

Towards Understanding Managing Requirements Engineering - A Case Study of a Thai Software House

Theerasak Thanasankit
Brian Corbitt

Department of Information Systems
The University of Melbourne
Parkville 3052, Australia
thant@studentmail.dis.unimelb.edu.au
brianc@staff.dis.unimelb.edu.au

Abstract

This paper uses a detailed case study of a Thai Software House to reconstruct the management process used in the Requirements Engineering in Thailand. Information Systems is rich in its understanding of Requirements Engineering and the application of 'western' concepts to process models. This paper uses the case study to show that the meanings generated in Requirements Engineering used in Thailand produce a different view of the management process as it relates to systems development. The paper suggests that this management process is infused with cultural practices which generate divergence from rationality and from structured management models created from 'western' studies. This paper reports one case study from within a larger study where a number of cases are used to generate suggestions about the Requirements Engineering process as it impacts on organisations within Thailand.

Keywords

Requirement engineering, management, culture, Thai social context, Thai culture and values

INTRODUCTION

This paper uses a case study of a Thai software house involved in requirements gathering to challenge the accepted perception and modelling and management of Requirements Engineering. In this study the social context of culture is used to explain different behaviours and processes which emerge from an illustrative case.

Many system developers suggest that many errors that occur during the requirements phase cause the high cost for fixing systems and invariably leads to either rejection of the system (Bell and Thayer 1976) or failure of the system to meet organisations' requirements (Laudon and Laudon 1995). Martin (1984) found that 64% of errors of come from the analysis and design phase. Rush (1985) found that 40% of the cost of development of an information system was in error removal, of which between 45% to 65% of the errors were made during systems design. Therefore, the focus of the development of information systems has moved to the requirements phase (Luff *et al.* 1994). Part of that problem lies with understanding the management of the Requirements Engineering process. Through a case study of a Thai Software House, this paper seeks to understand the true nature of the management of the Requirements Engineering process. The data for this research was collected in a series of open interviews of systems analysts in Thai software houses. These interviews provided an open

framework for the systems analyst to describe what they actually did in the RE process, how this impacted on the tools they used in the RE process and the eventual impact on the management of the systems development process.

Requirements Engineering management – a structured view

Requirements Engineering is viewed as a structure set of activities. Process models propose that developers should follow the processes outlined to derive, validate and maintain a systems requirements document (Kotonya and Sommerville 1998). A framework for Requirements Engineering processes designed by Loucoupoulos and Karakostas (1995) (Figure 1) is representative of these types of Requirements Engineering models and is used in this paper as a benchmark in the current debate over approaches to RE. However whilst Loucoupoulos and Karakostas (1995) note that:

... as a discipline requirements engineering is still evolving with a diversity of approaches being proposed and a lively debate going on. Therefore, it is neither possible nor appropriate to be prescriptive about the approach that one might adopt in developing a requirements specification (Loucoupoulos and Karakostas 1995: 1).

There is a substantial literature (Thayer and Dorfman, 1990; McDermond 1994; Zave, 1995; Sommerville and Sawyer, 1997; Kotonya and Sommerville 1998) that supports the structured view represented in the Loucouploulos and Karakostas model.

