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European Conference on Information Systems (ECIS)

5-15-2012

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Abstract

This paper explores the nature of complexity in Supply Chain Management (SCM) projects. We find three aspects to be critical in SCM projects: SCM business processes, information systems, and organizations (internal and external). We also argue that in essence, SCM projects are complex, demonstrating structural complexity, uncertainty, and interdependence between elements, all in a unique context. With this analysis in mind, we look at how established project management methodologies are suited to manage SCM projects. Correspondingly, we investigate the nature of agile project management methods and look at whether these are suitable in an SCM context. Secondary data on previous large-scale SCM projects are used to illustrate the nature of complexity in these projects and whether this could have had an effect on the outcome of the project.

Keywords: Supply Chain Management, Project Management, Complexity, Risk Management, Agile Project Management.

1 Introduction

Many large-scale supply chain management (SCM) improvement efforts fail in reaching goals within the defined limits of scope, budget and time. This paper theorises on one possible, widespread reason for SCM project failure: the selection of the wrong project management methodology. To analyze this, we will explore the nature of SCM projects and establish what types of complexities are associated with these. With these characteristics, we will look at what type of project methodology is suited to manage SCM projects. For the purpose of this paper, we will focus on manufacturing supply chains; even though many principles can certainly be applied in service supply chain, these are not directly investigated. Furthermore, our focus is on what we call “large-scale” SCM projects. These projects are typically in large organizations (+1000 employees) and cover many different parties in the supply chain.

A search for the terms ‘logistics’ or ‘supply chain management’ and ‘project management’ in major databases reveals very few results that focus specifically on this problem. Ayer (2009) dedicates his book “Supply Chain Project Management” to this particular issue and Krajewski et al. (2010) dedicate a chapter to project management in their book “Operations Management”. While these address the challenge of project management in an SCM context, they do not question the suitability of particular methods in this context. We wish to address this gap in research.

Mentzer et al. (2001) define a supply chain (SC) as “a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer”. Common for many definitions of supply chain *management* is that they stress the need to integrate business processes across company boundaries to generate value for all parties in the supply chain (Lambert et al., 1998; Dam Jespersen and Skjoett Larsen, 2005). Given the definitions above, a few things become important: the need to manage business processes and related data, as well as the need for integration with supply chain partners, all in an effort to ensure timely and cost-efficient delivery of a product to a customer.

This brings us to the question of what constitutes a typical SCM project. Business processes are involved, and as we discuss processes directly catering for customer needs (one of the main goals for the enterprise), this usually covers a large part of the company. Secondly, effective SCM would not be possible without a significant level of IT support to orchestrate logistics and to communicate with supply chain partners (Auramo et al., 2009). This can range from simple solutions in a spreadsheet, printed out and faxed to a supplier, to highly sophisticated enterprise resource planning (ERP) systems combined with automated system-to-system (S2S) solutions. In addition to internal complexities of SCM business processes and IT solutions, there is an external component to be managed. Quite often we see one focal company in the supply chain leading the supply chain development activities (Belaya and Hanf, 2009). This company leads the project, and despite often being able to exercise authority in the supply chain, it is still dependent on the capabilities of partners. For example, if a customer is unable to give any reliable insight to future demands or a supplier does not have means of communicating shipment data or supply availability (either due to missing IT support or lack of business processes), key data is missing for the focal company. Internal supply chain improvement efforts often turn into exercises where also partner organizations are trained to perform better. In addition to customers and suppliers, other partners in the supply chain can also be heavily involved in the effort, such as outsourcing partners and 3rd party logistics service providers (LSPs).

The topic at hand presents us with multiple dimensions of interest in the information systems (IS) domain: the combination of IT and business processes, the organizational dimension (internal and external), and project management practises to steer these efforts. The rest of this paper will examine SCM projects further from a project management perspective in an exploratory manner. In Sections 2 and 3, we present the characteristics of such projects and challenges in them based on existing literature. In a similar manner, we use literature to portray project management approaches in order to investigate the conceptual fit between these and SCM projects (Sections 4 and 5). Section 6 will look at secondary data of large-scale SCM projects to provide examples of the typical nature of these projects. The final section of the paper consists of concluding remarks and further research opportunities.

