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Reasons for Reorganization of Software Application Hosting and its Connection to Resilience in Software and Processes

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ABSTRACT

This paper suggests reasons why an organization starts the process of reorganization of its software applications hosting and how these reasons are connected with resilience in software applications used and business processes. The organization in question is a Swedish municipality and the decision investigated is a sourcing decision process. It is found that one main reason for starting the sourcing decision process is that the municipality needed to increase the control over software applications that were used. It can be suggested that, in order to have resilience in software and processes, how and where hosting is made plays an important role. This can be compared to centralization versus decentralization of hosting and the role it plays for delivering services 24 hours seven days a week. It can be concluded that municipalities have to prepare for that citizens will do more of the services which the municipalities' employees did before. This demands a higher level of resilience between software, processes and users in the future. This needed increase in resilience could be seen as a decisive factor for organizations to start a reorganization regarding hosting of software applications.

Keywords

e-Government, Governance, Hosting of software applications, Reasons for reorganization of hosting, Sourcing decisions.

INTRODUCTION

This paper deals with the question if sourcing decisions of how and where hosting of software applications are related to resilience in software and processes? However, that question to a high extent depends on what resilience means. Resilience can be described in the following way: *“In business terms, resilience is the ability of an organization, resource or structure to sustain the impact of a business interruption and recover and resume its operations to continue to provide minimum services”* (Answers.com, 2005). From this definition it could be stated that resilience is about how an organization secures and protects its information and communication technology (ICT) resources. Security and protection of ICT resources could be said to be about hosting of the resources to a great extent. Hosting in this paper is defined as localization. However, localization can be seen from at least two perspectives, how and where. First, how hosting is made could be roughly described as either centralized or decentralized. Decentralized hosting is when the user of the software application takes care of the hosting, as in the case of software applications located in PCs; in centralized hosting the usage is separated from the hosting part, as in the case of a client/server architecture. The second perspective can also be described as either centralized or decentralized with the case of PC versus client/server again as an example. However, another dimension is if the hosting is done internally in the organization or if the hosting is delivered as a service from an external provider, such as in the case of using external service providers. Another dimension that brings the issue of hosting of software applications and where this is located to the fore is the fact that the evolution of ICT has caused customers of organizations to a great extent to use the organization's ICT resources themselves. This increase in the numbers of users of software applications has raised the issue of security, protection and thereby the need for having resilience in software and processes. This discussion leads to the questions discussed in the paper: Why do organizations start a sourcing decision process aiming at reorganizing their hosting of software applications, how does the need of resilience influence the start, and what connection exists between these reasons and resilience?

The rest of the paper is organized in the following way. The second section describes reported reasons from the literature of why organizations start a sourcing decision process. Section three describes the retrospective study of the municipality that acts as empirical evidence of the findings that are discussed in section four. Section four delivers a discussion about why the decision-making in the municipality was started. The final fifth section summarises the paper and gives some conclusions to be drawn from the study.

WHY DO ORGANIZATIONS START A SOURCING DECISION PROCESS?

In this section five factors are described as reasons for starting a sourcing decision. These are: control, core competence, capability, cost and strategy. These factors are described as five propositions.

A sourcing decision process starts because the organization need to increase control

It can be stated that one reason for starting a sourcing decision process is that the organization needs to increase control. This control could be to control the cost of using software applications. It could also be control of the actual usage of the software applications, which could be described as a need to control what, when and how the software application is used, so that the software application support the business processes in the organization. Control is here compared to governance and it can be claimed, according to Weill and Ross (2004), that effective governance is important for effective management of software applications. Governance could to a great extent be characterized as “authority” as defined by Simon (1997) or “politics and power” as defined by Pettigrew (1973) or strictly as “decision rights”. So the question is what these “decision rights” are about. Weill and Ross (2004) describe ICT governance as decision rights regarding ICT management. Weill and Ross (2004, p. 8) define ICT governance as “*specifying the decision rights and accountability framework to encourage desirable behavior in the use of ICT*”.

