



Agility through scenario development and continuous implementation: a global aftermarket logistics case

Magnus Holmqvist¹ and
Kalevi Pessi²

¹Volvo IT, University of Göteborg and Viktoria Institute, Göteborg, Sweden; ²IT-University of Göteborg and Viktoria Institute, Göteborg, Sweden

Correspondence:

Magnus Holmqvist, Volvo IT, University of Göteborg and Viktoria Institute, Hørselgangen 4, Göteborg SE-417 56, Sweden.

Tel: +46 31 32 22733;

Fax: +46 31 77 28963;

E-mail: Magnus.Holmqvist@volvo.com,

www.viktoria.se, www.volvo.com,

www.gu.se, www.ituniv.se

Abstract

This paper examines a business and IS/IT initiative at Volvo that involves managing the development and implementation of an agile aftermarket supply chain. The case is based on Volvo's global initiative to create a platform, Web services, and a Web portal for selling spare parts over the Internet. Creating and integrating a new platform is difficult, and establishing new relations in global aftermarket logistics is even more challenging. Agility relates to an organisation's ability to sense and respond rapidly to unpredictable events in order to satisfy changing customer demands. Volvo's effort illustrates agility as achieved by working continuously with scenario development and keeping implementation projects to a comprehensible size in order to nurture learning. The effort involved direct actions to manage both the technology and the relations among supply chain actors. As this case shows, continuous implementation projects can deliver innovation in new relations and through new channels – particularly if projects address agility from the start.

European Journal of Information Systems (2006) 15, 146–158.

doi:10.1057/palgrave.ejis.3000602

Keywords: IS/IT implementation; scenario development; agility; Web services; supply chain; global aftermarket logistics

Introduction

Agility gives organisations the ability to sense and respond rapidly to unpredictable events and thus satisfy changing customer demands. This capability is critical in today's business world. New technologies and new ways of doing business are constantly introduced to create or alter global marketplace demands. At the same time, organisations have existing investments in both their IS/IT base and established business relations that can neither be ignored nor abandoned. To further complicate the situation, difficulties of technology diffusion contribute to a paradox of trying both to explore and to implement new technology in an unpredictable business context.

In global aftermarket logistics, managers contend with multiple interrelations and significant differences among actors. Both logistics research and IT research address agility (Christopher & Towill, 2000; Agile Manifesto, 2001; Dove, 2001). In the introduction to Business Agility and Information Technology Diffusion, Baskerville, Mathiassen, and Pries-Heje state that: 'In a world in which change and uncertainty drive the needs for business agility, and digital information drives business, agility in IT is critical for business success. We believe it is important to understand how... [agility] ...is multifaceted' (Baskerville *et al.*, 2005, p. 9). Logistics

Received: 18 May 2005

Revised: 19 June 2005

Accepted: 9 January 2006

research suggests that supply chain management requires agile characteristics in order to manage complex situations (Christopher & Towill, 2000).

The research question of this paper concern how organisations can achieve agility in practice. It examines a business and IS/IT initiative at Volvo. The paper's goal is to highlight and enhance the understanding of management issues related to development and implementation in the complex context of global aftermarket logistics. The case illustrates why business-to-business integration requires agility, and how Volvo implemented it within a complex supply chain.

The case is centred on a Volvo initiative to establish a Web portal for selling spare parts over the Internet. The case starts with a scenario development, and then addresses the technology and business issues involved in creating a platform for global aftermarket logistics. We then cover the process of introducing Web services and building new relations through implementation projects. Implementing IT solutions to create net-enabled business is not easy; implementing such solutions globally is even more difficult. This paper shows how Volvo focused on agility by working continuously with scenario development and implementation projects. This process involved direct actions to manage both IS/IT and relations between supply chain actors.

There are few global, comprehensive implementations that include advanced Web services. However, the commercial value and interest in the subject are high. For example, IBM is using one of the implementation projects within this research as a case study for Web services and has presented it in their 'Company of the month' section (IBM, 2004). Although IBM presents project work from only one single implementation, it gives a simplified and commercialised view of the objective, the implementation itself, and (not least) the origin of the overall developments.

The next section offers an overview of related literature, followed by a summary of the research method and an outline of the case context. We then present three specific implementation projects and their relation to enabling agility. Following this, we discuss practical and theoretical considerations, and conclude with comments on IT management and agility as delivered through implementation.

Business agility and IT management

The agility concept was introduced into IS research some years ago (Overby *et al.*, 2005). In times of increasing uncertainty and turbulence in the business environment, we need a concept that extends adaptability and flexibility to include speed and scalability (Baskerville *et al.*, 2005). Outside-in perspectives of agility are '... primarily concerned with the ability of enterprises to cope with unexpected changes, to survive unprecedented threats from the business environment, and to take advantage of changes as opportunities' (Sharifi & Zhang, 2000, p. 496). Yusuf *et al.* (1999, p. 37) present more

of an inside-out perspective: 'Agility is the successful exploration of competitive bases (speed, flexibility, innovation pro-activity, quality, and profitability) through the integration of reconfigurable resources and best practices in a knowledge-rich environment to provide customer-driven products and services in a fast changing market'. Furthermore, some software development approaches emphasise productivity rather than process rigor, and seek to deliver business value quickly in spite of changing user requirements (Fitzgerald & Harnett, 2005).

The agility concept is challenging 'lean' concepts, which have dominated manufacturing and supply chain management for the past several years (Benson *et al.*, 1992; Kidd, 1995; Christopher & Towill, 2000). Research in supply chain management covers both supply and demand concerns (Ericsson, 2003). Aftermarket logistics, with global and time-critical operations that rely on economies of scale, require a sense of the overall direction in order to be optimised. The numerous supply chain actors and the reliance on IS/IT support contribute to a complex scene (Lumsden, 1998).

Researchers have suggested several distinguishing characteristics of the agile supply chain (Christopher & Towill, 2000). First, it should be market sensitive in terms of its ability to read and respond to real demand. Second, it should use IS/IT to share data between customers and suppliers. Shared data between supply chain actors can only be fully leveraged through process integration, which is the third distinguishing characteristic. Finally, a new style of relationship is essential. In the 'extended enterprise' or 'net-enabled business', a confederation of partners with indistinct boundaries is linked together based on increasing trust and commitment. Christopher and Towill argue that in the era of 'network competition', competitive advantage will be achieved through better structuring, co-ordination, and management of relationships with partners, as well as closer and more agile relationships with customers.

