TIMING THE INFORMATION SYSTEM UPGRADE

Kankaanpää, Irja, University of Jyväskylä, PO Box 35 (Agora), 40014 University of Jyväskylä, Finland, irja.k.kankaanpaa@jyu.fi

Pekkola, Samuli, Tampere University of Technology, PO Box 541, 33101 Tampere, Finland, samuli.pekkola@tut.fi

Abstract

A system upgrade requires careful planning as its implications to organizational systems might be enormous. Although in IS literature the requirements and process of systems upgrade have been discussed, the timing when to upgrade and what factors guide it has been of lesser interest. Consequently, in this paper we focus on information systems upgrading and its timing from the perspective of the user organization. Upgrading is enabled by the availability of a new software version. When to upgrade, meanwhile, is determined by the business interests of the customer organization, business calendar, development projects, and the vendor. These factors were identified by interviewing 14 IT managers, mainly CIOs, from middle size to large organizations in Finland. They presented 16 different cases of upgrading or modifications of enterprise systems or similar undertakings. The analysis of the cases and the identification of the upgrade timing factors not only increase our understanding of the phenomena in general, but also reveal the customer's motives and interests regarding IS upgrading and its timing.

Keywords: Version change, system upgrade timing, vendor, customer, motives, determinants

1 INTRODUCTION

System upgrade is a decision making point for both the system vendor and the system user, i.e. the customer. In order to stay in markets, the vendors have to produce and sell new versions of their products. In fact, they are producing new versions faster than the customers can adopt them (Sawyer 2001). The system users think differently. They balance between acquiring the newest version and using their current system. As the enterprise resource planning (ERP) system implementation process is complex (Al-Mudimigh et al. 2001) and costly (Chen 2001, Stefanou 2001), the users have to consider both the fit between the system and their organizational needs (Hong and Kim 2002) and the timing of acquisition or upgrade. There is, consequently, a conflict of interest between the vendor and the customer in switching from one system version to another, i.e. upgrading the system.

ERP system implementation engages the customer in a tight relationship with the system vendor for a relatively long period of time (Markus & Tanis 2000, Verville et al. 2005). This kind of long-term marriage emphasizes the need for shared interests and mutual trust as they influence the quality of co-operation between the partners. Consequently, at the point of making decisions, the partners' motives and interests should be considered as they put the stakeholders in a position where their interests might conflict – if not immediately, then potentially over time.

Although system upgrades have become an integral part of IS management, the timing of a version change is unsystematically defined in the user organizations (Mukherji et al. 2006). Similarly, the investments to new systems have dominated IS research while the system upgrade has been overlooked (Mukherji et al. 2006). Particularly the timing of the packaged system upgrade has been a neglected in ERP system research (Ng 2001).

This paper studies the determinants for the timing of enterprise system (ES) upgrades, particularly ERP system upgrades, from the user organization's point of view. In other words, we aim at recognizing conditions that define system upgrade timing. The literature analysis focuses on clarifying the differing perspectives the user organization and the vendor have towards software product's life cycle. Also, the ES system evolution and vendor-customer relationship are analyzed. The purpose is to identify system upgrade related life cycle phases and to show how the differing viewpoints towards software product's life cycle generate differing, and partly conflicting, interests with respect to IS upgrade timing and frequency. This analysis has practical implications as it will help vendors and customers to understand the causes for potential conflicts with respect to IS upgrading by laying out the interests and motives of both parties.

In order to understand the customers' dynamics and determinants for ES upgrade timing, empirical research was carried out. 14 high level IT executives (mainly CIOs) were interviewed from 12 middle size to large Finnish companies and public organizations. The interviews yielded 16 cases concerning IS upgrading. Empirical findings provide in-sights on the drivers and inhibitors of system upgrade timing. They will help one in practice to schedule upgrading and understanding the required conditions.

The remainder of the paper is organised as follows. The next two sections discuss the software product's life cycle from both vendor and user organization's perspective and system upgrade and its timing. Research methods and settings of the empirical research are then described. This is followed by the reporting of the findings. The findings are further discussed and a model for the determinants of IS upgrade timing is presented. The paper ends with a summary.

