Using Rich Pictures to Represent Stakeholders' Role during Enterprise Systems Upgrade Decisions

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Abstract. Upgrading Enterprise Systems (ES) is essential to supporting a system's continuous improvement and stability. However, the decision to upgrade is influenced by different stakeholders' needs and perceptions. This paper utilizes Rich Pictures to get a better understanding of the stakeholders' role in the upgrade decision-making process from an organisational perspective. A qualitative survey design is adopted, utilizing semi-structured interviews to collect data from ten large organisations. Data accumulated was qualitatively analysed, and Rich Pictures were used to represent the data in the pictorial form. Analysis of results reveals complex interrelations between the stakeholders; this highlights the need for a reconciliation system to combine the different stakeholder perceptions during the upgrade decision-making process. The use of Rich Pictures in the study demonstrated the importance of balancing various stakeholders' perceptions that influence ES upgrade decision-making. Further research is required to explore these influences in depth to produce a reconciliation system that creates a combined effect between all the stakeholders' interests.

Keywords: Enterprise Systems, Upgrade decisions, Rich Pictures, Upgrade Stakeholders,

1 Introduction

Stakeholders' involvement in Enterprise Systems (ES) implementation is regarded as one of the most influential factors that lead to successful implementation [1]. Beatty and Williams [2] recommend considering upgrade projects as an implementation project, which is supported by different stakeholders with diverse roles, each having their set of expertise to contribute to the upgrade project. Thus, the stakeholders' involvement in upgrade is similar to implementation projects. In their study and based on previous studies, Walker, Steinfort and Maqsood [3] suggest four categories of stakeholders (i) clients; (ii) project leaders; (iii) outside services; and (iv) invisible team members. Additionally Walker, Steinfort and Maqsood [3] identifies there is a need to balance these stakeholders' interests to support effective project development and management. Eskerod and Huemann [4]

point out that typical stakeholders in projects include investors, suppliers, customers, users, authorities, neighbors, and media. While this categorization of the stakeholders is useful, when considering upgrade decisions from an organisational perspective it is important to expand on the stakeholders' categories. Based on Beatty and Williams [2] the upgrade project team will comprise technical and functional leads, end – users, management, vendors, consultants, legal entities. According to Wang and Chen [5], vendors, legal entities and consultants are considered to be external stakeholders, and top management, end-users, technical and functional personnel are regarded as internal stakeholders. Alsulami, Rahim and Scheepers [1] outline the different ways consultants are engaged in the change process and resolve conflicts. For example, organisations are dependent on consultants for knowledge, technical assistance, and expertise about the system; however, sometimes in-correct advice could be offered to for financial gains. Such contrasting influences highlight how external stakeholders' affect upgrade decisions.

Due to this diversity, the upgrade decision-making process requires a thorough understanding of these individual experiences in order to provide a more detailed representation of each stakeholders' needs and wants. Based on the different values that can be leveraged by upgrading it is important to maximize the upgrade benefits, which requires an inclusive approach that embraces all stakeholder opinions to enhance the organisation's strategic goal. According to Eskerod and Huemann [4], in such a situation stakeholder analysis plays a critical role to satisfy the different stakeholders interests as this enables opportunities and challenges to be anticipated. Also, stakeholder analysis will facilitate getting a better understanding of the stakeholders' interests and concerns. However, the interaction between the different stakeholders during upgrade projects is complex. Eskerod and Huemann [4] suggest that the use of Rich Pictures would enable the complexity to be addressed while attempting to prevent stakeholders from being overwhelmed by it, as the enable the analysis of the situation at hand by offering visual representation of the interactions to benefit the thinking processes [6].

Despite numerous studies on stakeholders' engagement, little work has so far been reported that explains the role of the stakeholders in ES upgrade decisions, indicating that there is a need for more effort to explore the influences of the stakeholders on ES upgrade decision-making. This study aims to understand the role of the different stakeholders in upgrade decisions and utilises Rich Pictures to represent the interactions of stakeholders during the upgrade decision-making process in order to to identify the stakeholders' worldviews.