A net-enabled business has been defined as an organisation that coordinates its activities and interacts with its stakeholders by exchanging messages over electronic networks (Malone *et al.*, 1987; Rayport & Sviokla, 1995; Görsch & Kühn Pedersen, 2000; Straub & Watson, 2001; Hackbarth & Kettinger, 2004). Such a business uses technology and associated architectures to access customers online and integrate supply chain partners. Christensen *et al.* (2001) present Web services as a loosely coupled architecture for integration, which may provide a natural arena for better understanding agility. Web services can provide solutions to integration, migration, and IT management evolution (Holmqvist & Pessi, 2004). Rogers's diffusion of innovation theory (2003) can nurture an understanding for implementation challenges, especially if it is combined with attention to organisational learning, information infrastructures, and the installed base in large-scale operations (Ciborra & Hanseth, 1998; Finnegan *et al.*, 2003; Changsu & Galliers, 2004; Mustonen-Ollila & Lyytinen, 2004).

IT management has been a key issue for a long time (Zachman, 1978; Brancheau & Werthebe, 1987; Niederman *et al.*, 1991; Gottshalk, 2000). Research range from attempts to create theoretical frameworks (Zachman, 1978; Bowman *et al.*, 1983; Sullivan, 1985; Earl, 1989; van der Poel & van der Waes, 1989) to empirical research on IT management practice (Galliers, 1987; Lederer & Sethi, 1988; Earl, 1993; Flynn & Goleniewska, 1993; Sabherwal, 1999) to the recent debate on strategic alignment (Ciborra, 1997; Avison *et al.*, 2004). Strategic alignment focuses on how to align business strategies and IS/IT strategies, often in order to drive IT effectiveness (Avison *et al.*, 2004). The four fundamental domains of strategic choice related to alignment concern: business strategy, IT strategy, organisational infrastructure and processes, and IT infrastructure and processes (Henderson & Venkatraman, 1993). Critics argue that the dominance of a structured strategy process is questionable in a context where uncertainty and ambiguity predominate and where it is difficult to articulate strategic intent (Ciborra, 1997). In contrast to Ciborra, Salmela *et al.* (2000) assert that even in turbulent environments, comprehensive planning can be beneficial. Turbulence is relative to context and changes over time requiring perspectives of continuous development that are broader and more fundamental than continuous quality improvement (Orlikowski, 1993; Santhanam & Guimaraes, 1995; Tan & Pan, 2003).

IT management researchers have debated the effectiveness of too little or too much strategic IS planning (Premkumar & King, 1992; Sambamurthy *et al.*, 1994; Newkirk *et al.*, 2003). Too little planning results in insufficient understanding of the planning context, while too much planning requires too much time. The agility concept – that is, the ability to detect and seize market opportunities with speed and surprise (Sambamurthy *et al.*, 2003) – can further nurture the discussion as to which approach is more successful: comprehensive planning, or less planning and more action.

In response to increasing uncertainty, interdependence, and complexity in the business environment, some researchers and practitioners have turned to scenario planning approaches. Scenario planning has been seen as an important corporate innovation in

strategic planning (Schoemaker, 1993). Multiple scenario analysis is an effective approach for dealing with the many long-run uncertainties that surround business organisations (Bood & Postma, 1997). Scenarios are narratives of alternative future environments. They are like hypotheses of different futures specifically designed to highlight the risks and opportunities in strategic issues. As Wack (1985, p. 74) states: ‘Scenarios help managers structure uncertainty when (1) they are based on a sound analysis of reality, and (2) they change the decision makers’ assumptions about how the world works and compel them to reorganise their mental models of reality’.

Research method

Progress in IT management research and practice can benefit from ‘...the drawing of specific implications, and the contribution of rich insight’ (Walsham, 1995, p. 79). The characteristics of this Volvo case are relevant in terms of size, scope, and content (Yin, 2003). It is also advantageous in that we had extensive access to the case context, which is crucial when studying complex situations that require comprehensive descriptions. The research has been inspired by collaborative practice research (Mathiassen, 2002) and its inside/outside perspectives. The first author of this paper is employed by and works ‘inside’ Volvo, but is also involved in research at the Viktoria Institute. The second author is a full-time academic researcher and provides ‘outside perspective’, which allows for more critical assessment and reflection. The collaboration included participation during interviews and workshops, as well as reflective discussions and theoretical considerations (for more on this, see Holmqvist *et al.*, 2001, 2003; Holmqvist & Pessi, 2004).

This paper reports on a study of three implementation projects: (1) establishing a platform and approaching truck dealers and end-customers in selected European markets; (2) refinements for key bus customers and stand-alone truck importers; and (3) developments for truck dealers and end-customers in Asia and Eastern Europe. Figure 1 shows the timeline for these implementations. The process of scenario development and details of the implementation projects are further addressed in later sections.

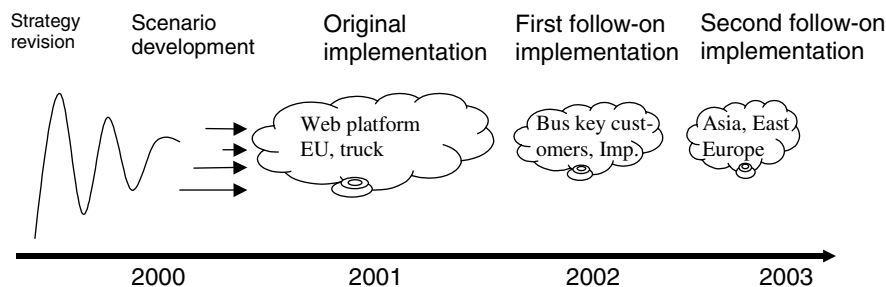


Figure 1 Timeline for implementation projects.

The research methodology is essentially interpretive case study (Walsham, 1995). The context, with an emphasis on the research setting's social and historical background (Klein & Myers, 1999), is described further in Holmqvist & Pessi (2004). We carried out data collection primarily through observations, semi-structured interviews, and workshops with stakeholders, decision-makers, designers/developers, and users. Observations and activities were recorded in a research diary. All implementation projects included interviews with the steering group chairperson, the project sponsor, and the person in charge of the pilot site (that is, the CIO, the aftermarket manager, and the dealer principal or equivalent). Furthermore, we interviewed other representatives in order to include all supply chain actors, gather different perspectives, and enrich understanding. Interviews ranged from 1 to 3 h, and began with open-ended questions to give the respondents a chance to elaborate as much as possible. The questions centred on the project, process, context, relation with other actors, etc., and we took notes throughout. These factors were also important during data analysis and comparisons between sources.

Once projects were deployed, we collected supplementary data via a user satisfaction survey. The first survey occurred 3 months after deployment, followed by new ones every quarter. Each survey consisted of an email with multiple-choice questions about existing services and the option to suggest improvements. The user feedback from each implementation project has been collected and analysed. Analysis and comparison between data sources were facilitated by the extensive context access, which let us reconfirm issues. This both strengthens validity and minimises biases. We used workshops to validate findings and refine our understanding of certain issues, such as 'revisiting' the scenario development during follow-on projects.

