WHY PROJECT MANAGERS ARE NOT COLLECTING STRATEGIC REQUIREMENTS

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Abstract - Since IT systems are used to support business strategies of an organization, strategic business requirements therefore are the motivation of the majority the requirements engineering approaches. But current requirements engineering approaches do not capture strategic business requirements but rather focus on functional and non-functional types of requirements. In this exploratory study two groups of business analysts explored requirements from a business scenario where different stakeholder views were given. A number of views represented the viewpoints of top management and the other views represented the viewpoints of operational level staff of the organization. The collected data showed that the requirements captured from top management are different from the requirements captured from operational level staff in a way that strategic business requirements refer to the future direction of the organization, however the requirements captured from operational level staff are about functionality and constraints of the system. The results indicate that strategic business requirements are associated to the top management and to capture them, business analysts have to pursue top management of the organzation.

Index terms - Project Management, Requirements Gathering, Strategic Requirements, Top Level Management.

I. INTRODUCTION

Information Technology has come out of its traditional "back office" role and has evolved towards a 'strategic' role with the potential to support business strategies of the firms [1, 2]. The strategic role of IT is quite different from transactional IT. In a strategic role, IT is used to expand the business, whereas in a traditional transactional role, IT is used to enhance efficiency. It has been consistently argued that IT should be elevated from its traditional internal operations to address external issues of how well the firm is positioned in the fast-growing market [1, 3]. Since organizations expect their IT systems to provide support for their strategic business goals, requirements engineering literature, i.e. [4, 5] argues that the requirements analysis must be conducted in the context of the firms' strategic business goals to achieve completeness in the system requirements specification. Unfortunately, the majority of the requirements engineering approaches ignore the capturing of strategic business goals/elements of business strategy and often their focus has been on functional and non-functional types of requirements.

Also, choosing the correct stakeholder is crucial to effective requirements gathering. According to [6] to build a useful system, we need to collect the right requirements; in order to know these requirements, we need to know the stakeholders' desire and needs. Therefore, approaching the right stakeholder is a major step in requirements capturing.

The majority of requirements engineering approaches such as i* [4], Tropos [7], KAOS [8] and B-SCP [9] recognise the importance of capturing requirements from stakeholders of the system, but their focus has been on operational level staff such as direct users and developers of the system, which result capturing functional and non-functional types of requirements. One assumes that the non-functional requirements include strategic business requirements, but they do not. Often the top management of the organization, which are important stakeholders of the modern IT systems, are not pursued for the requirements. The approaches do not provide information on who should be approached for strategic business requirements. What is business strategy and how top management is associated to it is extremely important will be covered in more detail in the literature review section.

To address the issue of business strategy in requirements gathering we propose a requirements gathering approach, where business analysts are required to pursue top management in the firm to collect strategic business requirements and to pursue operational level staff for functional and non-functional types of requirements. We highlight here that non-functional requirements do not include the strategic business requirements. Requirements gathered from operational level staff will help to establish the difference between strategic business requirements and functional & non-functional requirements.

In the exploratory study two groups of experienced business analysts were acquired. One group explored strategic business requirements from a list of business scenarios representing the viewpoint and requirements of various top managers of an organisation. The other business analysts group explored functional and non-functional types of requirements from a list of business scenarios representing the viewpoint and requirements of various operational level staff. Altogether 60 lists of requirements comprising of 248 requirements were collected from 30 business analysts. The lists of

requirements have various combinations of strategic, functional and non-functional types of requirements. The results indicate that the requirements captured from top managers are different from the requirements captured from operational level staff. Top management requirements are related to future goals/directions of the organization, however operational level staff requirements are mainly about functional and non-functional requirements.

The paper is organized as follows. Section II provides literature review of business strategy concept used in our approach. Research design of this study has been described in section III. Results and Discussion on this study are presented in section IV. Section V concludes the study.