Governance is in this context described as relating to controlling what happens in the organizations and especially how organizations use software applications in the best way. It could be compared to centralization as well as decentralization. It could be stated that in order to increase control from a specific decision-maker’s point of view centralization of resources is made. It can also be stated that the lack of control to a great extent can be traced back to decentralization of ICT resources. This can be explained by, for instance, looking at the impact PCs have had on the development of different versions of software applications. More control over their own computers has made it possible for end-users to download and develop their own software applications for their own problems. To a certain degree this has probably been a good thing and a great deal of an organization’s progress could probably be explained by this. However, as Simon (1960; 1997) and Markus (1984) state it, centralization or decentralization is a question for organizations of how far they should go with the decentralization or centralization. This means that for organizations that need to improve control, centralization of their resources is one way to do that. This discussion can be summarized as follows: an organization needs to increase its control of software applications and the usage of them because it has decentralized hosting over software applications too much. In order to increase control and thereby governance, outsourcing is a feasible sourcing option. However, to be able to have successful outsourcing the organization needs to have a certain degree of control and consequently the first step in outsourcing is to do an internal restructuring. Control in this context refers to both cost control, control of the usage, control of what software applications are used as well as control of versions of software applications. The evolution of ICT has facilitated this, without making the increased level of control a hindrance for the organization’s development.

Proposition 1: A sourcing decision process regarding hosting starts because organizations need to improve their governance of the software applications used in the organization.

A sourcing decision process starts because of a desire to focus on core competence

It can be stated that hosting decisions are initiated in organizations because these want to focus on their core competence. However, this depends to a great extent on what core competence is, and it can be claimed there are some difficulties in defining core competence. Axelsson and Wynstra define core competence as “*the most critical and most distinctive resources a company controls which are the hardest for others to copy when they are in a number of processes connected to the relevant strategic goals which the company pursues*” (Axelsson and Wynstra, 2002, p. 72). Kakabadse and Kakabadse (2002) claim that one key driver for using external service provision is a desire to focus on core competencies. Dewire (2001) argues that an organization should adopt external service provision if ICT is not a core competence. Aalders (2001, p. 219) proposes twelve reasons why an organization should outsource. The reported reasons given by Aalders treat ICT as one thing and do not highlight the differences between, for instance, maintenance and hosting.

It can be claimed that the start of a hosting decision process is influenced by a desire to focus on core competence, since the decision-makers see this as a way of focusing on the organization’s core competence. This indicates that sourcing decision-

making often involves an unclear view of the differences between hosting, maintenance and development of software applications. However, with understanding of those differences it can be suggested that if hosting is seen as part of the organization's core competence it should not be outsourced, and if hosting is not seen as part of the organization's core competence it should be outsourced. From this discussion the following proposition can be formulated:

Proposition 2: The decision-makers' view of hosting as part or not part of the organization's core competence influences the start of a sourcing decision process with the aim of focusing on core competence in the organization.

A sourcing decision process starts because of a need to increase capability

It can be claimed that the need to increase capability and especially capability obtained by use of software applications influences hosting decisions to great extent (Johansson, 2004). However, this depends on whether decision-makers see it as possible to increase the organization's capability by the use of software applications or not. It also depends on the decision-makers' thoughts about how different sourcing options influence the possibility to increase capability, which indicates that if the decision-makers are not satisfied with capability obtained they start a sourcing decision-making process.

From the capability perspective another reason why organizations start a sourcing decision process can be suggested and that is that decision-makers see internal ICT departments as unresponsive (McLellan, Marcolin and Beamish, 1998), and it is claimed that an organization's internal ICT department does not respond to organizational needs. Arguably organizations want a flexible ICT organization and the sourcing decision-making process is started with the aim of investigating how different sourcing options can contribute to this. A change in the structure of the organization and especially the use of external service provision is seen as a way of reaching this. A commonly quoted reason for ICT outsourcing is that ICT outsourcing provides increased flexibility to cope with changes in technology and in the business environment. Paradoxically the traditional ICT outsourcing agreement is based on long-term contracts that rather tend to inhibit than facilitate change (Shepherd, 1999). The aim of the sourcing decision process can be said to investigate if external service provision is a way for organizations to take advantage of the rapidly changing opportunities in ICT (Turban, McLean and Wetherbe, 2001; Currie and Seltsikas, 2000), and if it can assist organizations with ICT skills, especially in the development and software maintenance areas (Kern, Lacity, Willcocks, Zuiderwijk and Teunissen, 2001). However, it could be asked if it does so also regarding hosting. According to Mata, Fuerst and Barney (1995) it can be claimed that how resources is organized is very dependent on whether the resources provide the organization with competitive advantage. Having competitive advantage could be seen as having capability. From this discussion the following proposition can be formulated:

Proposition 3: The start of a sourcing decision process on hosting of software applications is influenced by a need to increase organizational capability from software applications.

A sourcing decision process starts because of a need to decrease costs

In organizations a great deal of resources are spent on maintenance of software applications (Brandt, Carlsson and Nilsson, 1998). Leffler (1987) argues that in most enterprises the cost for maintenance of ICT amounts to 50 to 80 per cent of the ICT budget. BearingPoint (2004) states that 57 per cent of an organization's ICT budget goes to support and maintenance. This means that for an organization that wants to decrease its ICT costs, savings on hosting and maintenance would be beneficial. The question is if this reflects why organizations start a sourcing decision process regarding hosting.

It could be claimed that one of the frequently reported reasons why organizations make a restructuring is that they want to decrease costs (McLellan et al., 1998). Arguably hosting is a task that needs considerable resources and costs much money. Therefore it could be claimed that one reason for starting a sourcing decision process is that the organization needs to decrease its costs of hosting and a reorganization of hosting is seen as the answer to this. This starting point is probably the one that has the clearest connection to the final choice of solution and also the closest connection to a clear assessment of the outcome of a sourcing decision. In other words this starting point means that the option with the lowest costs is the one that is finally chosen. However, if this is true a reason for starting a sourcing decision process could be formulated as in the following proposition:

Proposition 4: The start of a sourcing decision process on hosting of software applications is influenced by a need to decrease the costs for hosting.

A sourcing decision process starts because of the organization's strategy

An organization's strategy can also be seen as starting point of a hosting decision process. It could be clearly stated in a written strategy that hosting of software applications is not anything the organization should do, or it could be clearly spelled out verbally that the organization should not deal with issues regarding ICT resources. But such clearly stated strategies are

probably rare. However, in all organizations there is some kind of strategy, clearly expressed in a written document or just existing in the head of some decision-maker. In any case it can be stated that strategy plays an important role when it comes to why organizations start the process of a sourcing decision. This can be described as strategic architecture, which according to Hamel and Prahalad (1994) is the link between the now and the future. It could help decision-makers to structure the organization so that it starts to build the competencies that are needed in the future. Relating this to hosting decisions it could be that a hosting decision is initiated from a decision-maker's thoughts about the future and could be seen as an approach to developing future opportunities.

However, this probably depends on the size and structure of the organization but also on what role hosting plays in the organization and if the organization has one or several departments that deal with hosting of software applications or if the hosting of the used software applications is done by individual employees. By the last is meant that the user of a specific software application also uses the own PC to host that application. In that case a sourcing decision process will probably not start from the organization's strategy. However, this could be compared to a discussion about emergent strategy (Mintzberg and Quinn, 1996). It could be claimed that the hosting structure is an outcome of a strategy emerging from various decisions, that demands reorganization were decision-makers see the structure that has emerged as a reason to reformulate the organization's strategy. From this discussion the following proposition can be stated:

Proposition 5: An organization's strategy acts as the main influence on why a sourcing decision process is started.

THE MUNICIPALITY SOURCING DECISION CASE

This section reports from a retrospective study of a decision-making process in a Swedish municipality. The municipality, which is a Swedish local government, in 2002 started an investigation about how it should organize its hosting of software applications. The study of this process consists of eleven semi-structured interviews, which were tape-recorded. The interviews were made in January 2005, just after the decision-making process had been finalized. The material under investigation also consists of documented materials in the form of minutes but also reports from investigations made by the participants in the decision-making process employed by the municipality. It also includes a report made by an external consultant. A content analysis was made. The propositions presented in the section above have been used to structure the analysis and should be seen as a point of departure for the analysis.