Research rigor is a question in any case study; typical critiques target the validity of generalisation or the lack of self-criticism. However, the main objective in this case is to increase the understanding of agility and Web service implementation by providing practical experiences and context characteristics. Given the rigorous process based on collaborative involvement, this paper can contribute to both organisational development and scientific knowledge (Schön, 1983; Applegate, 1999; Braa & Vidgen, 1999; Mathiassen, 2002; Bhattacharjee & Paul, 2004). Critical assessment and awareness of differences in roles during research can be challenging, but the interactions provide learning for both parties.

We now present the case context, current developments and implementations, thereby introducing aspects of agility in terms of both technology and business.

Case context and aftermarket logistics

This case is anchored in the real business context of aftermarket logistics at Volvo, a world-class provider of transport solutions, services, and products. With global presence and sales exceeding 170 billion SEK, Volvo's

more than 85,000 employees focus on business-to-business operations in the areas of trucks, buses, construction equipment, marine and industrial engines, and aero (www.volvo.com).

Logistics is a complex operation characterised not least by intensive information exchange between several stakeholders. Aftermarket logistics with spare-parts distribution at Volvo involves thousands of suppliers and tens of thousands of distribution points to hundreds of thousands of end-customers (truck and vehicle owners and operators). The industrial product families contain more than 100,000 parts, which demand both a long-term service responsibility and complicated super-session chains.

Parts have become increasingly complex, both physically and because they are included in service arrangements and wider business solutions. Complexity has also increased as digital parts have been introduced and increased in volume. Fierce competition in the transport sector induces the business-to-business relations to focus on bottom-line results in the context of diminishing margins. At the same time, exploiting core competencies and finding new business propositions through innovations seem to be even more important.

Agility through implementation projects

The implementation projects we focus on in this case originated in the review and development of an ebusiness strategy initiated in 2000. Existing business-to-business relations were challenged in many ways. Still, in a mature and large-scale industry, things do not change overnight. Overall, business-to-business relations are strongly driven by business considerations rather than consumer behaviour – that is, productivity and bottom-line results matter more than image and appearance. At the turn of the millennium, it was time to change Volvo's Internet solutions from being simply a website that offered product and service information into a tool for conducting business with customers and dealers.

A main driver at this time was the common automotive industry view that the Internet, as a new technology, provided an opportunity to create an efficient channel to reach and conduct business with existing and new customers. Three main issues were identified as incentives for change:

- *Competitors*: Existing truck manufacturers or new entrants to the market might establish superiority on the Web. Special attention was given to the possibility of third-party Internet companies setting up to sell spare parts. This could develop into a potentially significant threat to the company's aftermarket business.
- *Cost reductions*: Internet and ebusiness could increase productivity in existing processes, as well as improve support for customers and especially for dealers. Services for the latter might include online training for mechanics, information and document distribution, spare-part look up, and so on.

- *New services*: The Internet provided an opportunity to broaden and expand the total offering, which might include simplified telematics services, load matching, and vendor-managed spare-parts replenishment.

Overall, Volvo's objective was set on establishing relations with end-customers. This represented a fundamental change, as the existing aftermarket relations were aimed at dealers, who in turn managed the end-customer business. The magnitude of this challenge was a concern, and the company viewed IT as an enabler. While the direction was clear – 'To reach end-customers, establish relations, and create a new channel', according to the Vice President of Volvo Trucks commercial development – it was also unconventional.

Given the widespread awareness and acceptance of uncertainty and unpredictability, it was difficult to set a large scope for the forthcoming change management efforts. In an attempt to avoid escalation effects, the management selected an untraditional approach in the Volvo context. The company decided upon a gradual development approach, which would gain agility through continuous action. This contrasted with the common refrain, 'Large change equals large project'. It can also be seen as an example of how to intentionally deliver agility. Previously, large change efforts at Volvo often resulted in large-scale projects. One example is Volvo's introduction of an electronic spare-parts catalogue for dealers. During the 1990s, relationships with dealers were well established, but it required a large IT effort to create electronic catalogue functionality. Furthermore, getting the solution rolled-out and implemented worldwide was a huge project. This single large development project had difficulties in specifying all functionality; it did not get input on needed context changes during development; and it rarely sought user feedback. It took more than 10 years to reach an acceptable status, incurring significant cost and lead-time over-runs. This paper focuses an initiative to reach end-customers, which is obviously even more challenging since establishing new relationships is a critical factor. Among the key issues here are the possibilities and implications of financial and legal relations (such as terms of payment and contract agreements) as the basis

for trust and collaboration. Establishing a basic comfort zone is important when approaching both IS/IT issues and other business considerations. In this research, we had the opportunity to study an agile approach, enabled through incremental implementations.

Here, we present the implementation projects in separate sections. However, each is still part of an intertwined reality, just as IT and business aspects are closely connected. Regarding agility, one business manager at Volvo offered the following perspective: 'The elephant can not be a ballerina'. Asked to elaborate, he went on to explain that traditional strategic projects usually operate like large elephants to create impact, but then have difficulty finding their balance and fine-tuning during implementation. One of the biggest assumed advantages of keeping the initial implementation project relatively small – and thus more comprehensible – was that project participants would gain considerable knowledge from taking practical actions at an early stage. Striving for a perspicuous project size was a focus throughout the implementation process.

Scenario development

Along with an initial value-chain analysis and assessment of the supply chain actors, a number of hypothetical scenarios developed at Volvo. Four scenarios were developed for the online services project's imminent introduction, as Figure 2 shows (adopted from Holmqvist *et al.*, 2001). The arrows show the physical distribution path based on the order flow, which would be affected through the Web portals with relation to the customer order point. For example, the 'Today scenario' showed that there was no online connection between the dealer and the end-customer workshop, nor was there management of the distribution between the two (therefore the dashed arrow).

Scenario 1: The spare parts are distributed directly from the support warehouse to the end-customer, which is the customer's workshop in all scenarios.

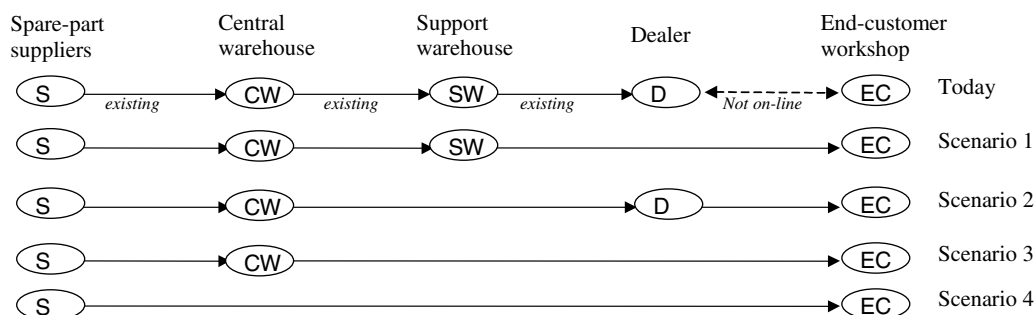


Figure 2 Overview of various scenarios.