II. LITERATURE REVIEW

The requirements engineering discipline has introduced a variety of requirements gathering approaches, whose purpose is to address business strategy in the system requirements models but the approaches have failed to capture strategic business goals in the requirements models. At this point we should clarify the meaning of business strategy. Management information system discipline provides a vast amount of literature on the concept of business strategy and according to that a business strategy is about defining goals pertaining to the external business markets and such goals are defined and elaborated by the top management of the organization [1, 2]. External business markets refer to the targets pertaining to the product market offering and distinctive strategy attributes that differentiate the organization from its competitors. It includes targets associated to the growth, alliances, partnerships, mergers and acquisitions. According to [10], a business strategy is about defining a precise and meaningful set of financial and differentiating customer value targets agreed upon by all the top management. This indicates that the top management is involved in defining a strategy. The majority of studies conducted on business strategy show the involvement of top management in assessing business strategy [11, 12]. Therefore, to some researchers such as [12], top managers should be utilized as they are the source of information when assessing a business strategy. So, a business strategy is about defining goals associated with the external business environment and often they come from top management of the organization. It means a business analyst has to approach top management to capture strategic business goals. Unfortunately, the requirements engineering approaches have ignored this aspect of requirements engineering. The approaches do not pursue top management for strategic business requirements, though many of these approaches have stated that they address business strategic requirements. The approaches capture functional and non-functional types of requirements with the assumption that the strategic business requirements are included within the non-functional requirements, but in most cases, the strategic business requirements are missing.

III. RESEARCH DESIGN

We pursued 52 business analysts in various Australian companies via emails and phone calls to become subjects for this exploratory study. In the first contact we briefly explained to them that in this study the subjects have to capture requirements from various business scenarios representing the viewpoints and the requirements of various stakeholders. They were also told that the purpose of the study is to investigate the performance of business analysts in requirements gathering. Twenty-five business analysts provided their consent in the first contact, and five more became available to participate in the study when we sent them a reminder email in the following week. So, altogether there were thirty business analysts from various industries participating in the study.

In addition, some academics and research students who had a great deal of teaching and research experience in business analysis and design were also included in this study. Out of the thirty subjects, four were female subjects. Two female subjects were business analysts with 3-7 years of experience, one was an academic and one was a final year PhD student. This breakdown, although highly homogenous in terms of gender, is representative of the industry and academia to which the study is concerned.

For the thirty business analysts, ten stakeholder viewpoints were provided to explore requirements. Half of the viewpoints were representing the views and requirements of operational level staff – sales manager, user, marketing manager, store manager and supplier and the other half were representing the top management - Chief Information Officer (CIO), Enterprise Architect (EA), accountant, business executive and business director of an organization. Due to space constraint, this paper will cover only two stakeholder viewpoints. A business scenario along with the many stakeholder views was an approach used in this study as it is widely recognized as an effective way for requirements elicitation [13, 14]. Researchers and practitioners have long been using scenarios for requirements elicitation and they have attained center stage of problem area across many disciplines, i.e. strategic management and software engineering. Development of a scenario depends on a scope it is addressing and therefore scenarios can be categorized into different levels, strategic, tactical and operational [15]

To have equivalent levels of focus on two sets of five stakeholder views, thirty subjects were divided into two equal groups. As shown in Table II, thirty subjects were divided into two equal groups based on

their experience and gender, Table II also shows that the both groups are almost at equivalent level in terms of their job titles, though there are more academics in group A than group B however more PhD students are in group B than group A. We gave two groups arbitrary names as group A and group B[15].

Sales manager view:
In retail business, pricing and merchandising strategies include efforts to sell more imported and private-label products because both types of products have been accounted for major portion to the firm's sales. It also includes high quality products and service to the customers with competitive price.
Cost reduction strategy is to find the best way for each store to control inventory. In particular, attention has been given to avoid non-availability – that is losing a sale because something is out of stock. A missed opportunity to sell an item because it is sold out is believed to represent up to three times the value of the actually realized profit. The company needs to not simply identify what particular products customers like but more importantly the company should accurately determine when, where and in which quantities and at which price these products are needed.

Product ordering is the most constructive part of retail business. To address the rapid changes in the compositions of customer demands and long queues Five Star wants an efficient ordering system which can also help to solve excess inventory problems.

