e-Government challenges –

from applications to complex solutions

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Abstract Many big organizations including Government agencies have what can be called a “multi-technological” chaos. They have in many cases hundreds of IT-applications badly coordinated and integrated. A proposed cure for this is often procurement of big and comprehensive software packages like Enterprise Systems. We argue that the procurement of this applications often are done in an old fashion way influenced by old behavior and outdated roles. This paper analyses two Swedish Government cases based on three complementary perspectives that can help the buyer and the seller to better understand the complex solutions of which the software should be a part.

Keywords: *e-Government, Enterprise Systems, Procurement, Complementary perspectives, Complex solutions*

I. INTRODUCTION

The use of electronic means to conduct an organization’s business internally and/or externally can be described as e-business [1]. This paper focuses on e-business within government organizations and procurement of complex software. The goal of the paper is to discuss how the procurement situation can be improved by a better understanding of important buyer, seller and organizational perspectives.

The software business has been undergoing dramatic changes over the past several years. The changes have heavily affected users as well as producers of software products and services. The most significant change perhaps is the decline of traditional product sales or license fees and the shift in product company revenues to services. This shift has been especially pronounced among the vendors of enterprise software.

Enterprise Systems appear to be a dream comes true. These commercial software packages promise seamless integration of almost every data and information flow in an organization. For the first time since large businesses were created, managers may be able to monitor the doings in an organization in near real time. But there are a lot of potential dangers and many debacles have been reported. These systems are profoundly complex pieces of software that requires large investments of money, time, and expertise and an understanding of the complex situation that they are a part of.

II. WHAT TO BUY AND HOW

Procurement can be seen as a ‘hard’ problem if the goods or services to be procured are very well specified, defined and commonly recognized. Procurement of complex software like

Enterprise Systems for example cannot be regarded as a “hard” problem because of its complexity and the many relationships it must handle. The trend seems to be that more relations need to be taken into account like, corporate social responsibility, environmental requirements and end user demands. The procurement therefore becomes ‘softer’ the more complex the situation is. A traditional way to categorize *what* and *how* has been into direct and indirect material and whether the buying is systematic or spot buying [2].

This approach has limitations when it comes to buying of complex software systems. Therefore, to get a deeper understanding of sourcing and procurement it is important to focus even more on what you are going to buy and then how you are going to do it. The specification of what you are going to buy is then strongly influencing how you are doing your buying. A better understanding of the linkage between *what* and *how* is needed. A starting point is to discuss the procurement context from both a buyer and a seller perspective.

III. THE PROCUREMENT CONTEXT - BUYER PERSPECTIVES

The buyers’ perspectives are influenced by the market possibility, if it is a commodity or a complex system buying, and if the organization is private or public. In many countries, the last factor is defining how the procurement is carried out and how tenders are handled. Public organizations normally have to follow the Laws of public procurement and in Europe EU regulations.

The object to be procured needs to be classified in new ways like the degree of commodities or systems, and the complexity of the overall solution where the procured system is a part.

Flood and Jackson [3] describe complex systems as having the following characteristics: (a) a large number of elements, (b) many interactions between the elements, (c) attributes of the elements are not predetermined, (d) interaction among elements is loosely organized, (e) they are probabilistic in their behavior, (f) the “system” evolves over time, (g) “subsystems” generate their own goals, (h) the “system” is subject to behavioral influences, and (i) the “system” is largely open to the environment.

Viewing complexity in this way, with its many facets, implies that a procurement of a complex system needs a more

comprehensive specification than a procurement of a commodity. The discussion among major stakeholders must therefore decide the specification and assessment model to be used. The final step, how to find and source the potential suppliers, will then determine and influence the processes how to do it.

Figure 1. Procurement context. [4]

The three dimensions in figure 1 can have many combinations. If you look at the procurement of enterprise software trying to replace a lot of more or less separate IT systems you will find that the number of potential suppliers is few. If you look at the other two dimensions you will find that the procurement specifications often are reduced to functional specifications for the software package as if it was a commodity.

This approach does not take into account the fact that the procured system will be put in as a vital part in a broader context with many stakeholders with different values and beliefs. Therefore it is essential that the buyer of these systems broaden their perspective with a better understanding of the complexity of the whole situation and the need to handle the relationships between all important stakeholders.

IV. THE SELLING CONTEXT – SELLER PERSPECTIVES

The software business has changed dramatically over the past several years. The changes have had important implications for the buyers, users, and seller of software products and services. Cusumano [5] has explored this phenomenon from three dimensions. He discusses changes in the revenue models, the delivery models, and different customer segments.

The revenue models are changing from traditional up front license models to subscriptions and software as a service and even free license models, getting revenues from services. The delivery models are changing from local client installations to remote web based delivery models. Last but not least the customer and buyer perspectives are changing. There are many commercial structures in the software industry that are difficult to change overnight. Software sales processes for all larger software companies are designed to deliver significant software revenues to the shareholders. Still software companies are forced to change their business models.