2 CUSTOMER, VENDOR AND PRODUCT LIFE CYCLE

Enterprise systems are specialized and increasingly diverse (Messerschmitt & Szyperski 2003). Their development is driven by both the customer's and the vendor's interests and motives (Sawyer 2001). The vendor is interested in developing software products for the markets while the customer's interest

is in assembling coherent IS out of software pieces (Sawyer 2001). The distinction between these perspectives is significant as they provide reciprocal, mutually complementary view towards an interesting phenomenon: timing the upgrade.

An organization that purchases an ES or ERP system enters into long-term relationships with the software vendor, even from five to ten years (Verville et al. 2005). This underlines the importance of the quality of the relationship between the customer and the vendor. However, due to the divergent perceptions towards the IS life cycle, potential conflicts of interest exist. The customer is dependent on the vendor for both system support and changes (Markus & Tanis 2000). This urges for an analysis of the software product's life cycle in order to be able to understand the relationship between systems development and its upgrading, the former performed by the vendor, the latter by the customer.

2.1 Software product's life cycle

The vendor's business is to sell software and related services. Software development process consists of five distinct phases: initial development, evolution, servicing, phase-out and close-down (Rajlich & Bennett 2000). Initial development refers to a phase where the system's first functioning version is built from the scratch. As initial development is expensive and risky with potentially no return, the vendor attempts to release the products as fast as possible in order to "generate revenue and to beat any competition" (Rajlich & Bennett 2000). Particularly at the beginning of the product's life cycle, the monopolist software producers use the tactics of "leveraging incompatibility" between different versions in order to force the customers to update their software (Mehra & Seidmann 2006).

The system seldom remains unchanged over time but instead tends to evolve. The "capabilities and functionality of the system" are extended to meet the changing needs of the users. The system undergoes a sequence of iterative changes triggered by customer demands, competitive pressure or legislative actions (Rajlich & Bennett 2000). The evolution is manifested through versions.

New versions are released at certain intervals until the sales drop. Software reaches the servicing phase (Rajlich & Bennett 2000). New versions are not assembled any more as the evolution becomes increasingly difficult or expensive. Under these circumstances the vendor provides corrective maintenance, that is, service patches. Service patches easily degrade the system architecture and speed up software decay which eventually leads to phase-out phase (Rajlich & Bennett 2000).

At the phase-out phase, the vendor tries to get revenue from the system with no efforts (changes, service patches) as long as possible before withdrawing the product completely from the markets. Since the servicing is stopped, the users have to work their way around the upcoming difficulties (Rajlich & Bennett 2000). Finally the system is closed down. The vendor withdraws it from the markets and induces the users to replace it by another system.

2.2 Customer's interests

The customer creates an IS from the available commercial software products (Sawyer 2001). These pre-fabricated products and their various versions are building material that are transformed into an operating and organizationally integrated IS by means of adoption and implementation. This process has been depicted by various life cycle models of ERP and ES systems (e.g. Esteves & Pastor 1999, Cooper & Zmud 1990, Markus and Tanis 2000).

Customer's IS related investment decisions and procurement strategies are largely guided by the markets (Narasimhan et al. 2006). For each system upgrade the company attempts to increase its compliance and alignment with their business needs. The customer is interested in the quality of the product, its delivery, and the vendor's responsiveness and innovativeness in order to evaluate how effective the vendor is and will be in meeting the customers varying needs (Narasimhan et al. 2006). Usually the customers want to be able to contribute to changes in the system. They also expect the new versions to be better aligned with their needs.

Because of the complexity and costs of the implementation of large IS (Al-Mudimigh et al. 2001, Chen 2001, Stefanou 2001), it is in the company's interest to upgrade systems only when needed. Frequent or unnecessary upgrades, even when being technologically feasible, cause problems by consuming staff resources and IT budget and by disturbing the end-users (Esteves & Pastor 2005, Mukherji et al. 2006). Consequently the customer wants to get the version changes done as rarely and efficiently as possible.

2.3 Conflicting interests between customer and vendor

The examination of the perceptions of the customers and vendors' IS life cycles reveals potential conflicting interests related to upgrade timing. These are summarized in Table 1. The software product life cycle from vendor's point of view has been taken as a reference model because the vendor's dominant position in the customer-vendor relationship.