2 The nature of SCM projects

Bermudez (2002) states that supply chain business processes are difficult to comprehend as they cross many organizational silos and because few companies have multi-department supply chain processes defined on a corporate level. While these separate organizations in the company certainly might co-operate, there is still a lack of one entity overlooking all processes and data associated with supply chain operations unless you move high up in the corporate hierarchy. Mentzer et al. (2008, p. 40) conclude that typical SCM projects "should be assigned to a cross-functional, firm-level manager (such as the COO)" (COO, Chief Operating Officer). Hence, while SCM improvement projects often strive towards increased visibility and co-operation this is difficult to achieve as many business processes in many (quite often very independent) business units need to be aligned. While a person such as the COO can act as a sponsor for the SCM project, this still leaves the operative decision making to each business unit separately. Our focus on "large-scale" SCM projects also implies that we typically see a geographical spread of the organizations involved in the project. This refers to both the internal organization and other (external) parties in the supply chain. Independent business units, geographical spread and lack of an appropriate overview of supply chain processes pose challenges for improving visibility and cooperation.

Information systems have been used to overcome these challenges. At the same time, neither the IS employed nor the IS projects are simple. Thus SCM projects will be challenging also from an information systems perspective. Hsu et al. (2011) argue that IS projects can be characterized as "uniquely complex" as they need to incorporate end-users, developers, and specialists from multiple domains. Bermudez (2002) refers to a study by AMR research saying that less than 15 percent of manufacturing companies have successfully implemented the information systems they have purchased from leading SC software providers. While this figure has hopefully risen since 2002, it still adds weight to the fact that the IS dimension of SCM is difficult to manage. Table 1 shows a comprehensive framework of information systems to support SCM (Nyman, 2012), providing an idea of the vast complexity of managing the supply chain from an IT perspective. Data management in this context refers to ways of handling and analysing data for decision support in SCM. Typical solutions in this category are materials requirement planning (MRP), enterprise resource planning (ERP), and advance planning and scheduling (APS) systems. Data exchange solutions help companies communicate with partners in the supply chain. These range from relatively simple solutions like e-mail, to Electronic Data Interchange (EDI) or XML-based frameworks like RosettaNet that provide fully automated data exchange. The third category analysed was data tracking, again ranging from simple solutions like bar-codes to more advanced solutions like Radio Frequency Identification (RFID) tags.

Solution Maturity	Data Management	Data Exchange	Data Tracking
Low	MRP	Fax	Manual Inspection
⇩	MRP II	eMail, Partner Portals	Barcodes
	ERP	EDI	.
High	APS	RosettaNet	RFID

Table 1. SCM information systems or equivalent (Nyman, 2012)

Nyman's (2012) conclusions indicate that the complexity of implementation increases with more mature IT solutions. This is due to the more "demanding nature" of the IT solutions themselves but also because of the dependency between the proposed categories. For example, mature solutions in data tracking will require mature data management solutions. As previously noted, there is also a clear link to the business process dimension. Auramo et al. (2005) conclude that to achieve strategic benefits for supply chain operations, "the use of IT has to be coupled with process redesign". Similarly, Sridharan et al. (2005) put forward that the choice of technology is a secondary concern, understanding business processes and their dependencies comes first. Thus interdependencies between various information technologies and processes increase complexity in SCM.

We have identified three distinct areas that demand attention in SCM projects. These are internal and external organizations, SCM business processes, and information systems. It is important to recognize that these are not stand-alone elements in the SCM "landscape", there are no SCM business processes without organizational alignment (internal and external) and vice versa, nor are there any well-functioning SCM IT solutions without business processes and vice versa. These are thus key interdependent factors influencing the nature of the SCM projects.

3 The nature of complex projects

According to Williams (2005), structural complexity and uncertainty are the dominant factors in studies on project complexity. Structural complexity refers to the size and number of elements in the project where elements are the particular organizations (internal or external) taking part in the project, or the different tasks needed to be done in the project. The high number of organizations involved in the SCM project will contribute to structural complexity. The number of tasks in the project can of course also be high. Uncertainty, on the other hand, refers to what the precise goals of the project should be or what the means of achieving these goals are (Williams, 2005). Few projects are started without a goal, but the abstraction level in the project can be relatively high. For example, an SCM project might have as a goal to improve on-time delivery. This, however, is a high-level target that can be approached in many different ways: through faster production, optimized logistics routes, or inventory postponement, to mention a few. Once the way of achieving the target is selected, it is fair to argue that there are, for example, many ways of optimizing logistics routes. Thus project uncertainty in this context is a "double-barrelled" concept that can refer to either the lack of a specific vision, the lack of a specific path, or both.