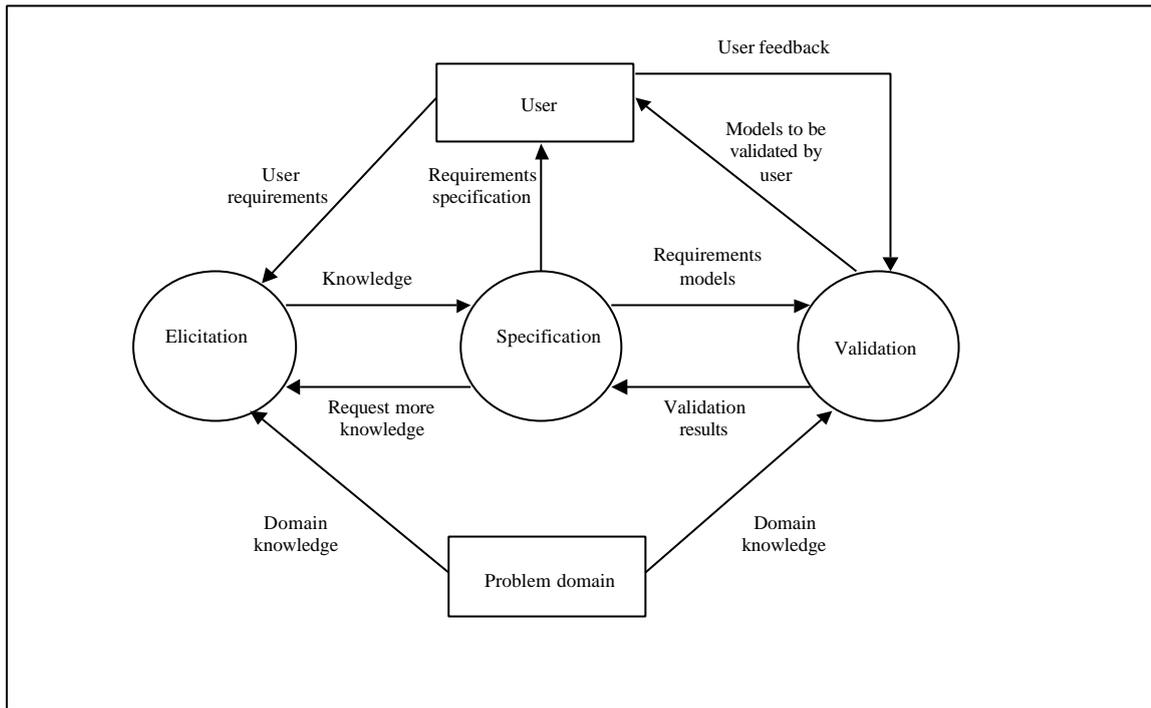


Figure 1 : A framework for requirements engineering processes (Loucopoulos and Karakostas 1995: 21).

The three major processes used during Requirements Engineering, elicitation, specification and validation, it is suggested, follow the iterative pattern typically described above. As part of managing this process, software developers are purported to follow each phase and subscribe to the utilisation of standardised methods such as DOD-STD-2167A (1988)¹, IEEE-Std. '830'², or NCC (1987)³.

The management of the RE process is most often explained as a structural, logical model (Kotonya and Sommerville 1998; Loucopoulos and Karakostas 1995). These models specify a process that is sequential, ordered and rational. The view is positivist. There is an expectation that one action creates another action. Whilst there is an emerging literature in management which rejects this structured view (Grint 1997) or which proposes a less rigid view of the management process (Checkland 1981), in information systems the models described have emerged from research on 'western' organisations using the traditional models of management science. This paper does not intend to engage in the debate about positivism versus interpretivism, versus post-modernist approaches to the management process. Rather we are concerned to see if these same models have applicability in another culture where meaning and context are constructed from a different set of norms and based in different values and behaviours. In the Thai context, one must expect that because culture is different the process itself is probably different. It is contextualised in an alternative social context.

THE ATTRIBUTES OF THAI CULTURE

There are several models of national culture suggested in the literature (Parson and Shils, 1951; Kluckhohn and Strodtbeck, 1961; Rokeach, 1973; McClelland, 1961; Glenn and Glenn, 1981; and Hofstede, 1991). All models are structural and therefore prescriptive constructs. Hofstede's framework has been widely accepted by many researchers attempting to understand culture differences between nations, especially in management research (Shore and Venkatachalam 1996; Sekaran and Snodgrass, 1986; Kedia and Bhagat, 1988; Kogut and Singh, 1988; Tricker, 1988; Rodriguez, 1991; Ueno and Sekaran, 1992; Morris *et al.*, 1994; and Shane, 1994). The popularity of the Hofstede model comes from its large sample and use of empirical data to demonstrate cultural difference. However, the model also has been widely criticised for using a single organisation (IBM) and for suggesting that the four dimensions identified by Hofstede are not sufficient enough to frame all aspects of culture differences (Thanasankit, 1999; Shore and Venkatachalam 1996). Rather than accept structured concepts in the typology created by Hofstede, we propose to discuss those values and cultural practices which frame other behaviour of systems analysts as they respond to clients in the Requirements Engineering process.