Phase	Vendor's interest	Customer's interest
Initial development	Deliver a new product on the markets as fast as possible	Purchase a mature and reliable, fully tested software
Evolution	Offer new versions frequently	Upgrade only when needed and only versions with optimal functionally
	Meet with customer demands, competitive pressure, changes in legislation	Get custom changes
Servicing	Offer service patches instead of new versions	Get large scale changes or a new version
Phase-out	Provide no changes	Get changes for the system
Closedown	Stop providing system support	Continue the use of the system

Table 1. Potential conflicts of interests between vendor and customer.

At initial development phase, the vendor seeks to deliver a product on the markets as fast as possible while the customer is seeking for mature product with no "childhood diseases". Thus, a conflict arises from supply and demand not meeting at product quality and maturity level. At evolution phase, vendor's eagerness to offer new versions at high frequency (Sawyer 2001) and induce the customer to commit to a specific upgrade program conflicts with the customer's interest to upgrade systems only when needed. At servicing phase, conflicts arise from customer's change requests which the vendor is not willing or able to provide. An apparent conflict emerges at phase-out stage when the customer requests system support that is no longer provided.

3 DEFINING SYSTEM UPGRADE TIMING

Software products typically evolve fast and in small incremental steps. As new versions are released regularly, the customer's question is not 'whether' to upgrade the system, but when to do so (Mukherji et al. 2006). Particularly in the context of ERP systems, the users do not typically invest in every new version but instead "leapfrog to adopting a subsequent release" (Mukherji et al. 2006). Hence, the upgrade decision is dependent on the available versions and contingent factors. Legal issues may force (Mehra & Seidman 2006), lack of vendor support may push and potential competitive advantage may motivate the version change (Kankaanpää et al. 2007). However, financial issues play a major role in upgrade decisions.

System upgrades are less expensive and are expected to yield less benefit than investments to new systems (Mukherji et al. 2006). An upgrade still remains a considerable investment that requires joint organizational efforts. Frequent upgrades are both costly and risky, yet delaying the upgrade decision may "lead to loss of competitiveness" (Mukherji et al. 2006). However, postponing the upgrading increases the gap between the version in use and the supported version in markets. The upgrading becomes increasingly difficult as the gap grows (Mukherji et al. 2006). This emphasizes the importance

of timing of the upgrade, which further necessitates the understanding of the vendor's product life cycle and developed plans (Narasimhan et al. 2006).

An economics-based decision model for defining the optimal IT upgrade timing (Mukherji et al. 2006) indicates that "investments in upgrades are best made when the gap between new technology and current technology reaches a critical threshold. Among other factors, this threshold is influenced by technology cost, change management cost and opportunity cost." (ibid). Technology cost refers to the costs of adopting a new version. Change management cost is the cost of upgrade deployment activities, e.g. the time used for learning new routines and re-training the users. Opportunity cost means the cost of lost opportunity. It can manifest itself through the decreased productivity or the loss of revenue due to the decision not to adopt new technology or to adopt an ill-fitting version.

The model suggests that in order to optimize the upgrade timing, the customer should wait until the technology cost of the new version decreases since the latest version is the most expensive immediately after its release. Also, if the estimated change management costs are high, upgrade should be postponed. However, if a company does not invest in new technology, it may loose the opportunity for higher productivity. (Mukherji et al. 2006). An optimal time for the upgrade occurs when the difference between the level of technology in use and the level of the most suitable new technology level hits a critical threshold. This means the company has to compare the technology and change management costs to the opportunity costs. "Leapfrogging" as an upgrade technique supports these findings: the most economical way of upgrading is to wait until there is a need for change, skip unnecessary versions, and upgrade when a clearly beneficial version is available. (Mukherji et al. 2006).

4 RESEARCH METHODS AND SETTINGS

In order to identify the preconditions influencing the timing of the system upgrade from the customer's point of view, 14 IT executives, mainly CIOs, from 12 mid to large size companies and public organizations in Finland were interviewed and are included here (Fontana and Frey 2000)[1]. Table 2 portrays the cases and their fields of industry.

Case #	Field of industry	Case description
A	Engineering	ERP system upgrade
B	Financing	ES system version change
C	IT services	ES system version change
D	Public administration	ES system vendor and version change
E	Public administration	ES system upgrade
F	Public administration	ES system upgrade
G	Retail	ES system version change
H	Public administration	Workstation and operating system upgrade
I	Retail	Workstation and operating system upgrade
J	Engineering	Groupware system upgrade
K	IT services	Invoice handling system version change
L	Retail	Accounting system change
M	IT services	Patient management system change
N	Engineering	Maintenance service system upgrade
O	Media	Publishing system change
P	Public administration	Intranet technology upgrade and vendor change

Table 2. Summary of the cases.