Scenario 2: The spare parts are shipped directly from the central warehouse to the dealer and then from the dealer to the end-customer.

Scenario 3: The shipments are sent directly from the central warehouse to the end-customer, bypassing both the support warehouse and the dealer.

Scenario 4: The spare parts are sent directly from the supplier to the end-customer, bypassing all traditional distribution centres.

Vehicle manufacturers like Volvo have traditionally played a major role in the aftermarket supply chain. Their dominating position originates from their control of product development, large purchasing power, command in the distribution network, and influence on dealers and customers. From Volvo’s perspective, the spare-parts manufacturer represents the supplier from which to buy spare parts. Dealers are the actors who buy spare parts from the vehicle manufacturer, and then service vehicles themselves or sell the parts to vehicle owners. Consequently, vehicle manufacturers refer to vehicle owners and operators as customers or even ‘end-customers’ that may have their own workshops.

It was decided that an initial implementation would create a platform with dedicated services for dealers and end-customers. Volvo would provide these services through a secure Internet connection that would support

the customers’ and dealers’ total business cycle. This ‘business life cycle’ ranges from getting information about services and products, to getting online services for vehicle fleet operations and follow-up, to ordering spare parts and accommodating resell (e.g., of an older truck). This paper focuses on the spare-parts services, called *Parts Online*. Figure 3 shows an internal project illustration of the online services that would gradually become available through Web portals as legacy integration proceeds. (A public section of the portal is available at www.volvotrucks.com/onlineservices.)

Original implementation

The scenario development provided the original implementation project with various possibilities. At that time, however, only one scenario had been cleared for implementation. The most feasible option seemed to be to strengthen the dealer–customer relationship by providing an additional channel for spare parts. Volvo would build upon the existing relation with its dealers. By improving the ‘dealer offer’, Volvo would gain in the competitive marketplace. Many dealers appreciated collaboration. A dealer principal at an IS/IT mature workshop offered a characteristic comment: ‘There are, of course, large differences between dealers; still, we do not have the possibility to lead this development on our own’. The implementation reinforced an overall business

Onlineservices

There are cycles of gradual portal integration with multiple services



Figure 3 Internal Volvo slide regarding gradual development.

strategy that intended to attract end-customers from their own workshops to the dealer workshops. As Figure 4 shows, this approach essentially builds on Scenario 2.

For Parts Online, the original goal was to increase sales of accessories and consumable parts to any end-customer, as well as increasing sales of spare parts to end-customers who operate their own workshops within selected markets in Europe. Parts Online is a system where end-customers can search for and manage orders of spare parts 24 h a day, 7 days a week (24/7). Figure 5 shows an example screen from the Web portal. Originally, the functionality was organised into the following categories: *Find parts*, *Order parts*, and *Use parts*. Dealers could save

time and resources on phone ordering, since end-customers would be able to do self-service on many activities. Volvo could gain experience and be involved in relationship build-up.

The original implementation project provided a means to reach customers, where the main impact was commercial relations, the technical platform, and extending the supply chain with delivery options and customer ordering systems. In Volvo's view, the largest challenges in deploying the technical platform were:

- single sign-on,
- multi-language and 24/7 capabilities,



Figure 4 'Reaching end-customers' through the original implementation project.

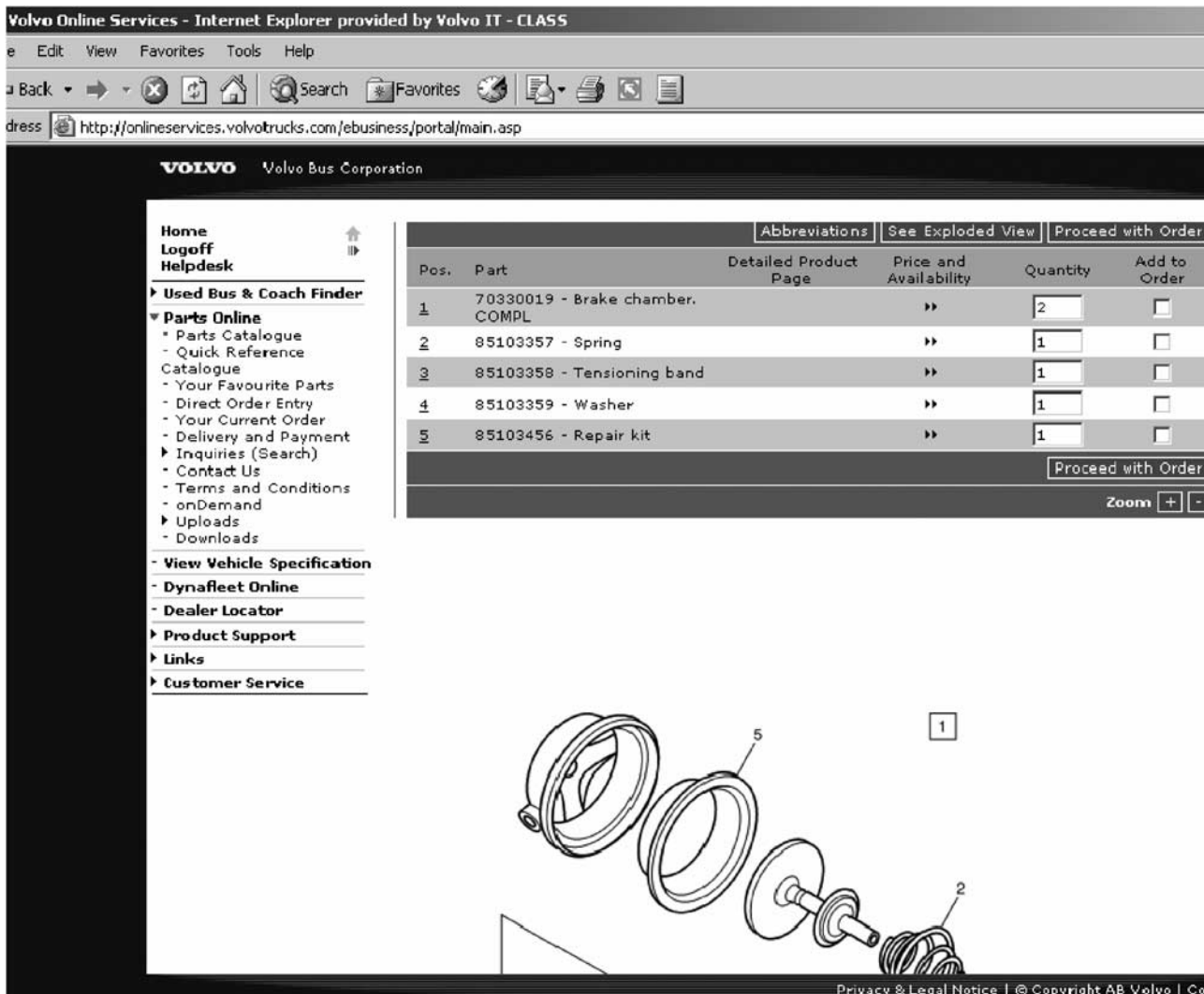


Figure 5 Example of Web portal screen from parts online.