According to Pettigrew (1973), it is important to describe and understand the history of an organization if a decision-making process and the reasons for starting the process should be described in a correct way. The history of the municipality can be described by its ideology, which is to strive for a great degree of decentralization. The municipality administrative unit consists of eleven committees. Six of these committees are organized into one group, the municipal executive committee. The other five are self-organized committees. They are supposed to be supervised by the municipal executive committee. However, as the ideology of the municipality focuses on decentralization to a great extent, these committees have a far-reaching decision authority. The effects of this ideology are very clearly shown in how the municipality has organized its hosting of software applications. Each of the committees has developed its own organization and hosting of its software applications. However, the municipal executive committee is meant to have the overall responsibility for the municipality's general ICT infrastructure. To illustrate the effect of the decentralization and the involvement of software applications in the municipality, it can be mentioned that a great variety of software is used in the municipality. There are nine different office products, eleven different database systems, sixteen different operative systems, five different e-mail software and 66 different software applications that are identified as critical for the municipality. In addition to those 66 software applications there are an unidentified number of software applications. This could explain the reason for the decision-making process. As described by the chief executive officer (CEO) in the municipal executive committee *"the weter of the municipality's software applications and ICT has to be controlled"*. This could probably be seen as the starting point of the decision-making process and the project *"ICT and telephony coordination"*.

The sourcing decision-making process

The process started in March 2002. A standing committee, consisting of the five municipal commissioners and the CEO of the municipal executive committee, gave the municipal executive committee the task to investigate the common ICT infrastructure in the municipality. The reason was the expansion of ICT used in the municipality. The investigation should define the municipal executive committee's responsibilities for development, maintenance and hosting of the municipality's general ICT infrastructure. It should also describe the need for competence development and how this should be organized. Following this directive the municipal executive committee engaged a consultant to make the investigation. The consultant interviewed employees on various committees, including some employees responsible for the ICT of the individual

committees. The consultant stated that the organization of ICT was distinguished by decentralization to a great extent, and there were no established long-term plans for how ICT should be developed.

In December 2002, the municipal executive board entrusted the municipal executive committee, in collaboration with committees involved with the task of investigation the possibility to coordinate hosting of software applications of the planned data centre. The next step in this decision-making process, which probably had the most impact on the outcome of the decision, was the employment of the new chief information officer (CIO). The CIO began to work on this issue in 2003 and immediately organized the decision-making process as a project. The CIO then presented the result of the project to the municipal executive board in October 2004. He stated in his report that a decision to position the municipality for its future development was necessary. There were two options. The options were to “*continue with the ICT infrastructure that historically has been built up in the different committees with a very low grade of coordination*” or “*to coordinate the ICT function and telephony for better usage of existing resources making the municipality prepared to meet future challenges and possibilities of increased effectiveness*”.

The basic data for the decision-making was a report from the project work, a file of investments necessary from 2005 to 2007 and an estimate of costs for the hosting of ICT after the reorganization. The municipal executive board decided for the option aimed at restructuring and coordinating hosting of software applications in the municipality. Since this decision meant exceeding the approved budget, it needed approval by the municipal council. This was granted in November 2004, and the decision was to coordinate hosting of software applications and ICT in the planned new data centre. The decision by the municipal council was unanimous.

Why the decision-making process was started?

There were two reasons to start the decision-making process aimed at restructuring hosting of software applications in the municipality. First, the municipality needed to increase its control over its ICT costs. ICT costs had probably increased considerably. The reason for using the word “probably” is that the municipality did not know how much it’s ICT cost. In each unit the committees had, according to the CEO, a good grasp of their own costs. But overall control of costs was weak. Cost control was emphasized as one area that must be improved. Weak cost control was also given as one reason why outsourcing was not seen as a possible alternative at this stage. However, the attempt at coordinating and increasing control was described as aiming to facilitate having an external partner to compete with the internal data centre.