Vidal and Marle (2008) look at this in a similar way: project size, variety, interdependence, and context contribute to project complexity. From our point of view, the interdependence and context are of particular interest. Interdependence is high when different parts of the project have a big influence on other parts of the project. Furthermore, context refers to the fact that something done in a previous project might not necessarily work in new surroundings. Similar conclusions are mentioned by Söderlund (2004) who stresses the need for understanding the contextual dimension in projects and the fundamental differences across projects. Supply chains tend to demonstrate a high dependency between elements (be it processes or organizations) and they tend to be unique in the sense that no particular supply chain is exactly the same as any other. After all, even if two companies manufacture exactly the same product, they most probably use slightly different suppliers or produce their goods in slightly different locations. Another study mentions many of the same factors as above but also adds "form of contract" to the list (Müller and Turner, 2007). Given the fact that many companies are involved in SCM projects (ranging from software providers, suppliers, outsourcing partners, to LSPs), the contractual dimension of the project cannot be overlooked. Antvik and Sjöholm (2007, p. 14) list, among other things, the number of interfaces, organizational layers, geographic locations and interested parties as key factors contributing to project complexity. If the number of any of these factors is high, project complexity is correspondingly high. These conclusions are very similar to that of Vidal and Marle (2008).

We can also examine this from the opposite side; what constitutes a non-complex project? Engineering and military endeavours have been credited with exemplifying the origins of project management (Bailey, 2005; Vidal and Marle, 2008). These types of organizations and projects are often characterized by tangible products, straightforward command and control structures and management hierarchy, a good balance between authority and responsibility, and objectives that are well understood by most stakeholders (Bourne and Walker, 2005). Looking at this from an SCM perspective, the large number of internal and external stakeholders alone creates challenges in terms of “straightforward command and control structures” and “objectives that are well understood by most stakeholders.”

Looking at the above, typical large-scale SCM projects often demonstrate structural complexity, uncertainty, and interdependence between elements, all in a unique context. While form of contract also contributes to complexity, we have opted to see that as a particular form of structural complexity and interdependence. All-in-all, SCM projects are complex.

4 SCM projects and traditional project management methodologies

For the purpose of this article, the standards promoted by organizations such as the US-based Project Management Institute and the United Kingdom's Association for Project Management are deemed as “established” or “traditional” project management. A vital part of these standards is risk management (Kutsch and Hall, 2009). Risk management processes have been introduced to either prevent or contain events pertaining to uncertainty (Geraldi et al., 2010). Koskela and Howell (2002) go further in saying that traditional project management methodologies in fact *assume* low uncertainty. That is, risk management is actually a tool to achieve the underlying assumption of the methodology.

Geraldi et al. (2010) have been looking at what constitutes a successful response to unexpected (or undesired) events. So-called unknown-unknowns (events that were impossible to foresee) are difficult or impossible to handle with risk management processes, yet these are frequently occurring in projects. We argue that complex projects, like SCM projects, are more likely to demonstrate unknown-unknowns because of their “chaotic” nature stemming from all the factors contributing to project complexity. Instead of a formal risk management process, “soft skills” and competence in the project team are indicated as suitable response mechanisms. Furthermore, a high degree of freedom, communication with stakeholders, and behaviour (self-awareness, ability to handle stress) are some of the appropriate measures to counter the negative effects of uncertainty. The alternative risk management put forward by Geraldi et al. (2010) show a striking similarity to what Martins and Terblanche (2003) consider as organizational traits that resonate with innovation. For example, freedom to make decisions, empowerment, mistake handling, risk taking and open communication are indicated as influencing innovation (Martins and Terblance, 2003). The relationship between handling uncertainty in projects and the need for innovation requires further attention but the same organizational traits seem to be needed for both.

In other words, risk management processes are a requirement for traditional project management (as the methodology assumes a low degree of uncertainty). However, SCM projects seem to resonate poorly with traditional risk management due to the inherent project complexity. Other measures are needed.

Traditional project management methodologies also stress the need for planning in advance, even so that planning ahead becomes the essential management tool (Williams, 2005). All possible events should be anticipated at the time of planning (Pich et al., 2002). Predetermined actions and activities work well as long as the assumptions, goals, and overall environment do not change from the time of planning to the time of execution (or go-live of the project). Where conditions are changing and uncertainty prevails, there is, however, increased criticism and awareness that traditional project management methodologies relying on proactive planning do not necessarily offer the best fit for purpose (Geraldi, 2008). From what we have established so far, this might well be the case for large-scale SCM projects.