- security,
- business process synchronisation, and
- legacy connectivity.

Single sign-on required tactical solutions to deliver access to different legacy systems without requiring users to log-on several times. The heterogeneity among end-customers raised new demands on multi-language and 24/7 capabilities, which development had previously down-prioritised as ‘good-to-have’. Security aspects got several new dimensions due to considerable heterogeneity among the new supply chain actors. Difficulties with business process synchronisation and legacy connectivity will be discussed further below, but mainly relate to the implications of an unpredictable context. Nevertheless, the vast work did result in a platform that could actually be easily extended and respond in an agile way to increasing business demands. It also had functionalities that ‘support the total business cycle’. (The next section addresses these developments.) This combined business and technology agility was a major benefit and, at the time, a large part of the innovation that would prove to deliver much more value than originally estimated. This would not have been possible without the first implementation. Furthermore, the implementation met considerable challenges in the central involvement of very local relationships. Market companies and dealers, as well as global functions, have yet to improve collaboration in cross-functional and cross-hierarchical ways. Consequently, this is still an emerging area.

Continuous implementation and innovation

Although there were large obstacles to overcome – both in terms of technology and relations – the established platform provided opportunities for ‘follow-on’ projects. Follow-on implementation projects refer to a directly succeeding project that can almost be regarded as a single flow of activities within the organisation. In this case, a project was launched based on a derived innovation. Not only would the Web portal features be usable directly by end-customers, they would also work for more established relations, such as those with importers. Importers mainly exist in small markets – sometimes referred to as the ‘rest of the world’ outside Europe and North America (e.g., Africa, Middle East, and Caribbean). Importers represent companies that import spare parts and sell to dealers.

Furthermore, in a few rare and minor cases, the aim was to extend business directly to end-customers. This would involve close proximity and human-to-human contacts

from end-customers to dealers, but with the system and logistics connection going from a central warehouse directly to end-customers. The initial focus was on ‘key customers’ of large bus operators. To be considered a key customer, a person or organisation would have to meet certain criteria, such as having and maintaining a workshop with justifiable volumes and distribution points. A workshop manager at a large pilot site in Berlin summed up requirements on IS/IT as well as business: ‘Even if we were interested in direct collaboration with Volvo, we had large demands on availability and productivity. It was good that their solution was not just a software installation’.

This first follow-on implementation, related to Scenario 3 and seen in Figure 6, generated a win-win-win situation between end-customers, dealers, and Volvo (and also gave importers a better offer). This derived ‘win-win-win’ situation emerged as a profound innovation and thereby a clear delivery of the introduced agility. The win-win-win situation, as well as the importer opportunities, had not been taken into account during scenario development. It has been a unique situation in which global functions, market establishments, and dealers collaborate both cross-functionally and between different levels. This has contributed much to learning and understanding the context. Furthermore, the return on investment has been very high in relation to the minor ‘follow-on’ investment that was required.

As the follow-on implementation was concluded, new possibilities emerged, not least because of the previous project’s positive results. Volvo’s focus was set on strengthening support to growing markets outside Western Europe (such as Asia) and extending the support warehouses’ capabilities to deliver to end-customers. These warehouses were located in different countries to provide deliveries for Asia and Eastern Europe. Technically, the platform needed minor adaptations; the main objective was rather to extend logistical capabilities. That is, the goal was to use the additional capabilities to leverage agility and thereby provide business value.

Based on the experiences gained during the first two implementations, a second follow-on implementation (i.e., the third implementation project) was launched, correlating closely with Scenario 1 (see Figure 7).

Because there were several support warehouses, a main challenge of the implementation was to execute a more decentralised deployment. Although possible to manage, the deployment required close analysis and monitoring during roll-out. However, management attention was lower during this implementation project, resulting in

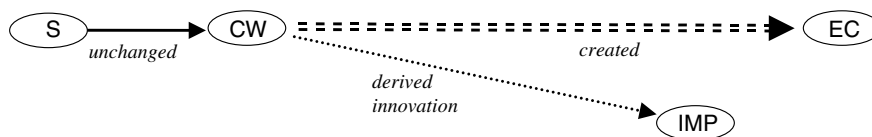


Figure 6 ‘Restructuring relations’ through continuous implementation.

reduced focus. Technically, more advanced Web services (such as service instructions) could be developed. This was mainly because a critical mass of practical competence had been built-up, but also because platform stability had been established. Still, these Web services encountered difficulties, especially regarding alignment for business process synchronisation (Holmqvist & Pessi, 2004). As an example of the difficulty with business process synchronisation, even a 'simple' order entry can illuminate important implications. Once immersed in the details of the order entry process, each new party actually has differences, including cut-off times, order classes, transportation modes, and so on. These differences need to be assessed and managed. A quote from an end-customer in Singapore illustrates how she regards both the functionality and the new relationship: 'We would like to see enhancements to be made of the description of your services. At the same time, we are delighted for our established relationship and the way this can develop'.

Reflections on implementation projects

Before exploring the practical and theoretical considerations, we have a few brief reflections relating to the implementation projects. In the original implementation, the functionality was rudimentary, but evolved gradually. The context was very dynamic, and thus the project's scope was intentionally kept at a comprehensible size in order to secure deliveries. At the same time, this created a situation in which it would be possible to adapt rapidly to new issues during unpredictable conditions. The fundamental objective of reaching

end-customers was, at least indirectly, initiated by strengthening the relation between dealers and end-customers.

The creation of a new platform was problematic. In order to establish relations with end-customers, it was essential to involve dealers. This triangle of relations was difficult to foresee as well as to manage. The main platform challenges were: single sign-on, process synchronisation, multi-language and 24/7 capabilities, security, and legacy connectivity. Some of these issues are classical in IT management discussions; others, such as single sign-on and business process synchronisation would benefit from more attention. Also, while advanced functionality develops through legacy integration and continuous implementations, the needs and implications of aligning processes become especially obvious. These might include (as noted by the user in Singapore) improving service descriptions in a technical way using WSDL, as well as assigning business contact people to nurture relations.

Although any summary of a complex context is doomed to have shortcomings, Table 1 is an attempt to highlight some of the characteristics that have been illuminated in this case (adopted from Holmqvist *et al.*, 2003).

The overall impression is that the initial implementation project's work offered payback in follow-on implementations. Both cost and lead-time were lowered considerably in later stages. The largest benefits of agility through implementation are that it enabled innovations in terms of functionality, IS/IT, and business coordination, and it offered the ability to manage



Figure 7 'Extending reach' through continuous implementation.