[1] An invitation was emailed to 37 organizations, from which 13 responded. This resulted 15 interviews: Four interviews yielded 2 IS upgrade cases, eleven interviews yielded 1 case, and one yielded no case. Only the interviews with the cases are included here. Consequently, the interviews yielded a total of 16 cases from 14 subjects representing 12 organizations.

The interview questions were formulated according to a literature survey (c.f. Kankaanpää & Maaranen 2009). A large number of detailed questions were drawn from the theory basis after which their abstraction level was raised. This decreased the number of questions. They were then pilot tested by three colleagues. The questions were revised according to the feedback before the actual interviews. Data collection took place from February to April 2009. The questions were emailed to the subjects prior to the interview. Each CIO was interviewed face-to-face in their premises – except in two sessions, where both CIO and his/her aide were present. Each interview was recorded with permissions, and transcribed for analyses.

For this paper, the data was analyzed against the interview questions (see Appendix A). Then, it was categorized according to themes that arose from the material. The researcher familiarized herself with the material thoroughly in order to gain deep understanding of the cases.

5 FINDINGS

The interviews show that the rationale for IS upgrade timing depends on business benefits, business calendar, organization's ongoing and planned development projects, and vendor. In the following, those are discussed in detail.

5.1 Business interests

The potential value for business, minimized hindrance for the business, and the organization's readiness for an upgrade provide a basis for IS upgrade timing. In general, these business related issues define the large scale time frame for upgrades.

Expected business benefits greatly influence the timing of the version change. As one of the CIO's described: "*the upgrade timing depends precisely on the value of its business case*[2]" (case B). This points out the customer's interest to evaluate the potential opportunities and added business value that could be reached with the new version. Likely business benefits encourage for rapid upgrade.

Despite the expected business benefits, the organization's financial situation has a word whether to upgrade. "*We had a good financial situation in our company. We have money to invest. And we can get a positive investment decision. That set the schedule*" (case J). However, another CIO provided slightly different viewpoint: "*So in this case the timing was chosen on the basis of when there are resources available for the version change. However, as a matter of fact, we upgraded the system as we had to do so*" (case B). The availability of resources and favorable financial situation are preconditions for a version change. When these conditions are met, the investment proposals can be more easily accepted and funds granted. Hence the timing of the version change of large IS, such as ES systems, is commonly decided in conjunction with planning and budgeting.

The business interests of the customer necessitate minimizing the hindrance for the business. Particularly this appears with non-business critical systems upgrades: *"Because this is not clearly business driven version change, it is timed in a way that it causes the minimum amount of inconveniences. If it was a business driven version change, then we would have defined the timing by the business case.*" (case B).

5.2 Business calendar

As simply as it is, possible timeslots for upgrading are defined by the organization's business calendar. Business calendar defines the annual business activities of a company. Business calendar is strongly

[2] Translations from Finnish are made by the authors.

influenced by the (national) accounting practices, laws, and cultural issues, such as people preferences and holidays. Also, the level of internationalization and industry specific business characteristics, define each organization's own business calendar. For instance, a CIO from retail industry described the influence of operating in multiple countries: "*the more we expand our business abroad, the smaller are the timeframes [for system upgrades]. There is no time in a day because the stores are open. This is a retail industry specific issue. The stores open up in different counties at different times, typically at 9 a.m., and then they close at 9 or 10 p.m. But 9 a.m. in another country is different than in Finland or somewhere else.*" (case L).

Each field of industry has its own high-business and low-business seasons. As a rule of thumb, IS upgrades are preferably made during the low-business seasons where the potential hindrance for business is at lowest. However, such windows for change are sometimes rare – as the quote from retail industry (case L) above points out. The changes can be made only outside the business hours, putting an emphasis on the quality of upgrading work. If the upgrade of a system fails, the next opportunity might be open a year later. Yet the businesses are not the same: for building sector and agricultural field the low-business season is winter, in public administration low-business seasons are March and October (no budgeting or reporting taking place), and for health care, there is no low season. *"Often they [upgrades] are related to system down-time and similar issues. When the health-care services rely on the system, the timing of a shut down is extremely important. And it cannot be down for many days. Yes, the timing is extremely important."* (case E).