2 Rich Pictures

The construction of Rich Pictures is one of the stages of the Soft Systems Methodology [SSM] [13], which is itself arguably one of the most well-known and enduring of a number of socio-technical approaches for systems design. The drawing of Rich Pictures is real-world activity, applied to situations, which are perceived to be problematic in some way. The SSM analyst will spend time within the problem situation as an observer

and will articulate what they perceive to be the main tasks and issues of the situation in pictorial form. It essentially serves as an aid for the facilitator to understand the organisational context of worldviews. The technique of rich picturing can be used by experienced users of the methodology throughout the application, that is, it can extend into the systems modelling stages. In general, the purpose of the Rich Picture has changed and broadened over the years of the development of the methodology, and it can be used as an interactive communication technique. Thus, it can also be used independently of the methodology, to enable systems designers to understand tasks and issues inherent in the organisational environments in which systems operate. Rich Pictures are therefore an ideal approach for capturing the stakeholders' influence on upgrade projects, as they encourage the exploration and representation of the complex situation to offer a broader understating of the 'hidden meaning' about the concept under discussion [6]. Mayouf, Cox, and Boyd [14] suggest Rich Pictures can be used to represent the same situation differently, thus allowing exploration of the various stakeholder's perspectives. Further, a Rich Picture should reveal not only the complexity of such perspectives but also the interacting relationships between them. It, therefore, offers a conducive approach to represent the human aspects of the situation and helps to gain a better understanding of the problem space by telling a detailed story that captures the 'soft' aspects that are 'human' relatable and offer sufficient meaning [3]. It is also suggested that the use of Rich Pictures facilitates effective assessment of the problem space and encourages communication as the pictorial representation helps break down barriers and prompt the gaining of new insights of the problem space.

3 ES Upgrade Overview

Organisations that have adopted Enterprise Systems (ES) are continuously faced with decisions about upgrading their systems, as the process is complex. While strategies and methodologies to minimize the risks of disruptions exist, the complexity is not eased because stakeholders have different perceptions of what the upgrade process will achieve. In this paper, Enterprise Systems (ES) is referred to as a comprehensive, configurable, integrated suite of systems, information resources and technologies which support organisation-wide operational and management processes.

Upgrading is a process of replacing a current version entirely or partly with a newer version or system, this is a continuous process recurring at least once every three years and takes up to eight months on average to complete [7]. Upgrading offers substantial benefits such as lower operational costs, improved performance, new functionalities, and technology features. However, Khoo, Chua and Robey [8] suggest that no direct business benefits are achieved, since vendors use high license fees and support pricing schemes, along with completely removing support for older versions as a technique to encourage organisations to upgrade their systems. Therefore, upgrading is an important aspect in the system's lifespan since it ensures continuous improvement and stability of the systems and aims to take advantage of the benefits such as new functionality introduced by the new version. Thus, it is important to understand when it is appropriate to

upgrade. Claybaugh, Ramamurthy, and Haseman [9] suggest that the timing should offer the assurance of minimal disruption and downtime. Additionally, Kankaanpää and Pekkola [10] suggests this is usually influenced by the 'availability of a suitable version', 'the customer's need for upgrade' and 'economics'. However, the need to upgrade is also influenced by the different stakeholders' view of the upgrade and their roles [1].

Organisations follow two upgrade strategies. Technical upgrade moves the existing system to the latest technology platform, hence concentrating on technology changes to leverage latest features and align systems within the product lifecycle. Undertaking a technical upgrade involves analyzing the structure of data dictionary objects and evaluating individual coding areas to confirm that changes do not disturb the existing system [2]. Functional upgrade concentrates on functionality extension and optimizing business processes based on the organisation's needs. Consolidation of different systems is required to optimize processes by adopting generic functionality offered in the new version. The selection between the two strategies is influenced by the various reasons that affect organisations with regard to upgrading their systems; Feldman, Shah, Chapman and Amini [11] summarized these factors as:

- Technological: - The new version streamlines processes to improve the system's usability. Thus, upgrades support organisations to reduce the effort required for, and costs of maintaining multiple versions of the system through standardizing and improving functionality, which allows leveraging latest technology features to support integration and merging with other systems.
- Organisational: - The new version improves performance by automating the processes or aligning business strategies with new functionality. Hence, upgrading provides an opportunity to evaluate, consolidate, and restructure existing business operations to ensure continuous improvement. High initial costs due to testing and reapplication of modifications could sway organisations not to upgrade. However, the potential of reducing the overall operational and maintenance costs such as licensing fees can positively influence upgrade decisions.
- Environmental: - The threats of losing support or paying a high premium for support are primary reasons why some organisations upgrade their ES. Another key factor is compliance with legislation, standards, mode of operating, especially in highly regulated environments such as the banking industry.