There are several reasons for this. One reason is free and open source software. Another reason is that the market has seen many enterprises and individual buyers rebelling against paying a lot of money for software. Consulting companies and

implementation partners acting in the software industry context also influence the overall dynamics in the industry, adding more participants and complexity in the sales processes.

We argue that the buyer and the seller depending on their background often have different opinion about the solution that they together should solve with the help of the procured software. In order to improve the situation we propose an additional perspective based on soft systems methodology that can be used as a complementary view for the buyers and the sellers get a better understanding of *what* should be delivered.

V. “SOFT SYSTEM” PERSPECTIVES

Management science has been heavily influenced by the goal-seeking paradigm. Soft systems thinkers like Checkland regarded this as an inadequate formulation in terms of the actual practice of management. He and others pointed out that intervening in ill-structured problem situations required relationship maintaining that is at least as important as goal-seeking and answering questions about what we should do is as significant as determining how to do it.

During the Second World War three system methodologies were born. The methodologies were Operational Research (OR), Systems Analysis (SA), and Systems Engineering (SE). They were all attempting to tackle real-world problems in a systematic way. Applying this kind of systems thinking to real-world problems was a breakthrough. Much criticism has however been put forward regarding these methodologies limitations for management use. The criticism has been focusing on its inability to handle significant complexity and to cope with a plurality of different beliefs and values. This “Hard system thinking” can for example not be of much help when it comes to politics and power games in an organization. The reality facing today’s managers is so complex and subject to change that it is impossible to reduce problem situations to a form that would make them amenable to such modeling. Another limitation is that hard systems thinking are unable to deal satisfactory with multiple perceptions of reality. [6]

Stakeholders have normally diverse opinions about the nature of the system they are involved with and about it’s proper purpose. Therefore, in the 1970s a general understanding was established that hard system thinking was not useful for more complex situations and in problem contexts that were deemed to be more pluralist and coercive in character. Systems methodologies related to problem contexts were than created focusing on systems models expressing different viewpoints so that alternative perspectives can be systematically explored, compared and contrasted. This approach has been called “soft systems methodology”. Soft systems thinker abandoned the notion that it was possible to assume easily identifiable, agreed-on goals that could be used to provide an objective account of the system and its purpose.

The “soft systems” approach suggests that complex real-world problems should be discussed and analyzed with help of the “ideal-type” grid of the problem context. The participants and the complexity of the system in focus are the two primary sources in a problem situation in this approach. (Fig. 2). The vertical axis expresses a continuum of system types conceptualized at one extreme as relatively simple and at the other as

extremely complex. The horizontal axis classifies the relationships that can exist between those concerned with the problem context. The participants are then classified in three types, “unitary”, “pluralist”, and “coercive”. When participants have relationships with similar values, beliefs, and interests they are defined as unitary. On the other extreme participants are called coercive when relationships have few in common and, if free to express them, would reveal conflicting values and beliefs. [6]

		PARTICIPANTS		
		UNITARY	PLURALIST	COERCIVE
SYSTEMS	SIMPLE	Simple-Unitary	Simple-Pluralist	Simple-Coercive
	COMPLEX	Complex-Unitary	Complex-Pluralist	Complex-Coercive

Figure 2. Jackson’s extended version of Jackson and Key’s “ideal-type” grid of problem contexts. [6]

We argue that most of the large software systems and business-solutions that big organizations procure must be analyzed and understood as complex-pluralistic if not complex-coercive based on the problem context. Using this approach can be fruitful complement to the buyer perspectives and help the buyer to better understand what to buy. The seller can also be helped by complementing his perspectives on the complex business solution he should offer.

VI. SWEDISH CASES

To illustrate the need to better understand the problem situation when complex software are procured a short analysis of two public procurements in Sweden will follow. The findings from the cases are based on reports from The Swedish Agency for Public Management (Statskontoret). The agency provides the Government with survey support in its efforts to strengthen the capacity of Sweden's public administration.