Table 1 Summarised view of implementation projects

	Original implementation (building on Scenario 2)	First follow-on implementation (Scenario 3)	Second follow-on implementation (Scenario 1)
Development cost (rel size)	1	1/5	<1/20
Lead time (rel)	1	1/2	1/4
<i>Challenges</i>			
Project process	Complex, because of the many functions involved, but with good focus	Easier, because of follow-on learning curve	Poor focus, because of less management attention
Technology	New, complex	Stabilising	Established
Commercial relations	Existing, but new collaboration	Emerging, but new	Experience from former set-ups
Logistics	Not focused	New	Existing
<i>Results</i>			
Cost/benefit	Emerging value	Great value	Value as expected
Innovation		Win-win-win relations	Extended reach and features

relations between stakeholders. The choice to keep projects at a comprehensible size contributed to these advantages. Still, the original implementation was generally perceived (especially during the first year) as too costly and delivering too little. The original implementation project was also perceived as taking longer than expected. However, in retrospect, choosing a relatively small implementation – even though the directional change was large – has come to be regarded as a successful approach. The learning enabled between business functions contributed to valuable experiences, particularly during stages of decreased management attention (as in the second follow-on implementation). In this case, the change process received different attention levels at different stages, and the agile characteristics possibly contributed to progress throughout.

The choice to strengthen the dealers rather than ‘eliminate the intermediate’ was seen as controversial, not least in the light of the initial ‘ebusiness hype’. However, considering the products’ complexity, the required service competence, and the supply chain structure, the choice has allowed the company to enable learning in several dimensions (Finnegan *et al.*, 2003). The business value objectives in terms of cost reduction potential were realised, but the number of expected online customers was overestimated. Dealers saved time by eliminating administrative work and decreasing time spent on the phone with customers. To maintain the relationship between Volvo and its dealers, it was important to reassure the dealers that the solution was built to support their businesses, not bypass them. By letting customers register with dealers and buy spare parts directly from them, financial and legal relations were maintained (while still allowing gradual changes). As experiences accumulated and relationships were built with mutual comfort and trust, innovations were generated. During the process, the concept of win-win-win arose, was formalised, and was used to communicate how a beneficial set-up for Volvo, the dealers, and the customers could be designed.

In order to ‘support the total business cycle’, Volvo chose a gradual approach to the integration of new services. The company was aware that establishing a new channel with new technology would be difficult, and could meet with resistance. Consequently, it aimed to include a valuable service in each part of the business cycle and expand gradually rather than to try to embrace everything at once (as Figure 3 exemplifies). The smaller scope and the goal of early interactions during implementations allowed essential learning in an uncertain and unpredictable context. This agile approach gave the organisation resilience while trying to conquer complexity in global aftermarket logistics.

Practical and theoretical considerations

Agility should be taken on with responsibility, expressed not just in words but in structure and culture (Dove,

2001). Because global aftermarket logistics has a high degree of uncertainty as a measurable dimension, it is possible to mitigate somewhat through good capabilities of sensing and responding. However, the context also contains ambiguity and unpredictability in non-measurable situations. Among the challenges are coordinating the development and implementation so that they lead to favourable business and IS/IT situations.

The case presented in this paper summarises and expands existing research, which include: aftermarket logistics and theoretical scenarios (Holmqvist *et al.*, 2001); the characteristics of ebusiness in logistics (Holmqvist & Enquist, 2001); actual ebusiness consequences for spare-part distribution (Holmqvist *et al.*, 2003); process integration and Web services (Holmqvist & Pessi, 2004); and initial findings related to agility and implementation (Holmqvist & Pessi, 2005). While several practical and theoretical considerations have already been presented in this paper, a brief overview may be valuable before we offer concluding comments.

The research presented in this case originates from a strategic revision made during a time of perceived turbulence (‘the ebusiness boom’). The result was a decision to approach development and implementation incrementally, rather than manage change by launching a large project and change management initiative. The scenario development provided much initial awareness and remained a knowledge base, contributing to an architectural agility. Utmost, it leveraged implementation experiences by providing a relation to follow-on projects. The scenario development work was ‘revisited’ on several occasions: in formal workshops, as an introduction to new project members, and as refreshing inspiration to others. Using Web services proved feasible in this context. However, it also highlighted important implications: potential channel conflicts have been manageable (Görsch & Kühn Pedersen, 2000), strategic characteristics have been incremental rather than leapfrogging (Hackbarth & Kettinger, 2004), and differences in relations have changed gradually and been supported by electronic integration (Malone *et al.*, 1987; Rayport & Sviokla, 1995).

Before providing concluding comments, it is important to note that no general governance model for agility will be presented. At the most, scenario development can be seen as a guideline; given business dynamics, strategic developments are not amenable to strict control. Thus, many strategic planning and alignment approaches (e.g., Henderson & Venkatraman, 1993; Lederer & Salmela, 1996) might be inhibiting in practice, while simply allowing ‘drift’ (see Ciborra, 2000) may reduce the ability to drive progress. It is also important that developed scenarios (Schoemaker, 1993) not become prescriptive, but rather be used for strategic considerations and inspiration with an understanding that early, practical actions enable valuable learning.

This case illuminates important considerations regarding the discussions on extensive vs little strategic

planning. The main argument against little planning is that it can result in an insufficient understanding of the planning context (Newkirk *et al.*, 2003). This argument implies that more planning provides better readiness to achieve changes. However, in a context that is characterised by numerous international actors, sensitive business relations, and high uncertainty and ambiguity, there are demands on agile capabilities. In such a context, it is questionable whether more planning efforts would make an organisation more successful at implementing changes. As this case highlights, with a clear strategic direction – ‘To reach end-customers, establish relations, and create a new channel’ – it is possible to develop scenarios and be agile in direct actions during implementations. This contributes to continuous learning, which refines the development and provides results that would have been otherwise overlooked given the complex context.

Assuming that large global changes require large projects might provide a comforting feeling, but it can also lead to fixed project gates and milestone deliveries that grow into a mismatch with changing conditions. Thereby, the risk of project escalation increases (Keil & Mann, 2000). Volvo’s project to develop an electronic parts catalogue for dealers is one illustration of this. Although de-escalation tactics (Montealegre & Keil, 2000) can be required if things grow out of control, it is better not to get into such a situation in the first place. Creating and sustaining agile capabilities is a way to mitigate such risks (Dove, 2001; Baskerville *et al.*, 2005). Learning and participation from actual implementations can influence scope, the number of affected users, supply chain actors, and geographical sites. The incremental and interactive approach between strategy and action, development, and implementation is favourable in the complex context of global aftermarket logistics. Consequently, agility is nurtured in two ways: by action through implementation, based on a strategic awareness; and by keeping projects small enough that it is possible to both comprehend and lead development.