Thus, it can be reasoned that different stakeholders such as vendors, legal entities, consultants, top management, end-users, and technical and functional personnel play an integral role in upgrade decision-making. The combination of various stakeholders' tacit knowledge and interests is a strength but also problematic when individuals perceive ES upgrade differently. For example, Khoo, Robey and Rao [12] suggest that the stakeholders' experience will benefit the upgrade differently, citing that user experience is dependent on the successful implementation of useful new features. Hence, exploring these influence of the different stakeholders with the aid of Rich Pictures could help to provide a better understanding of a complex problem, by highlight the role of these stakeholders and identify their worldviews.

4 Research Approach

Given the complexities of upgrade decision-making and interaction between the various stakeholders' involved, further research must unravel this difficult area of ES and extend guidance for industry. This work follows a qualitative survey design which, according to Jansen [15] and Lindgren and Münch [16], is a useful approach that provides a multidimensional and diverse outlook of the subject under investigation. Thus, it facilitates correlating the information collected from the respondents' to establish common or different patterns, which supported gaining insights into complex issues associated with stakeholder influence on ES upgrades projects. The semi-structured interviews conducted allowed the in-depth investigation to elicit detailed insights about stakeholders' role and influence during ES upgrade. The participants for the study were purposefully selected to include different stakeholder with diverse roles, such as functional (business) users, technical leads and database managers, systems administrators, chief information officers, project managers, end-users and consultants. Data gathered was qualitatively analysed, the unit of analysis was the organisation. The qualitative analysis followed three steps, firstly preparation of the data i.e. transcribing the interview notes to facilitate cross-examination and gain a comprehensive picture of the stakeholders' interaction. Secondly, systematic coding was performed to give meaning and eliminate repetition, along with identifying any significant relationships emerging from the data. Two independent coders were used in order to enhance reliability of the findings. Thirdly, inferences were drawn to formulate attributes based on similarity; and a Rich Picture was developed to represent the data in pictorial form. This was later used to formulate the stakeholders' worldviews and articulate conclusions.

5 Results and Discussions

Twelve respondents with six or more years' experience and involved in two or more upgrade projects were interviewed for an average of 45 minutes each. These respondents represented ten different organisations, which were either currently upgrading, in the process of upgrading in the next 6-12 months, or upgraded their ES systems, in the previous six months. This comparison revealed different aspects to the upgrade decision-making; however, the stakeholder's interaction and their upgrade outcome expectations did not significantly change despite when the upgrade decision-making timeframe.

The findings suggest that the stakeholders' perceive the outcome of upgrade differently, which influences the decision-making. The use of Rich Pictures allowed a capturing of the complexity of upgrade projects and the different stakeholders' requirements and needs. Thus, it provided an insight into understanding the stakeholders' interaction and the messy situations resulting from these interactions. For example, Fig.1. illustrates that from a technical view ES upgrade implies changing the technical aspects of the underlying system, while business users think of upgrades as a mechanism for incorporating new functionality and improving existing processes. On the other hand,

management perceives upgrades as an opportunity to plan and improve the overall performance and direction of the organisation. These different expectations of upgrade projects present a messy situation, which can lead to making unnecessary trade-offs during the decision-making. This can result in the upgrade not achieving its objectives.