A. Swedish Armed Forces

In order to fulfill its responsibilities, the Swedish Armed Forces is allocated around 4 billion Euros each year. One half goes to operations and the other half to research, development and materials systems. The Swedish Government decided in June 2003 to start implementation of a new integrated resource and control system for all parts of the Swedish Armed Forces. The project is called PRIO. The overall purpose of the investment is related to the rapid world changes and the Government's requirements to have better cost control of the Armed Forces. The Three Main goals for PRIO were:

- Decision and management support for top management
- Fulfillment of external requirement regarding cost control and auditing
- Strengthening and improvement of all processes within the Armed Forces

These initiatives, which are supposed to develop the Armed Forces, shall be supported by PRIO project. Statskontoret got an assignment from the Government in 2005 to evaluate and audit this big project. The project has six implementation phas-

es ending 2012. The initial cost for the project was estimated to 250 million Euros for the period ending 2017 after five years of operation. A final report has been presented by Statskontoret in June 2010. A lot of important data and facts are revealed in the report. Some of them are the following:

- The project cost has increased by 60% and is now estimated to 400 million Euro
- The economical benefits estimated by the Armed Forces is 210 million Euro for the years 2009-2018
- The first part of the project has been implemented in April 2010
- A lot of today’s IT-systems will be replaced by PRIO
- The quality of the data and information in the old systems are by and large unknown
- The system support is based on software from the software provider SAP
- Many stakeholders within and outside of the Armed Forces are affected
- IBM was chosen as the main contractor based on functional specifications prepared by the Armed Forces

[7]

B. Swedish Social Insurance Agency

Social insurance is an integral part of most people’s daily lives in Sweden. The Agency has crucial impact on the population’s security and welfare and on the national economy. In 2008, the cost was 46 billion Euros. That is equivalent of 15% of the gross national product (GNP). A little over the half of the expenditure went to old age pensioners and survivors. A third was spent on the sick and disabled, and the rest to families and administration. [8]

The daily operations at the agency are more or less completely dependent on the installed IT systems. The government therefore gave the Statskontoret an assignment in 2005 to evaluate an audit the IT plans and implementations at the Agency. The final report was presented in June 2009. The report contains a lot of severe critique regarding IT procurements and implementations. The critique can be summarized in the following categories:

- The agency has a model for IT governance but it has yet to be implemented
- The old IT-strategy has not been changed to reflect the new organizational structure and it’s new way of operating
- The heavy reliance on software from SAP, where 70% of the functionality would be standard solutions, is withdrawn after severe failures
- There is a bad alignment between the user’s need and the IT-solutions

- The agency have relied substantively on consultants for development and testing of new systems
- The money spent on different projects is very difficult to measure

[9]

VII. DISCUSSION AND CONCLUSIONS

The PRIO project in Sweden is a typical project where the demand for change in the organization is huge. A change of the information system is only one aspect of the overall change. The investments are also huge. The report from Statskontoret states that several problems are more related to aspects outside of the actual system. The procurements were done the traditional way with up front license investments and one vendor (IBM) as the main service contractor. Since first going live in January 2009, the operation of the technical system has been relatively stable with a limited number of errors of a more serious nature. In contrast, activity-related disorders and quality defects have had a significant impact on activities. This is particularly true for the work on the financial statements, accounts payable and procurement processes. The human resource center have had great problem with change management and changing operational behavior. All the problems and deficiencies are serious.

When we analyze the procured IT-solutions at the Swedish Armed Forces and Social Insurance Agency with the help of the perspectives presented above we find that at lot of mistakes have been done. The first three conclusions are related to both cases and the two last conclusions are more strictly related to the PRIO-project.

- The IT solutions were based on functional specifications as if they were a commodity although it was as a complex-pluralist situation. The quality of master data (the system's basic information, such as suppliers, employees, accounts, etc.) was inadequate. System for operation startup was not sufficiently tested.
- A lot of important stakeholders view on the complex solution where the software system should be a part was not taken into account. Business presence and involvement of the regular organization have generally failed. Stakeholders of the new systems were inadequately prepared for the new situation and were not introduced to new ways of working.
- The vendors and the consultants with their high demand for profit have been given too much influence. The operational conditions were not stable in terms of business processes, administrative procedures, roles and responsibilities, and integration with existing systems
- The PRIO project was too big and has been prolonged over so many years that at least four of complex systems characteristics (f)-(i) have not been taken into account.
- The Government as a main stakeholder has decided in 2010 to start an investigation regarding improved processes and the organizational structure of the Armed

Forces. Big parts of the PRIO system will be affected by the results of this investigation.

In this paper we have examined e-Government challenges. The e-Government solutions we have analyzed belong to the category complex-pluralist, if not complex-coercive. The seller and buyer perspectives create mechanisms, incitements and procedures that push the procurement toward "Simple-Unitary" thinking. View from an organizational perspective we also argue that important business matters are delegated to IT-people and consultants with little or no knowledge of the real organizational processes and needs. There are many reasons to believe that a lot of governmental organizations are in a similar situation.

We have investigated the selling and buying context from a Meta perspective with the purpose to identify mechanisms and structures that affects a procurement situation. The mechanisms and structures are not possible to change quickly, though there are changes ahead in the selling context. This can be further catalyzed by a changed procurement behavior. We believe that the knowledge of these forces is a good foundation for identifying possible improvements. A new focus on *what to buy* and *how to do it* is needed.

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