The so-called unknown-unknowns are one of the most difficult “types” of uncertainty in projects. Traditional risk management processes struggle with these events, and they are nearly impossible to plan for in advance. There is however a paradox in the fact that management tends to respond to high uncertainty with more control. In other words, more planning and stricter risk management is put in place where entirely other measures are needed (Bourne and Walker, 2005). This can be labelled as a "bureaucratization of chaos" (Geraldi, 2008). Clearly, there is a need for a different approach to uncertainty in SCM projects.

When looking at complex SCM projects, it seems the traditional approach of planning ahead and management of risks should be replaced by more communication, competence in SCM processes, information systems and methods, and freedom to innovate (Geraldi et al., 2010; Martins and Terblanche, 2003). When looking at the relationship between potential for innovation and traditional project management methodologies, there are several studies indicating that the opposite is true. Due to their deterministic nature, they actually act to stifle innovation (Bryde, 2003; Keegan and Turner, 2002). Thinking about this from a purely practical point of view this becomes clear. If you plan in advance who is doing what and when, there is little room for the flexibility and freedom needed in large-scale SCM projects.

In summary, we have established the nature of typical SCM projects and concluded that these type of efforts need a high degree of freedom and SCM competence, combined with a host of "soft skills" in the project team. Traditional plan-ahead project management techniques and risk management processes such as the Project Management Institute's PMBoK (PMI, 2008) might not offer the necessary conditions for these endeavours to succeed. Probing for alternative, newer modes of project management, eyes turn to agile approaches that have been proposed to conform to the uncertainty and complexity of the project world (Williams, 2005). The following will examine whether these methods provide a better fit-for purpose in large-scale SCM improvement efforts.

5 SCM projects and agile project management methodologies

In the domain of software development, a group of methods jointly called agile methods have gained popularity as many have considered them to better suit changing business and technology worlds. The core of agility is in adaptability to changes and the reduction of the cost associated with these changes. This is done by ongoing planning throughout the software development process and by splitting the process into short iterations. Agility also demonstrates a shift in principles, such as focusing on people instead of on a process (Cockburn and Highsmith, 2001).

In search for the characteristics of agility, Conboy (2009) used the concepts of flexibility and leanness to probe literature on management, manufacturing, and organizational behaviour. He saw the essence of agility not only in rapidly adapting to change but also creating it and learning from it "while contributing to perceived customer value" (Conboy, 2009, p. 340). This interest in and the use of agility in systems development reflects a similar trend in other areas: a shift from a mechanistic to a dynamic approach has been made also in organizational management. The environment is seen as unpredictable, problems are seen as wicked, the goal of problem solving is responsiveness, and learning has become generative (Nerur and Balijepally, 2007). This has also affected the view on managing projects. For example, Augustine et al. (2005) suggested an agile project management method based on projects as complex adaptive systems (nonlinear, open and dynamic, and interacting with their environment through uncontrollable inputs and outputs). In this view, project management consists only of some simple rules, such as small organic teams, guiding vision, free and open access to information, that keep chaos away. Such an approach based on principles rather than control by step-by-step guidelines is descriptive for the agile mindset.

Although some of the more specific agile methods proposed in systems development (such as Feature-Driven Development and Scrum) already cover project management aspects, these methods concentrate on the challenges of their domain, leaving many questions critical to other project management needs unanswered (Abrahamsson et al., 2003). More recently, also general practically oriented descriptions to agile project management have been provided (such as Wysocki, 2009, and Chin, 2004). To present agile project management as opposed to traditional, we refer to Wysocki (2009) who illustrates both agile and traditional approaches as project lifecycle models that include the five basic project management phases (that Wysocki refers to as scope, plan, launch, monitor and control, and close). However, where traditional approaches proceed from start to finish, repeating the phases only once during a project, agile approaches make projects into a series of iterations, each of which containing all of the phases – possibly with the exception of scope. In the agile life cycle models, the iterations are not predetermined as in the traditional ones: changes are expected. Also, the client (internal or external) provides feedback at the end of each iteration. This feedback is input for the next iteration, providing opportunities for learning during the project. In a way, the iterations transform a project from a full-body cast with no flexibility into one with more functional joints that enable greater flexibility – and agility.