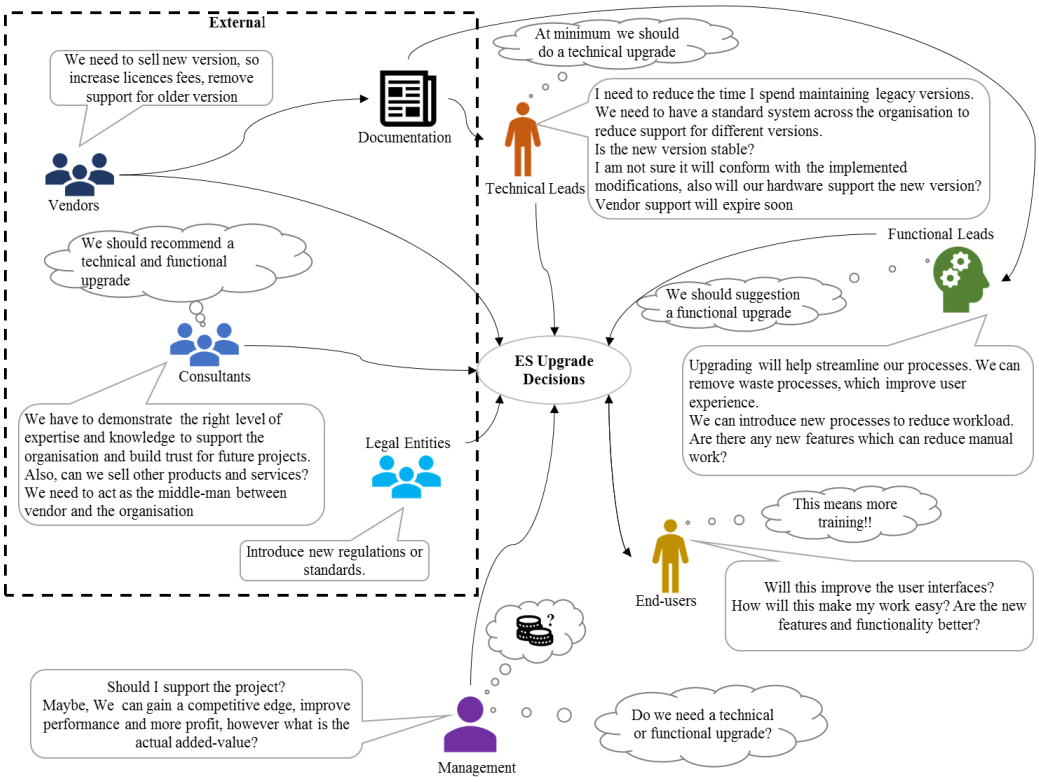

Fig. 1. Rich Pictures representing the interviews and literature review

Based on the rich picture annotations regarding the different perspectives of an upgrade process, a number of different worldviews may be suggested:

- Technical Leads: A systems upgrade should ensure an integrated and stable system which is technically supported and will eliminate the expensive maintenance of unconnected legacy systems
- End – Users (i.e. Business Users): We need a system with user-friendly functionality which is easy to use and requires minimal training
- Management: We need a system which enables us to improve organisational efficiency and effectiveness
- Functional Leads: We need a system which removes wasteful processes and reduces manual workload

- Vendors: We need to increase license fees to maintain profitability and eliminate non-cost effective support for outdated systems
- Consultants: A systems upgrade will enable us to demonstrate our value to the organisation as technical experts and ensure future projects with the company
- Legal Entities: A systems upgrade is necessary to enable compliance with regulatory requirements and to adhere to the relevant standards

These views suggest that upgrade decisions are a result of the interplay between different stakeholders' perceptions, and thus for an upgrade to happen, it is important to establish a common ground that ensures consensus between the stakeholders' interests. The different worldviews highlight the stakeholders' requirements and the manner in which they perceive the upgrade project. The aim of this paper was to highlight the importance of performing a stakeholder analysis to provide a holistic perspective of stakeholder's needs, issues, challenges, and requirements. Further, research is required to explore these influences in depth to design a conceptual reconciliation system, which combines all stakeholder interests.

6 Conclusion

Upgrade decision-making is a complex undertaking, which is not eased by the different expectations of the upgrade outcome which may be held by stakeholders. Exploring stakeholder involvement would enable a better understanding of how best to align the various upgrade expectations to support the organisational goals for an upgrade project. The paper gives a brief account of how the different stakeholders affect the decision to upgrade and suggest that interested parties play a critical role in upgrade projects, especially during the decision-making. Despite the data accrued from a limited set of organisations based in the UK and Ireland, the paper highlights that the use of Rich Pictures can provide much needed insights. These can inform the development of a conceptual system model to support, upgrade decision-making by incorporating stakeholder perceptions and requirements. Also, it is suggested that Rich Pictures can be used to communicate and represent complex projects to provide a new approach of understanding the situation explored. From an organisational perspective, the study highlights the different interested parties and their worldviews; additionally, it provides insights on the importance of understanding the role of the stakeholders in the decision to upgrade ES and selection of an upgrade strategy. From a theoretical standpoint, the Rich Picture and the suggested worldviews form a basis for future work, which aims to design a reconciliation system that takes into account all stakeholder views to provide a synergy between them. Hence, this work opens up an avenue for discussion on how to incorporate stakeholder perceptions in upgrade decisions, which have received little attention to date.

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