Nevertheless, there are also several universal times when IS upgrades are avoided. Those include Christmas, turn of the year, and summer holiday season. The turn of the year demarks the end of the fiscal year and the beginning of the reporting period. The closing of the accounts and annual reporting cannot be compromised by any IS related risk. *"At the turn of the year, we always tried to quiet it down. The reason is that the turn of the year is critical for the banks. That is the reason. Then another thing is, that then there are usually lots of changes to taxation and such. And the reports are done and everything else. And when you have implemented new applications, new features etc. throughout the year, annual reporting, which is exceptional, occurs for the first time. So you aim at calming it down, you don't do much in that month. We set the close season from half way of December and it continues over the turn of the year."* (case B).

Similarly, during the summer season, or Easter time, the changes in IS are avoided. This is because the employees are on holiday, not available for doing upgrades. This means that factually there are two periods in a year when the upgrades are possible: "*From mid August to late November and from February to May, that's when the major changes are made*" (case N). Yet, these time frames are not continuous. Fiscal year and fiscal periods determine time frames for the possible IS upgrades as, for instance, reporting has to take place regularly. Optimally the best time for IS version change is at the end a fiscal year, immediately after the annual financial statements and reports have been published. This means that new versions should be deployed at the beginning of the year.

Different kinds of systems have different windows of opportunity for their upgrades. Accounting systems, for instance, have strict rules when any change can be made. This means that financial administration systems are frozen during the closing of the books in January and February. Also the connections between systems have to be considered as "*everything influences everything*" (case O).

5.3 Development projects

Systems are not upgraded in a vacuum. An upgrade is usually conducted in a project that is dependent on the organization's project calendar and development agenda, and internal policies and plans. For instance, an organization's IT strategy may define a frequency of system upgrades. This was the case in case C where ES upgrade was performed regularly, in every 2 years. In case H, workstations were updated in systemic 4-5 year intervals. The size of IS upgrade project also influences the timing. The bigger the project, the earlier it has to be planned and scheduled.

Ongoing and forthcoming development projects influence IS upgrade timing. Basically there are two strategies: to avoid concurrent projects (i.e. IS upgrade and other projects), or to integrate process improvement projects with an IS upgrade project. If simultaneous yet independent changes cause unnecessary inconveniences and hindrance to end-users, concurrent changes and overlapping projects are avoided. For instance in case J, as upgrading the groupware system changed the work practices of thousands of employees, the version change was timed carefully in order to avoid encumbering the end-users with other simultaneous projects.

The approach of integrating process improvement with IS upgrade takes an opposite approach. The rationale is to pack multiple changes into one big project. This means that the end-users have to go through a fundamental change in a short period of time instead of a sequence of smaller changes in long period of time. This minimizes the amount of hindrance to one's work and productivity. For instance in cases A and O, the timing of a version change were settled according to the business process development so that they would support each other, and help the users to adapt to multiple changes at the same time.

5.4 Vendor

The upgrade is evidently dependent on the availability of a new version. Sometimes the latest version is not fully operational or contains many bugs. The timing is thus dependent on the vendor's ability to deliver and guarantee a fully functional and usable version. Any uncertainty there leads to assuring actions by the customer. For instance in case I, the schedule of an operating system release was not clear. This forced the organization to update their workstations not with latest but an older version in order to avoid risks related to the newest and most desirable version.

Support services and their termination is a compulsive reason for upgrade. In case K, regardless of the vendor's suggestion, the organization had postponed their version change for several years. The vendor was reluctant to continue the support service despite of the organization's continuous requests. Finally, the vendor announced that the support ends and that they cannot take any responsibility for the system any longer. This defined the timing of the version change in a concrete fashion.

Case K also points out that vendor's interests are not always in line with customer's interests. The vendors propose version changes and upgrades from their own business perspectives and schedules which do not necessarily match with the customers' interest, needs or business calendar. Although some organizations found the vendor's upgrade programs useful and beneficial, in most of the cases, the conflicting interests between the vendor and the customer were experienced. Usually the vendor wanted to do changes that the customer did not want – or vice versa. "*Then there're the vendor's reasons why it would be good to do the version change now. Those reasons seldom match with ours. They usually don't. In other words, the vendor's desires always contradict with our model. Or very often they do. Nevertheless, the customer anyway understands that they have to change the version in order to keep up with the development, so how it should be scheduled then?*" (Case L).