In line with Söderlund (2004), also Wysocki (2009) is an advocate of using a project management approach that is based on the characteristics of the project and its context. The essence of his reasoning is that uncertainty of the project goal and solution together form the basis for choosing the project management approach. He prescribes traditional approaches for projects where both the goal and the solution are clear, but SCM projects include uncertainties. Some of the uncertainties are related to the solution. As for the goal, SCM projects vary: SCM projects do have a stated goal even though its formulation may be abstract. An abstract goal that does not translate into detailed subgoals is, in fact, uncertain. For projects with a clear goal and an uncertain solution, Wysocki (2009) recommends agile project management whereas for projects where both the goal and the solution are highly uncertain, an extreme approach is suitable. Although these approaches have some common traits, the frequencies are different, as well as the size, inputs required, and outputs produced for iterations or salience of learning and discovery. For example, in the models Wysocki labels as "agile", the scope of an iteration is not changed, but in the so-called "extreme" approaches each iteration starts from the beginning with (re-)defining the scope. However, it is the general idea that is of importance; where Wysocki (2009) differentiates between agile and extreme project life cycles, Chin (2004) states that agile project management focuses more on execution than on planning (decisions are supported during project execution instead of making them all at the beginning of the project).

The whole idea of agile project management appears to stem from similar criticism towards traditional project management methods as we have presented in our analysis of SCM projects. For example, Chin (2004) describes the unsuitability of traditional project management methods to environments that "exhibit internal and/or external uncertainty, may require some unique expertise, and possess a high level of urgency" (p. 3), similar to the descriptions concerning the challenges of SCM projects. Even though a number of variations on "non-traditional" project management (agile or extreme) can be identified – as the essence of agility is in flexibility and adaptability – the same origins result in the same "non-traditional" core traits: reliance on people (and their competence), customer involvement, communication, prioritizing, frequent iterations to allow for change, and collaboration rather than control.

Some of these characteristics would seem to comply well with the demands of SCM projects. Allowing for changes provides for a higher degree of freedom in the face of uncertainty, and a greater involvement of the client increases communication that can alleviate the complications raised by complexity. Additionally, the learning opportunities give room for innovation. Also, agility relies on the competence of project members, instead of the bureaucratic approach that was deemed harmful for the success of SCM projects. Further, the improvisational nature of agility provides adaptable patterns (Leybourne, 2009) that can speed up the process of getting through the complexities of project life (instead of working in a total ad hoc mode). Relating Leybourne's argument to the idea of making decisions during execution, the improvisational approach supported by patterns is an approach to decision-making that sits well with the project management needs for complex SCM projects. A problem with an overall agile approach in SCM projects may be the interdependencies so typical for SCM. Agility strives for enabling flexibility through incremental work and minimal advance planning while the existence of many interdependent parts increases the pressure to plan. Although increased control may not be the way to cope with the intertwined SCM projects, the improvisational nature of a more agile mode may not be enough even if the patterns provided by the method can help in discerning interdependencies.

6 A look at previous large-scale SCM improvement efforts

As a first continuation on this conceptual exercise, we looked into existing analyses of some problematic SCM projects in order to see if the grains of our reasoning could be found in past projects. In this paper, three such projects are used as examples. The illustration is based solely on studies on large-scale SCM improvement efforts, published previously by other researchers. The examples have been chosen based on the availability of documentation as well as how known they are. Two of the cases, Nike and Hershey, are quite (in)famous and have gotten a lot of attention in both popular and academic press (e.g., Buxbaum, 2001; Sridharan et al., 2005). The third one, "Global beverages UK", has been described in conference proceedings (Brown, 2011).

These projects have experienced major challenges. To exemplify traits, we illustrate the nature and the critical aspects of SCM projects in terms of SCM business processes, information systems, and organizations. Two of the characteristics of project complexity, structural complexity and interdependence, manifest themselves through the three critical aspects of SCM projects. In addition, uncertainty (also an element of project complexity) is exhibited in the descriptions of scope in these examples, bringing together any possible lack of vision and/or path. We did not focus on the context aspect of project complexity in the illustration as the context was stated per definition to be unique in SCM projects. A summary is presented in Table 2. Naturally, we cannot fully isolate the characteristics of SCM projects and the project complexities from the cases. Other interpretations for the reasons behind the failure in these projects are possible, if not likely, and it is not our purpose here to demonstrate causality but to exemplify traits.