Second, security was emphasized as an important factor for starting the process. The hosting of a number of critical software applications was dependent on only one person. This was described as an effect of decentralization, and the decision-makers saw centralizing the hosting as the only alternative. The other security concern was that some of the committees did not have suitable premises for their servers. Both cost and security reasons could be described as a need to increase control and could therefore be seen as an attempt to increase governance of software applications in the municipality.

To increase control can therefore be seen as the reason for the initial directive from the standing committee in March 2002, which was to investigate the municipality’s general ICT infrastructure. The consultant’s report has one point that reflects the results of the entire decision-making process in an interesting way. He states that the development of broadband connections in the municipality prompted the issue of a coordinated hosting of the entire set of the municipality’s servers.

It could be argued that one reason for the municipality to start the sourcing decision process was that decentralization of ICT resources had gone too far at least from the entire organization’s perspective. The municipality had built up a structure in each department leading to increased complexity in the hosting and maintenance work of its software applications.

DISCUSSION

The structure of software applications and ICT in the municipality is straggling. It can be claimed that it is well controlled, since each committee controls its own resources. However, from an overall perspective, control is inadequate. The municipal executive committee that is supposed to have the overall control and should coordinate generally used software applications in the municipality, is struggling to do this. That ICT resources are not well controlled in the municipality is reflected in the statement by the municipality’s CIO who says nobody can clearly state how many different systems there are. The CIO says that the number of different software applications used in the municipality is in the range of 300-400.

Increasing control and governance can be seen as reasons for the initial directive from the standing committee. The initial directive in March 2002 was, as described in Section 3, to investigate the municipality’s general ICT infrastructure. It is clear that the consultant exceeded the instructions when he also investigated the ICT infrastructure of the different committees. However, the consultant also recommended a total investigation aimed at centralizing all hosting at a central data centre. The report stated that the development of broadband connections under the management by the municipality highlighted the issue

of coordinating hosting of the entire set of the municipality's servers. This was a major reason for the start of the decision-making process regarding hosting. By providing citizens with a broadband connection the municipality expected citizens to communicate more with the municipality through this broadband. Investing in broadband connections demands offering citizens' meaningful usage. One reason for the sourcing decision process was that the municipality organization had decentralized too much and the decentralized hosting structure was not seen as suitable for an introduction of e-government. However, as Simon (1960; 1997) and Markus (1984) describe it, whether to decentralize or not is not the issue. Instead it is questions of how far an organization should decentralize or centralize as well as a question of what an organization should decentralize versus centralize. In the municipality the decentralization of ICT resources has gone too far, at least seen from the entire organization's perspective. Each department has its own structure of software applications leading to increased complexity of the hosting and maintenance work of those applications which makes it more difficult to attain resilience.

CONCLUSION

The strategy of the municipality can be seen as aiming at decentralization as much as possible. In spite of this it started a sourcing decision process aimed at deciding on a solution that centralized the hosting to a great extent, a decision contradicting the strategy. Comparing this with Hamel and Prahalad's (1994) discussion about strategic architecture it can be suggested that the decision was made with the objective of making it possible to decentralize even further. This can be explained if one looks at the new users and the new usage of the municipality's software applications. It can be claimed that the municipality has far-reaching decentralization and continued decentralization by letting the citizens themselves produce the services they need is seen as beneficial. The next step for the municipality is to decentralize tasks to the citizens. The decision-makers have seen it as necessary to restructure the hosting of software applications, to be able to increase control, increase capability, decrease costs. This can be related to a change in strategy which means that the municipality focus on its core competence that is to provide services to its citizens. To be able to fulfill these factors a higher resilience between software and processes are needed, and the centralization of hosting is seen as the solution for that.

From this it can be concluded that municipalities in Sweden have to prepare for their future usage of software applications, implying that citizens will do more and more of the services which the municipalities' employees have done before. This requires municipalities to prepare for a higher level of resilience in software and processes in the future. This needed increase in resilience could be seen as a factor that makes organizations start a reorganization regarding hosting of software applications.

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