No matter whether the vendor and the customer negotiate when to change the version, there are situations when the upgrade is not possible when wanted. For example in case D, version change was defined by the ending of the contract with the vendor. As soon as the contract ceased, the customer was able to change the vendor and upgrade the ES system.

6 DISCUSSION

The literature analysis suggests that the timing of the IS upgrade is dependent on the availability of a suitable version, the customer's need for upgrade and economics. These are supported by the empirical findings of this study. Additionally, the empirical findings suggest that, from the customer's point of view, the timing of an IS upgrade is guided by four determinants, namely business interests, business calendar, on-going and planned development projects, and the vendor (see Figure 1).

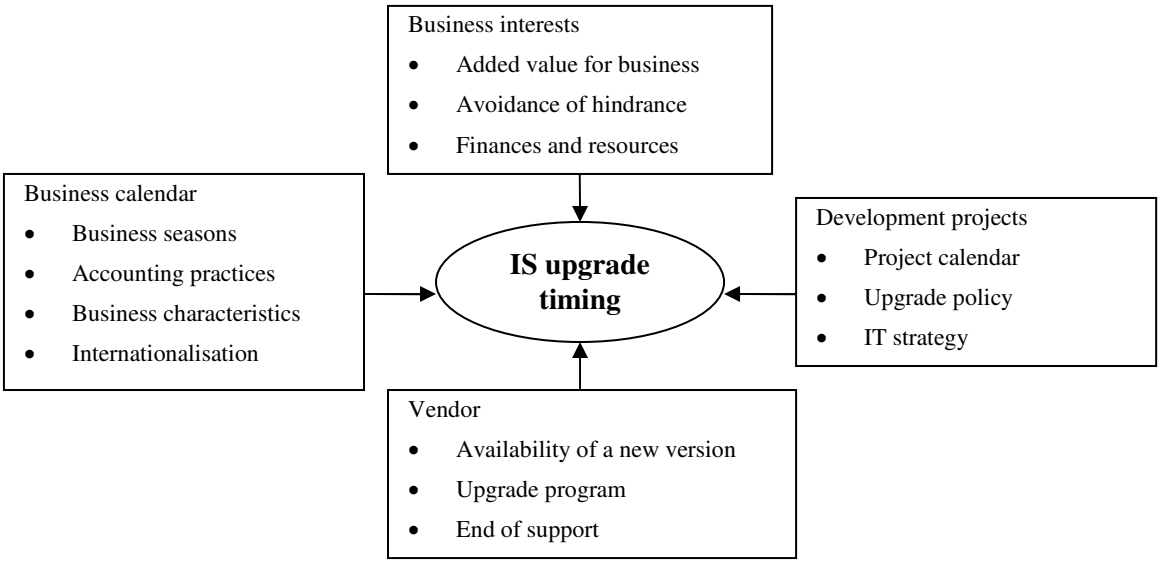

Figure 1. The determinants of IS upgrade timing.

The literature suggests that the possibilities for system upgrade for a customer are largely dependent on the phase of the product's life cycle. Our findings parallel. When the product's lifecycle is in its early phases, the vendor tries to persuade the customers for frequent version changes (see also Rajlich & Bennett 2000). Yet that is not necessarily the customer's interest (see also Esteves & Pastor 2005, Mukherji et al. 2006). During the servicing phase new version are no longer developed and in phase-out also the provision of support is terminated. Hence, the customer needs to understand the difference between software product's evolution and servicing (Rajlich & Bennett 2000), i.e. the software product life cycle. Our findings suggest that the interests of the customer and vendor often collide for the aforementioned reasons regarding the product life cycle. In Case K, conflict was a result from the customer's desire to continue the use of an aged version that the vendor was not able to support. However, the most commonly experienced conflict is due to the fact that a vendor persists on a version upgrade against the customer's interests.

Our findings indicate that the reasons that limit the possibilities and time-slots for system upgrade in the user organization are business calendar, including business seasons, accounting practices, business characteristics and degree of internationalization. Besides, business interests such as avoiding hindrance to the business and availability of resources and finances set boundaries and limitations for the timing of IS upgrading. Nevertheless, the most significant determinant for upgrade timing is the business value of the upgrade. An upgrade can be justified only if a profitable business case can be presented.