Enterprise Architecture view:
Five Star intends to use IT for its unique competitive situation, retail industry and corporate objectives for which the company want to link software systems with the overall management goals. Business performance target of Five Star is to achieve total sales in Australia in excess of the sales of all Australian retail stores which aligned with Five star's mission. For that Five star wants to pursue top quality control beyond conventional standards through which Five star would be responding to customers' diverse needs by supplying items worthy of customer expectations. Five Star is keen to dominant the market through distribution and logistics efficiency, operation and information systems effectiveness, franchise support efficiency and corporate image. For effective customer service and better inventory control Five Star wants from their suppliers to deliver the products that were in demand on a just-in-time basis, thereby eliminating dead and slow selling items and replacing them by the faster selling one. In this regard Five Star wants to have superior distribution and logistics efficiency through a combined delivery system. This would represent revolution for the suppliers whose products were traditionally delivered separately through exclusive channels however in this way there would be fewer deliveries from the producers and wholesale dealers.

3.1 Conducting the study and data collection

This study was conducted in the common room of UTS with the mutual agreement of all the thirty subjects on time, date and place. All the thirty subjects gathered in the room and they were given two pages of brief of a retail company, we named, Five Star. It included introduction to the Five Star's businesses and rationale of conducting this study. Subjects were given 30 minutes to read the brief and all of them completed within 30 minutes.
In the next step, two groups of subjects as shown in Table II were separated from each other. Group A was presented a set of five stakeholder views representing the viewpoint of operational level staff - sales manager, marketing manager, store manager, users and suppliers and group B was presented a set of five stakeholder views representing the viewpoint of top management level staff - Chief Information Officer (CIO), Enterprise Architect (EA), accountant, business executive and business director. Each subject had the option to choose between one and five stakeholders from their respective list. Both groups were not allowed to cross check the list of scenarios. Based on the choice, the scenarios were provided to the subjects of two groups for requirements gathering. Each subject was required to capture at least five requirements per stakeholder view which means that if a business analyst chose two viewpoints then s/he has to identify at least ten requirements for two stakeholder views. The reason to ask for five requirements per view was that the subjects could capture focal paths and the requirements capturing could finish within two hours.
The study went smoothly and no unusual events were recorded in either group. The majority of the subjects completed the requirements capturing between 1:30 - 2:00 hours, however five of the subjects who chose one stakeholder view completed the requirements capturing in around 1:00 hour. Requirements captured from a view by a subject are considered to be a list of requirements.

IV. RESULTS AND DISCUSSION

We pursued 52 business analysts in various Australian companies via emails and phone calls to become subjects for this exploratory study. In the first contact we briefly explained to them that in this study the subjects have to capture requirements from various business scenarios representing the viewpoints and the requirements of various stakeholders.

4.1. Interactions for requirements gathering

There were 34 instances of choosing five viewpoints of the operational level staff and 26 instances of the viewpoints of top management. All the views in the

two groups were analysed by at least one dedicated subject except the view point of the accountant, who was not met by any of the fifteen subjects of the group. The reason for not choosing the accountant to meet for requirements is unclear from the data; however, the statistical analysis of data shows that the meeting rate of the subjects with the viewpoints representing top management is 43%, whereas the meeting rate of the subjects with the viewpoint of operational level staff is higher at 56%.

Data at individual view level shows that the subjects met with operational level staff more evenly than with top management. The data shows that the highest meeting rate was with the sales manager (26%) and least meeting rate was with the supplier (14%). The difference between them is 12%. On the contrary, data shows that there is a great difference between the highest meeting rate stakeholder (Enterprise architect, 38%) and the lowest rate stakeholder (Accountant, 0%). Actually, the majority of the meetings of subjects occurred with EA and CIO making up 72% of the meeting rate of the subjects with top management. These statistics indicate that the subjects are more familiar with operational level staff than the top management. In other words, they knew the importance of operational level stakeholders which led them to distribute well across the list of five stakeholders. However, meeting frequencies were not well distributed across five top managers as for operational level staff. This indicates that the business analysts were not well aware of the importance of the top managers for requirements gathering. It may well be the reason that led business analysts to avoid meeting accountant.

4.2 Requirements gathered from operational level staff

We expected to collect at least 170 business requirements from thirty-four interactions as each interaction was expected to capture at least five requirements. Some of the requirements were vague and they could not qualify to be valid requirements, therefore we ended up having 140 business requirements from scenarios representing the viewpoints of operational staff. Details of excluding thirty requirements are provided below.