Hofstede (1991: 27-28) argues that Thai culture is one with high power distance where there is considerable dependence on subordination to bosses and where "subordinates respond by either *preferring* such dependence (in the form of an autocratic or paternalistic boss), or rejecting it entirely, which is psychology is known as *counterdependence*: that is dependence, but with a negative sign...the emotional distance between subordinates and their bosses is large; subordinates are unlikely to approach and contradict their bosses directly". High power distance creates tall organisational structures for most Thai organisations. The power-oriented

¹ The U.S. Department of Defense standard for mission critical software development and its associated DIDs (Data Item Description) (Davis 1993: 367).

² Institute of Electrical and Electronics Engineers Standard.

³ National Computing Centre Standard in the UK.

culture in Thailand usually tends to respect the leader as the father figure of the organisation. Rohitratana (1998: 190) suggested that “due to paternalism and dependence, the concept of a ‘flat structure’ in an organisation, which entails speedy decisions cannot effectively take place. The reason is that only those at the top can possibly make decisions; that is their obligation, to operate as ‘fathers’”. Thais perceive the role of ‘leader’ as a controller rather than a colleague. This may be called ‘*superior-inferior*’ concept, which is dominant in Thailand.

Therefore, without superiors directions and guidance, effectiveness may be reduced within the organisations. McKenna (1995 in Rohitratana 1998: 190) suggest that superiors role “are almost like those in family. There is respect and obligation. This is how things get done”. In Thai society, a person’s power normally comes with his/her title, rank and status in the organisation or in the society (Komin 1990). The social construction of power has historical roots where privilege and status are gained from position and title. In the workplace this social construction is translated to parallel the broader construction.

In Thailand society constructs its reality as group or social interests rather than individual interests. Hofstede argues that collective societies usually support structures where people are born and live in extended families. Relationships between subordinates and superiors are perceived in moral terms, like family links. Decision-making, management and promotions are based on group performance (Hofstede 1991; Trompenaars 1993). Trust and relationship with others are the basis of the Thai culture. Relationship-oriented behaviour happens more commonly than work-oriented behaviour in Thai society and its organisations (Sorod 1991). Jirachiefpattana (1996: 105) suggests that “personal and family connections play an integral part in operations of Thai business. Views and opinions have a greater impact on business management when expressed by members of family or in-group members”.

Thais base their relationships upon trust and emotion. Conflict between individuals is kept to minimum or is avoided if possible. Thais prefer to have stable social relationships and maintain surface harmony (Rohitratana 1998). The characteristics of *surface harmony* are that a person is prefer to be smooth, kind, pleasant, conflict-free, non-assertive, polite and humble (Rohitratana 1998). Thais usually believe that “being nice helps people like you and builds the kind of long term obligation to provide service which just does not follow from blasting an unseen ear over the telephone” (Cooper 1991: 40).

Thais seek certainty in their relationships. Uncertainty is not just for individuals. Rather, it can be shared within the community or society. Thai decision-making is commonly not a team approach like in western countries. From a recent survey in Thailand, subordinates in Thai organisations accept that their superiors make decision in an “authoritarian” way (Holmes and Tangtongtavy 1995). The authoritarian management style used in Thai organisations is not dictatorial. Rather, this management style allows managers to make decision for what he/she thinks is correct (Holmes and Tangtongtavy 1995). It is his/her job to decide and guide subordinates. Therefore, decision-making in Thailand usually confined to high level management. Thai culture does not encourage subordinates to dare, to make mistakes, or to take initiative.

RESEARCH METHODOLOGY

The data for this paper was collected over a 3 month period in Thailand. System Analysts were interviewed in their workplaces about the nature of the Requirements Engineering process. The interviews used an open ended set of questions which addressed issues which the authors had derived from two sets of literature – the Requirements Engineering literature from Information Systems and Software Engineering, and from the literature about Thai Culture. An informal, semi-structured, interview technique was used following the techniques developed and used by Kitwood (1980) and Wilson and Arnold (1986). As in these two studies, the informal style of the interviews suited the participants, and allowed them to express their views in a non-threatening environment. Fetterman (1989:48) noted that: “formal or structured interviews have an explicit agenda, while informal interviews have a specific but implicit research agenda ... and informal interviews can be used to discover the categories of meaning in a culture and ... are useful in discovering what people think and how one person’s perceptions compare with another’s”. Non-directive questioning (Spradley 1979), which is open-ended and acts as a stimulant for the subject’s thoughts, was often used to make the subject feel at ease so that he/she would be able to give considered views and opinions rather than just giving yes or no answers.