The technology upgrade model by Mukherji et al. (2006) states that the best time for an upgrade is when the gap between the version in use and new available version reaches a critical threshold. Our findings do not explicitly reveal whether the companies use such models for determining the suitable upgrade timing. However, the findings support "leapfrogging" as the most efficient and used technique for defining IS upgrade timing. Only in rare cases (e.g. case B) the actual upgrade plan was followed and each new version deployed. The predominant technique was to balance between using the old version as long as possible and changing versions as rarely as possible. This means that the customers have in-depth knowledge about the functionalities of the systems in use and their own needs. On the other hand, they actively follow the development of the products on the markets in order to be able to compare the functionalities with the functionalities of their present version. The degree of leapfrogging is determined by the aforementioned business calendar related issues and business interests.

Additionally it is influenced by the organizational development projects. Project calendar, internal policies and plans, organization's IT strategy define a frequency of system upgrades (e.g. case C and H).

IS upgrades are planned and scheduled in conjunction with other development activities in order to avoid overlapping projects (case J) or to combine projects when joint benefits are anticipated (cases A and O). This was considered as an important issue particularly concerning the fluency of work of the end-users.

Our investigations provide evidence on the importance of correct timing of IS upgrades. Business reasons are the main motives for defining IS version change or upgrade timing. They are strongly related to risk management, expected business benefits, and avoiding hindrance to business. Yet they are not the only reasons. Technological advancement and wear have also their impacts on upgrades. Despite of the dependency on the vendor, the customer has quite a lot of freedom with respect to upgrade timing. The customer may postpone the upgrade up to the point when it has to be made as e.g. support services are stopped (e.g. case K). The availability of a suitable version and resources are the preconditions for IS upgrade. Business calendar, business issues and development projects on their half define when in are the possible times for upgrade.

In the past, IS literature (e.g. Avison & Fitzgerald 2003, Iivari et al. 2009, Hartwick & Barki 1994) has greatly emphasized the vendors' needs to understand the customer. Likewise, the customer may benefit from understanding their software product's vendor. In order to gain competitive advantage, the customer need to carefully plan their IS upgrade activities in respect to appropriate versions available. If they can anticipate the changes in the product's lifecycle, they can choose their next upgrade and its schedule more beneficially. Based on the literature analysis and empirical findings, it can be concluded that if the customer-vendor relationship is framed by open climate and mutual trust, the conflict of interest stemming from the economics of upgrading (i.e. eagerness to sell and reluctance to buy) can be minimized.

7 SUMMARY

In this paper we have studied the determinants for the timing of enterprise system (ES), particularly ERP system, upgrades from user organization's point of view. We aimed at recognizing conditions that define system upgrade timing. We have collected, by interviewing 14 CIOs, a list of determinants that influence the IS upgrade timing. The empirical findings indicate that customer's IS upgrade timing is defined by business interests, business calendar, ongoing and future development projects, and the vendor. The paper contributes to practice by illustrating determinants for the timing of system upgrades in user organizations. The paper contributes to research by increasing the general understanding of the rarely studied phenomenon: system upgrades. Both vendors and customers may benefit by gaining a deeper understanding of the dynamics of IS upgrade timing by comprehending each other's motives and interests related to it.

In this study, our focus has been on the customers. In order to understand the phenomenon holistically, also the vendors should be studied by empirical means. The study was limited geographically in Finland. Thus the organizational culture provides nationally colored findings and limits the ability to generalize the results. Although most of the studied organizations are in global business, the results might be different in another context. The findings indicate that there are differences in how timing is defined in different fields of industry. Yet, our sample is too small to make any generalizations about and beyond these differences. We call for further research to investigate this issue. Despite these limitations, we believe the results are valuable for researchers and practitioners in their future activities of scheduling the next upgrade.

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Appendix A: The interview instrument

Background information

(A recently upgraded IS was chosen for the topic of the interview.)

Name of the information system: _____

Purpose of the information system: _____

Vendor: _____

Year of acquisition:_____

Interview questions

What kind of phases the IS has gone through during its life until the present date?

What reasons triggered the latest upgrade?

How did you get information of the available new versions?

On what grounds the upgraded version was selected?

On what grounds was the timing of the upgrade decided upon?

What kind of significance the timing has on IS upgrade?

How well the timing of this recently upgraded IS succeeded? _____ (On scale 1…..5, where 1 = poorly and 5 = outstandingly)