Concluding comments

Volvo’s structure for global aftermarket logistics relies on a platform that integrates legacy and new Web services, as

About the authors

Magnus Holmqvist (M.Sc.) is currently finalising his Industrial Ph.D. studies at the Göteborg University and the Viktoria Institute. He also works with Business Innovation at Volvo IT. He has extensive experience in global aftermarket logistics. His research interests include the integration of complex systems, process development and implementation, and project management.

well as on establishing new stakeholder relationships and altering existing ones. As the case shows, implementation projects emerging on a platform designed to address agile business demands bring innovations that enable a new business channel in a complex context. The study followed development and implementation, as well as innovations that emerged in the new business and IS/IT structure.

Creating a new platform is problematic, and establishing new relations is even more difficult. Among the key platform challenges were single sign-on, process synchronisation, multi-language and 24/7 capabilities, security, and legacy connectivity. The implications of single sign-on and business process synchronisation are particularly important areas for further research. With business relations, it is safer to introduce new technology within established domains, to build trust gradually, and to collaborate to gain contacts with new stakeholders. The financial and juridical relations required by any business-to-business relation create a comfort zone in which technical solutions and features can be introduced. As this case also illustrates, continuous implementation projects can deliver innovation in business concepts and in relations between stakeholders. Thereby, they can deliver an unprecedented agility in how IS/IT enables business value. The leverage for this is high, and it is easier to roll out the new channels after the first implementation.

In summary, agility is achieved by working continuously with scenario development and by keeping implementation projects to a comprehensible size in order to nurture learning. Both involve direct actions to manage technology and relations between supply chain actors.

Acknowledgements

A close collaboration between Volvo and the Viktoria Institute made this work possible. We would like to extend our gratitude to several research fellows who have contributed to valuable refinements of this paper, not least during the IFIP8.6 working conference in Atlanta. We are also grateful for feedback received during the review process.

Kalevi Pessi (Ph.D.) leads the Business Technology research group at the Viktoria Institute. He is head of the IT Management master programme at the IT-University in Göteborg. He has served as Managing Director and Knowledge Management Director in trade and industry. His current research interest relates to business value and architectural design.

References

- AGILE MANIFESTO (2001) Manifesto for Agile Software Development (Available online at <http://agilemanifesto.org>; accessed 10 October 2004).
- APPLEGATE L (Ed) (1999) Rigor and relevance in MIS research – introduction. *MIS Quarterly* **23**(1, Special Issue March), 1–2.
- AVISON D, JONES J, POWELL P and WILSON D (2004) Using and validating the strategic alignment model. *Journal of Strategic Information Systems* **13**, 223–246.
- BASKERVILLE R, MATHIASSEN L and PRIES-HEJE J (2005) Agility in fours: IT diffusion, IT infrastructures, IT development and business. In *Business Agility and Information Technology Diffusion* (BASKERVILLE R, MATHIASSEN L, PRIES-HEJE J and DE GROSS J, Eds), pp 3–10, Springer, New York.
- BENSON S, DOVE R and KAHN J (1992) An Agile Systems Framework: a foundation tool. In *Proceedings of the Second Annual Conference Agility Forum (AMEF)*, December 1992, Iacocca Institute at Lehigh University, Bethlehem, PA-USA.
- BHATTACHARJEE A and PAUL R (2004) Special issue on 'interpretive' approaches to information systems and computing. *European Journal of Information Systems* **13**(Special issue), 166.
- BOOD R and POSTMA T (1997) Strategic learning with scenarios. *European Management Journal* **15**(6), 633–647.
- BOWMAN B, DAVIS G and WETHERBE J (1983) Three stage model of MIS planning. *Information and Management* **6**(1), 11–25.
- BRAA K and VIDGEN R (1999) Interpretation, intervention, and reduction in the organizational laboratory: a framework for in-context information system research. *Accounting Management & Information Technologies* **9**, 25–47.
- BRANCHEAU JC and WERTHEBE JC (1987) Key issues in information systems management. *MIS Quarterly* **11**(1), 23–45.
- CHANGSU K and GALLIERS R (2004) Deriving a diffusion framework and research agenda for web based shopping systems. *Journal of Electronic Commerce Research* **5**(3), 199–215.
- CHRISTENSEN E, CURBERA F, MEREDITH G and WEERAWARANA S (2001) Web Services Description Language (WSDL) 1.1. *WC3 Note*, Ariba, International Business Machines Corporation and Microsoft. 15 March 2001 (available online at <http://www.w3.org/TR/2001/NOTE-wsdl-20010315> www.w3.org; accessed 10 October 2004).
- CHRISTOPHER M and TOWILL D (2000) Supply chain migration from lean and functional to agile and customised. *Supply Chain Management* **5**(4), 206–213.
- CIBORRA C (1997) De profundis? Deconstructing the concept of strategic alignment. *Scandinavian Journal of Information Systems* **9**(1), 67–82.
- CIBORRA C (Ed) (2000) *From Control to Drift*. Oxford University Press, Oxford.
- CIBORRA C and HANSETH O (1998) From tool to Gestell: agendas for managing the information infrastructure. *Information Technology & People* **11**(4), 305–327.
- DOVE R (2001) *Response Ability: The Language, Structure and Culture of the Agile Enterprise*. John Wiley & Sons, Canada.
- EARL MJ (1989) *Management Strategies for Information Technology*. Prentice-Hall, Hemstead.
- EARL MJ (1993) Experiences in strategic information systems planning. *MIS Quarterly* **17**(1), 1–24.
- ERICSSON D (2003) Supply/demand chain management – the next frontier for competitiveness. In *Global Logistics* (WATERS D, Ed), Kogan Page, London.
- FINNEGAN P, GALLIERS R and POWELL P (2003) Applying triple loop learning to planning electronic trading systems. *Information Technology and People* **16**, 461–483.
- FITZGERALD B and HARNETT G (2005) A study of the use of agile methods within Intel. In *Business Agility and Information Technology Diffusion* (BASKERVILLE R, MATHIASSEN L, PRIES-HEJE J and DE GROSS J, Eds), pp 187–202, Springer, New York.
- FLYNN DJ and GOLENIIEWSKA E (1993) A survey of the use of strategic information systems planning approaches in UK organizations. *Journal of Strategic Information Systems* **2**(4), 292–319.
- GALLIERS RD (1987) Information systems planning in the United Kingdom and Australia – a comparison of current practice. *Oxford surveys of Information Technology* **4**, 223–255.
- GÖRSCH D and KÜHN PEDERSEN M (2000) E-channel competition: a strategic approach to electronic commerce. In *Proceedings of the Eighth European Conference on Information Systems*, (MAHRER H, Ed), pp 1066–1073, Vienna, Austria.
- GOTTSHALK P (2000) Studies of key issues in IS management around the world. *International Journal of Information Management* **20**, 169–180.
- HACKBARTH G and KETTINGER W (2004) Strategic aspirations for net-enabled business. *European Journal of Information Systems* **13**, 273–285.
- HENDERSON J and VENKATRAMAN N (1993) Strategic alignment: leveraging information technology for transforming organizations. *IBM Systems Journal* **32**(1), 4–16.
- HOLMQVIST M and ENQUIST H (2001) IT IS not new vs old, yet real e-logistics. In *Proceedings of the 24th IRIS Conference* 445–458, Bergen, Norway.
- HOLMQVIST M, HULTKRANTZ O, STEFANSSON G and WINGQVIST A (2001) Consequences of E-commerce on physical logistics: a theoretical scenario for spare part distribution. In *Proceedings of Ninth World Conference Transport Research*. Seoul, Korea.
- HOLMQVIST M, HULTKRANTZ O, STEFANSSON G and WINGQVIST A (2003) Consequences of E-commerce for spare part distribution. In *Logistics Research Network Annual Conference 2003 2003-09-10 to 2003-09-12* (D MENACHOF, Ed), pp 196–216, Cass Business School, London, UK.
- HOLMQVIST M and PESSI K (2004) Process integration and web services, a case of evolutionary development in a supply chain. *Scandinavian Journal of Information Systems* **16**(Special Issue), 117–144.
- HOLMQVIST M and PESSI K (2005) Agility through implementation. A case from a global supply chain. In *Business Agility and Information Technology Diffusion* (BASKERVILLE R, MATHIASSEN L, PRIES-HEJE J and DE GROSS J, Eds), pp 173–183, Springer, New York.
- IBM (2004) Webservices IBM site. Accessed 10 October 2004. Available online at: <http://www-306.ibm.com/software/ebusiness/jstart/casestudies/volvo.shtml>.
- KEIL M and MANN J (2000) Why software projects escalate: an empirical analysis and test of four theoretical models. *MIS Quarterly* **24**(4), 631–664.
- KIDD PT (1995) *Agile Manufacturing, Forging New Frontiers*. Addison-Wesley, London.
- KLEIN HK and MYERS M (1999) A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS Quarterly* **23**(1), 67–94.
- LEDERER A and SALMELA H (1996) Toward a theory of strategic information systems planning. *Journal of Strategic Information Systems* **5**, 237–253.
- LEDERER A and SETHI V (1988) The implementation of strategic information systems planning methodologies. *MIS Quarterly* **12**(3), 444–461.
- LUMSDEN K (1998) *Logistikens grunder* (in Swedish). Studentlitteratur, Lund, Sweden.
- MALONE TW, YATES J and BENJAMIN RI (1987) Electronic markets and electronic hierarchies. *Communications of the ACM* **30**(6), 1–15.
- MATHIASSEN L (2002) Collaborative practice research. *Scandinavian Journal of Information Systems* **14**, 57–76.
- MONTEALEGRE R and KEIL M (2000) De-escalating information technology projects: lessons from the Denver international airport. *MIS Quarterly* **24**(3), 417–447.
- MUSTONEN-OLLILA E and LYYTINEN K (2004) How organizations adopt information system process innovations: a longitudinal analysis. *European Journal of Information Systems* **13**, 35–51.
- NEWKIRK H, LEDERER A and SRINIVASAN C (2003) Strategic information systems planning: too little or too much? *Journal of Strategic Information Systems* **12**, 201–228.
- NIEDERMAN F, BRANCHEAU J and WETHERBE J (1991) Information systems management issues for the 1990s. *MIS Quarterly* **15**(4), 475–500.
- ORLIKOWSKI W (1993) Case tools as organizational change: investigating incremental and radical changes in systems development. *MIS Quarterly* **17**(3), 309–340.
- OVERBY E, BHARADWAJ A and SAMBAMURTHY V (2005) A framework for enterprise agility and the enabling role of digital options. In *Business Agility and Information Technology Diffusion* (BASKERVILLE R, MATHIASSEN L, PRIES-HEJE J and DE GROSS J, Eds), pp 295–312, Springer, New York.
- PREMKUMAR G and KING WR (1992) An empirical assessment of information systems planning and the role of information systems in organizations. *Journal of Management Information Systems* **9**(2) Fall, 99–125.