This study reports an ethnographic study of eight systems analysts in Thai Software Houses. Ethnographic research takes the researcher close to the 'reality' of people’s lives [6]. It allows the researcher to develop theory from observation and practice [14], and to test theory [3]. Ethnography, as both the stimulant and evaluant of theory, requires contextualisation. Essentially this means that through participant-observation data, the researcher is attempting to generate data from the perspective of the individuals being studied [53]. The ethnographic research done for this paper reflects the constructions and observations of many people involved in the Requirements Engineering process, including ourselves.

To counteract these perceived deficiencies, Willis (1977) [54], Maseman (1982) [27], Thomas (1983) [47] and Angus (1986) [1] argue for a critical ethnography that seeks to describe how the actors in social groups or settings create meanings that generate practice. To Thomas (1983: 485) [47], critical ethnography 'suggests a sensitivity to the issue of the subject-object split or dialectic analysis'. Critical ethnography examines social structures and social interaction as being in a state of 'becoming' and not in a state of 'what is', which traditional ethnography had searched for [1, 2]. For Maseman (1982: 9) [27] “the critical approach is distinguished from interpretivist approaches primarily by their connection to theoretical perspectives which are linked to a general theory of society and a concept of social structure which exists beyond the actors’ perception of it”. Angus (1988: 74 - 75) [2] summarises the nature of a critical approach to ethnography, stating that “a critical ethnography, as opposed to conventional ethnography, insists upon an on-going awareness of the fundamental human agency of social action while simultaneously remaining aware that the subjective consciousness of individuals may conceal underlying structural relationships which are capable of distorting and limiting, or of enhancing and enabling, negotiated systems of meaning”.

Critical ethnography, then, challenges the motives behind what is apparent. The political motivation to change or reproduce society will not always be reflected in the rhetoric of requirements statements. Rather the motivation is often hidden, complex or obscure. It is often understood only within the context of cultural practice and ritual. To find out what will

and will not work in Requirements Engineering there is a need to examine the subjective feelings and motivation of those involved. There is also a need to find the 'hidden' and subjective components of human social action as they engage, construct and reconstruct requirements throughout the Requirements Engineering process. However, in research of this kind the researcher must also attempt to uncover some of the limitations related to his/her own perceptions and experience and culture. As Meek (1987, p. 196) [31] states “fieldwork filters and translates what is observed according to his/her own values, biography and intellectual training and temperament”.

Eight Thai systems analysts were interviewed in Bangkok during 1998 and 1999 (Table 2. shows the 8 Thai systems analysts background). The interviewees were selected based on their responsibilities in gathering requirements from clients, who engaged in interviewing users, and who were observing users' activities, and gathering documents to construct requirements specification for development of information systems. The principal methods for collecting data were by in-depth interviews with Thai system analysts. The questions were open-ended and system analysts had freedom to describe their experiences and problems beyond the questions' boundaries. The interviews sought an understanding of what the systems analysts did when undertaking Requirements Engineering and sought explanations for those actions. The interviews were very lengthy as the researcher continually asked the systems analysts why they behaved in certain ways and why they took certain actions. The researcher also engaged each interviewee about the nature of their work and sought to gain an understanding of how they dealt with the organisations and the people they were working with and for. The interviews were thus not structured. Rather, the interviews reflected a methodology which sought real meaning and explanation from the interviewees. There was no attempt by the researcher to suggest how and why culture may or may not have impacted on the Requirements Engineering process. Rather, the researcher was seeking to uncover explanations from the interviewees using their own words about what was driving what they did.

Table 1: The 8 Thais systems analysts background.