	Lack of scope	**Organizational complexity**	**SCM business process complexity**	**IS complexity**
Global Bev. UK	Yes	Yes	Yes	-
Nike and i2	-	-	Yes	Yes
Hershey	-	Yes	Yes	Yes

Table 2. Summary of large-scale SCM project factors

6.1 Global beverages UK

"Global beverages UK" is a pseudonym for a UK subsidiary of a worldwide large alcoholic beverage manufacturer. The subsidiary belongs to the European business unit. The analysed case looks at the "social and political" implications of a project intended to reform the forecasting process in the subsidiary through the implementation of a new information system (Brown, 2011).

The analysis presented by Brown (2011) gives us insights to the complexity characteristics of this particular case, in particular related to organizations and business processes. There is also uncertainty regarding the scope as there does not seem to be a clear justification as to why a certain mode of working is to be implemented. Although the ultimate outcome and result of the project remains somewhat ambiguously described in Brown's analysis (the project at Global Beverages UK was still in progress), it is easy to conclude that major challenges have presented themselves. Insights to some of these challenges are illustrated and this gives us the opportunity to consider alternative discourses to the approach taken by Global Beverages UK and its European parent company.

The UK subsidiary has previously been relatively independent, now there is strive for more harmonized forecasting processes on a European level. Overlapping functions should be eliminated. The overall, high-level focus in the European business unit is on cost reduction and the forecasting process is deemed to have a direct impact on expenditure (or more precisely the accuracy level of forecasts and any possible duplicate activities). On management level, there is reliance on statistical forecasting methods and it is believed that these will improve the process. Based on this, the SAP APO (Advanced Planner and Optimizer) solution has been selected as the new IT solution to replace a legacy system. With the new system (based on statistical forecasting methods), the business process, previously also relying on a qualitative dimension, should be adapted accordingly. There seems to be a level of uncertainty regarding the detailed scope of the project as well as the methods to achieve the objective. Despite the high-level targets being clear (cost reduction through improved forecast accuracy and a standardized solution), there is a mismatch to lower level objectives on how to re-design a largely qualitative process into a quantitative one. The somewhat naive assumption that a new information system will bring about (or force) changes in the business processes is proven to be incorrect: frustrated end-users end up working with a new unregulated process that somehow combines the old "judgement" process with the new statistical one (with, according to Brown, "unknown consequences"). The article also raises the question whether statistical methods really support the higher level objective of improved forecasting accuracy.

The forecasting department in the subsidiary retain that market conditions (in the UK) are such that a particular (qualitative) process is needed for forecasting. Top management blames problems with implementing the new statistical forecasting process on self-created particularities. Whether correct or not, this also illustrates the organizational complexities associated with streamlining operations across different divisions in a company (serving markets with different needs). Also, a top management driven, forced implementation of a new information system to re-design a vital SCM process is going to be difficult. The freedom to innovate could have been a critical step in achieving a process that fills the needs of various stakeholders. All in all, organizational complexities, business process modelling and uncertainty regarding detailed scope and tasks (how to redesign operations) may not have been properly handled in the project.

6.2 Nike and i2

Nike, the international apparel manufacturer, started a major SCM project in the late nineties. The original budget for the effort was $400 million, but as often with these types of efforts, the cost estimates did not hold and with the final stages of the project re-scheduled to 2006 (three years after the originally estimated completion of the transformation effort), the costs estimates were at half a billion USD (Koch, 2004). The SCM software bought from i2 technologies and its implementation (which was a small part of the total SCM project that also included ERP and Customer Relationship Management, CRM, components) is the focus of this analysis. With revenues and earnings soaring in late 2000, Nike reaffirmed targets for the full fiscal year. It then came as a shock to investors when Nike had to revise projections a few months later. The reason for this was significant inventory shortages and inventory excess at the same time (for different products). Nike put the blame on a failed implementation of i2 software (and i2 blamed Nike for not following proper implementation procedure), but the reality is (again) slightly more complex (Sridharan et al., 2005; Konicki, 2001a; Konicki, 2001b).