In four interactions the subjects did not find five requirements. For two individual interactions there were two requirements missing and for the other two individual interactions there were three requirements missing. So, altogether ten requirements were missing. The background of the subjects of these four interactions shows that three of them were male subjects with large to medium level of industry experience as shown in Table II. The fourth subject was the PhD student who captured three requirements for an interaction. It is important to highlight here that all four subjects met with more than one stakeholder for requirements gathering, three experienced subjects met with three to four stakeholders however the fourth subject, the PhD student met with only two stakeholders. These results indicate that there is a correlation between the practitioner's experience and the meeting frequencies with the stakeholders. The higher the experience of the subject, the higher the meeting frequency with the stakeholders. One subject's data was disregarded as it was presenting very trivial functional requirements. For example, "add and delete items from stock" and "add and delete customers from the system". The subject was a software engineer. Fifteen requirements were found to be unclear as it was difficult to understand what do they mean? For example, a requirement was "based on the population item can be provide". We are not sure whether it refers to forecasting demands or home delivery service. Another vague requirement is "sync 3 against 2, build ordering system". These vague requirements were captured by the software engineers. So altogether we collected 140 requirements from the fifteen subjects who met with operational-level staff of Five Star. As far as this study is concerned the results indicate that the highly experienced business analysts tend to meet with more stakeholders for requirements gathering. Software engineers may not be as appropriate as business analysts for requirements gathering.

These requirements were gathered from the scenarios representing operational level staff of Five Star. These requirements clearly are functional and non-functional types of requirements of the system and they are captured from the viewpoint of the operational level staff. This is aligned with the claims in the literature sections that the majority of the requirements gathering approaches capture functional and non-functional requirements as they usually deal with operational level staff such as direct users, developers of the system.

4.3 Requirements gathered from top management

We expected to collect at least 130 business requirements from 26 interactions as each interaction was expected to capture at least five requirements (see Table IV). Some of the requirements captured were vague and incomplete so we ended up having altogether 108 business requirements. Details of excluding 22 requirements are provided below.

The subjects did not gather five requirements for three individual interactions. For one interaction two requirements were missing and for the other two individual interactions three requirements were missing. So, altogether there were eight missing business requirements. Ten requirements were found to be vague as it was difficult to understand which category of requirements they belong to. For example, "linking software systems with management goals" and "start small, not big/giant business". Such requirements were excluded from the study. Eight entries were found to be suggestions instead of business requirements. For example, "improve gradually (start with single digit)". They were also

excluded from the study. So, altogether 22 requirements were excluded from the requirements lists.

They are the strategic business requirements captured from the top managers of Five Star. As we argued in the literature review section, strategic business requirements are related to the top management of the organization. They are the ones who should be approached to gather strategic business requirements. Clearly, these requirements are different from the requirements captured from operational level scenarios. Strategic business requirements present the future direction of the organization, which are not available from the operational level staff.

Collected requirements data also show that more than 66% of the business analysts who captured requirements from top managers identified functional and non-functional requirements as well.

Eight business analysts had individually provided three to five functional and non-functional types of requirements along with strategic business requirements. We emphasize here that we did not shift functional and non-functional types of requirements captured from top management to the requirements captured from operational level staff. We wanted to keep the requirements in their respective lists for analysis purpose.

Collected requirements data show that 33% of the subjects captured only strategic business requirements of Five Star and they did not collect any functional and non-functional types of requirements.

However, the subjects, who gathered requirements from the operational level staff, did not capture Five Star's business strategy requirements. The results indicate that the business analysts, who capture requirements from only operational level staff, were not able to collect any business strategy requirements. However, the business analysts who meet with top management are more likely to know functional and non-functional requirements as well as the strategic business requirements.

CONCLUSION

Results of this study are inconclusive as this was an exploratory study conducted with a small subject sample of 30 subjects. As such, we cannot generalize the results of this study. The study showed that business analysts cannot capture business strategy requirements unless they approach top management. Operational staff are not aware of the business strategies of the organization, as such, business analysts, who meet only with operational level staff can only identify functional and non-functional types of requirements without any strategy business requirements. We need further research with a much larger sample to justify these claims to make the results conclusive.

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