- RAYPORT JF and SVIOKLA JJ (1995) Exploiting the virtual value chain. *Harvard Business Review* (November–December), 75–85.
- ROGERS EM (2003) *Diffusion of Innovations* (5th edn). Free Press, New York.
- SABHERWAL R (1999) The relationship between information systems planning and information systems success: an empirical assessment. *Decision Sciences* 30(1), 137–167.
- SALMELA H, LEDERER AL and REPONEN T (2000) Information systems planning in a turbulent environment. *European Journal of Information Systems* 9(1), 3–15.
- SAMBAMURTHY V, BHARADWAJ A and GROVER V (2003) Shaping agility through digital options: reconceptualizing the role of information technology in contemporary firms. *MIS Quarterly* 27(2), 237–263.
- SAMBAMURTHY V, ZMUD RW and BYRD TA (1994) The comprehensiveness of IT planning process: a contingency approach. *Journal of Information Technology Management* 5(1), 1–10.
- SANTHANAM R and GUIMARAES T (1995) Assessing the quality of institutional DSS. *European Journal of Information Systems* 4(3), 159–170.
- SCHOEMAKER P (1993) Multiple scenario development: its conceptual and behavioural foundation. *Strategic Management Journal* 14(3), 193–213.
- SCHÖN D (1983) *The Reflective Practitioner: How Professionals Think in Action*. Basic Books, New York.
- SHARIFI H and ZHANG Z (2000) A methodology for achieving agility in manufacturing organizations. *International Journal of Operations and Production Management* 20(3/4), 496–512.
- STRAUB DW and WATSON RT (2001) Research commentary: transformational issues in researching is and net-enabled organizations. *Information Systems Research* 12(4), 337–345.
- SULLIVAN CH (1985) Systems planning in the information age. *Sloan Management Review* 26(2), 3–13.
- TAN CW and PAN SL (2003) Managing e-transformation in the public sector: an e-government study of the Inland Revenue Authority of Singapore (IRAS). *European Journal of Information Systems* 12(4), 269–281.
- VAN DER POEL P and VAN DER WAES R (1989) Framework for architectures in information planning. In *Information Systems Concept: An In-depth Analysis* (FALKENBERG IE and LINDGREEN P, Eds), 177–191, Elsevier Science Publisher, Holland.
- WACK P (1985) Scenarios: uncharted waters ahead. *Harvard Business Review* 63(5), 72–89.
- WALSHAM G (1995) Interpretive case studies in IS research: nature and method. *European Journal of Information Systems* 4, 74–81.
- YIN R (2003) *Case Study Research – Design and Methods*. Sage Publications, Thousand Oaks, CA.
- YUSUF YY, SARHADI M and GUNASEKARAN A (1999) Agile manufacturing: the drivers, concepts and attributes. *International Journal of Production Economics* 62(1/2), 33–43.
- ZACHMAN JA (1978) The information systems management system: a framework for planning. *Data Base* 9(3), 8–13.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.