every other sub-process.

Integration Realization is the process during which the business requirements are transformed into new capabilities and features in ERP System Landscape, as a result of system development and integration. The vendor had a key role in realization. Initially, a close relationship between YCorp and Vendor drifted apart, slowing down the cycle of realization of new features. Integration Governance is needed to align the integration efforts in the company with organizational strategies. This process should establish the high-level integration and standardization needs of the organization. YCorp attempted to govern its integration efforts by creating ERP templates and roadmaps for the system, but struggled in reaching a consensus on the scope and the future direction of Custom ERP. By not following the organizational strategies for integration, as for example happened in the merger explained in Section 4.3, the complexity of ERP System Landscape increased. Integration Governance is critical activity to avoid the increased fragmentation and complexity of the ERP System Landscape. The purpose of Integration Housekeeping is to facilitate integration

efforts. This is can be done with assets such as standards, technical upgrades and architectural descriptions of ERP System Landscape. YCorp did not have a detailed architectural description, which led to duplicate development initiatives and undiscovered integration requirements. Both Integration Governance and Integration Housekeeping processes are periodically needed to be executed because, for example, strategic and standardization needs must be constantly monitored and adjusted with the organization.

Finally, we identified that Integration Evaluation (IE) is a critical process to evaluate the needs to find out whether an integration realization project should be initiated. Before establishing either large or small scale integration projects, an evaluation of feasibility of the initiative should be conducted. This includes finding out the business and technical requirements for integration, the needed resources and constraints. For instance, interconnections to other systems and the needs for testing need to be clarified. Assets created by Integration Housekeeping and Integration Governance processes are needed in Integration Evaluation. For example, unlike it was in YCorp, organizational ERP strategy should be applied by the possible new organizations joining the company. By having an architectural description of ERP System Landscape (an asset created during Integration Housekeeping) would enable the better control of integration efforts. Evaluation should include piloting of new technologies that are needed. This was not done in YCorp when choosing the base technologies for the Custom ERP. Integration Evaluation is a critical process to be executed to avoid the pitfalls of integration. If the integration initiative seems to be unfeasible, the initiative should be abandoned. This means that the Integration Evaluation may also lead to a disqualification of an integration initiative.

5 DISCUSSION

Already 15 years ago, it has been suggested that that attempts to manage the arrays of enterprise information systems or infrastructures is not often successful because of constant *surprises and side effects* that cause the infrastructure to *drift* (Ciborra 2001). We state that understanding better the integration process can partly reduce the drift and undesired side effects. The integration process described in this paper complements the Enterprise Integration Method (EIM) proposed by (Lam and Shankararaman 2004). The EIM process starts from the assumption that a business case has been already accepted by the top management. We state that the evaluation of feasibility of integration initiatives is also a critical part in the process. Even when there is a business justification for the project, the array of systems can evolve in an undesired direction as it happened in YCorp. The main difference between our process and EIM is the separation of governance and housekeeping processes from the integration realization process. EIM mostly focuses on the latter, describing in more detail how integration is carried out on the technical level. Unlike EIM, our process takes a long-term view on integration and emphasizes the continuous management of the systems landscape.

Our study has its limitations. The current process stays at a very high level without describing detailed roles, activities involved or steps to carry out the sub-processes. This will be our task in the future, as we intent to refine the integration process in other contexts. As integration is a collaborative effort conducted with different organizations and multiple actors, different roles need to be included when refining the process. Our current dataset is limited in this sense, focusing only on the client organization on the second interview round when dealing with integration and enterprise architecture issues. The future research could also take an action design research approach in which the process is refined with cooperation with the companies

In the future, we will refine the process further. The detailed identification of actors, activities and assets of the processes by utilizing other case networks of organizations is our intention. In addition, it is interesting to see how the decisions to establish projects are made – are they triggered by strategic, business or technical needs. Similarly, investigating how coordination of the sub-processes (governance, realization and housekeeping) in the evaluation phase is worth of more thorough research. Furthermore, it is necessary to investigate, how different processes are executed after the requirements are derived and how the processes interrelate during development. Our model is generic, but helps practitioners when tackling with integration issues in organizations, especially in complex environments. The integration process described in this paper will help managers to re-engineer their current processes.

6 CONCLUSIONS

Integration is a crucial activity as the enterprise systems built in different times for different purposes are taken beyond their originally intended usage scenarios. Additionally, new service innovations need to be constantly created by integrating the resources provided by the existing landscape of information systems in the company. This study took

a Grounded Theory approach to construct a process to manage the complexity of enterprise systems integration. The process was constructed by analysing the data collected from a large manufacturing enterprise. The process links together the four aspects (sub-processes) of integration. Dedicated actors need to take responsibility of governance, realization and housekeeping, while evaluation requires collaboration between all the actors of each sub-process. Integration Governance aims at maintaining and updating the high-level strategy that exposes the integration needs of the organization. Integration Realization is a collaborative process, during which the needs are realized to the landscape of information systems as features. During Integration Housekeeping, the ERP System Landscape is standardized and maintained technically. In addition, a detailed architectural description is formed to facilitate the integration efforts. Integration Evaluation needs inputs from both governance and housekeeping processes to properly identify the integration needs and requirements. The integration process described in this paper can be used by practitioners to align their operations and to avoid pitfalls in enterprise systems integration.

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