In terms of clarity of scope and goal of the project, there seems to have been a clear vision at Nike. Koch (2004) reports that there was a clear strategy to integrate ERP, CRM and APS systems across geographical areas and that despite the difficulties faced, this strategy was maintained (and ultimately apparently achieved). Also, clear targets were set in terms of manufacturing cycle times and other supply chain related metrics. This was to be achieved through the reduction of fragmentation of for example order management systems.

So what went wrong at Nike? There are several indications of lack of proper business process modelling and matching of this against IS capability (Wilson, 2001; Koch, 2004). Nike had a large number of products and variants, as well as data on these in several legacy systems, adding to the complexity of the task. Core business processes, in this case demand management and factory production steering, needed to be modelled and harmonized. The choice of the SCM software did not correspond to the needs of the business and later on, when a clearer picture of what the desired business process should look like, the role of the i2 software was revised and certain functionality was moved over to the ERP solution. If the business process – that today relies on both predictive algorithms and data on orders and invoices – would have been properly designed from the start, many problems in the project might have been avoided.

6.3 Hershey

As a result of product line expansions and acquisitions, Hershey Foods Corporation had ended up offering over 3,300 different confectionery products, which their customers (retailers) wished to be delivered in increasingly sophisticated batches. In order to automate shipping and logistics functions between the retailers and the company's 25 plants worldwide, a $112 million supply chain system project, described by Lovata (2002) and Sridharan et al. (2005), had been undertaken towards the end of the 1990's. While the project included software from not one but three different vendors (ERP from SAP AG, CRM from Siebel Systems, and a logistics package from Manugistics), also hardware installations were to be made (including the mainframe, networks hubs, servers, 5,000 workstations, and telecommunications installations), guaranteeing nothing but a complex system implementation effort. The company was also blamed for ignoring or downplaying the importance of the interdependencies related to the tight system-business process link and to the complexity of the company's organizational structure. The new system concerned the work of 1,200 persons in sales and also other departments (in total, the company had 14,000 employees), covering the whole sales process from order placement to final delivery: accounting, production scheduling, purchasing raw materials, and placing products in trucks, for example (Lovata, 2002; Sridharan et al., 2005). The vast amount of transactions and the related business processes were not accounted for properly.

The system was implemented partly in a phased manner but much of it can be characterized as "big bang". The first implementation took place in April 1998 and the last modules went live in July 1999 (Lovata, 2002). According to Sridharan et al. (2005), implementing the whole system at once instead of a staged approach was Hershey's key mistake; also Lovata (2002) criticizes the lead times in the project and the timing of the go-live. By and large, the project had a clear scope that was not changed; it was the schedule that changed.

7 Conclusion

The main focus in this paper has been on looking at the characteristics of SCM projects and to relate project management methodologies to the SCM context. We have established that three dimensions are central for SCM projects: SCM business processes, information systems and organization (both internal and external). We have discussed how these play into the complexity of SCM projects. Criticism is put forward regarding the application of "traditional" plan-ahead methodologies combined with rigorous risk management processes in SCM projects. We argue that by the selecting a wrong methodology, you may stifle innovation and bring about bureaucratization that will have an adverse affect on the outcome. Further, we found agile methods (including extreme project management) to show promise in that the elements of agility allow for the intricacy of SCM projects. We also found that the agile approaches have drawbacks in the SCM context: there are concerns regarding the management of SCM dependencies with an agile project methodology. A principle-based working method may not be enough for managing the interdependencies present in SCM projects. SCM projects are in many ways unique in their complexity – even to a larger degree than IS projects in particular or projects in general. We feel that "traditional" project management offers a poor fit-for-purpose in the SCM context while agile project management approaches cater for the needs of SCM projects better. However, based on the analysis at hand, we cannot deduce how SCM projects are best managed.

The findings of this conceptual study bridge a gap in SCM/project management literature and provide a starting point for tackling a problematic issue. A conclusive answer to the question of how SCM projects exactly should be managed was, however, not provided. Considering the high relevance to practice of the topic, further studies are called for to look into how real-world SCM projects are steered and what constitutes an appropriate approach in terms of project methodology. Additionally, the exact corollaries of the relationship between project methodology and SCM project success demand detailed attention. In order to come closer to a “best” project management approach for SCM projects, interviews are being conducted as an interpretive case study at the time of writing.

Acknowledgements

We gratefully acknowledge the financial support of the Finnish Funding Agency for Technology and Innovation (Tekes) (grant number: 40488/11), as well as the Marcus Wallenberg and Waldemar von Frenckell foundations.

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