SA	Education	Type of project	Type of clients	Experiences in IS
SA 1	Bachelor of Computer Science (Thailand)	<ul style="list-style-type: none"> Large and medium IS development and implementation 	<ul style="list-style-type: none"> Private clients Government 	<ul style="list-style-type: none"> 2 years
SA 2	Bachelor of Economics (Thailand) and Master of Information Systems (USA)	<ul style="list-style-type: none"> Large and complex IS development and implementation 	<ul style="list-style-type: none"> Mainly government 	<ul style="list-style-type: none"> 15 years
SA 3	Bachelor of Science (Statistic) (Thailand)	<ul style="list-style-type: none"> Large and medium IS development and implementation 	<ul style="list-style-type: none"> Mainly government 	<ul style="list-style-type: none"> 5 years
SA 4	Bachelor of Accounting (Thailand) and Masters of Computer Science (USA)	<ul style="list-style-type: none"> Large Re-engineering and IS development and implementation. 	<ul style="list-style-type: none"> Private clients Government 	<ul style="list-style-type: none"> 13 years
SA 5	Bachelor of Information Technology (Thailand)	<ul style="list-style-type: none"> Large and medium IS development and implementation 	<ul style="list-style-type: none"> Private clients Government 	<ul style="list-style-type: none"> 5 years
SA 6	Bachelor of Business Computing (Thailand)	<ul style="list-style-type: none"> Large and medium IS development and implementation 	<ul style="list-style-type: none"> Government Educational institutions 	<ul style="list-style-type: none"> 4 years
SA 7	Bachelor of Medical Science (Thailand) and Master of Information Systems (Thailand)	<ul style="list-style-type: none"> Large and complex IS development and implementation 	<ul style="list-style-type: none"> Private clients Government 	<ul style="list-style-type: none"> 5 years
SA 8	Bachelor of Computing (Thailand) and Master of Information Systems (Thailand)	<ul style="list-style-type: none"> Large and medium IS development and implementation 	<ul style="list-style-type: none"> Private clients Government 	<ul style="list-style-type: none"> 10 years

Each interview was set after a request was made to system analyst's superior for permission. Each interview was recorded on tape in Thai, transcribed into Thai and then translated into English. The translation did not correspond word by word. However, the researcher had to understand Thai language perfectly to be able to pass meaning from Thai language into English language without missing any important details. Reporting the details of each case in Thai would be more accurate. However, where meaning is necessary, appropriate English words have been used.

A THAI CASE STUDY – TS GROUP

The TS Group is a large and well known software house in Thailand. It comprises seven organisations which constitute the TS Group. The organisation services include: geographic information systems, customised software development, hardware provision, telecommunication systems, and information systems consulting. The information systems development section is situated within both the Design and Implementation Division and Application Support Division. Systems analysts are divided into two groups. One group works in the Design and Implementation Division and focuses on all aspects of the development of information systems. These systems analysts have few programming skills. The other group of systems analysts, in the Application Support Division, also look after the whole process of information systems development. However, this group has more programming skills and they sometimes are requested to help other groups during coding.

The Requirements Engineering Process

The following story represent the systems development process described as the norm by TS systems developers. It is necessarily generalised but represent what each of the systems analysts thought should be, and hopefully was, the process they followed. The TS Group has a Sales Department for projects acquisition. Systems analysts in the TS Group are not involved during the project acquisition process. The Terms of Requirements (TOR) for a project are passed from the Sales Department to a Section Manager. The Section Manager divides the project into functions and then assigns some functions to each systems analyst. The Section Manger provides each team with a TOR for system analysts to study and initiates the process of development of the information system for the client. System analysts must use the TOR to identify the scope and requirements from their clients. They need to understand the requirements in the TOR and find out the possibilities in constructing the information system to meet his client's needs. Mostly, the TOR contains requirements that could not be constructed either because of current technology or lack of skills within the organisation to construct such features. The system analysts had then to explain to their clients what could be done and what could not be done in the TOR. After agreements were reached about the scope and features of the information systems, the system analysts started to elicit requirements from different level of users within the client's organisation.

The requirements engineering processes within the TS Group started after systems analysts received the TOR. Systems analysts needed to study the TOR to understand the scope and functions, which required by their clients. Systems analysts preferred their clients to set up a committee for them to work with. The role of a committee was to provide systems analysts with access to users for eliciting requirements, with documents to identify inputs and outputs of the system, and with approval to progress on each step of the SDLC.

Elicitation was usually performed using group meeting and one to one interviews. The first meeting was to gather the overall picture of the systems from the top management. This was achieved by interviewing the Director of the organisation. It was important to gain understanding about the vision and objectives for the system to achieve. This meeting was very important for systems analysts as this would be the only opportunity for them to meet with the Director. Invariably this would also be the only meeting for the Director to be involved with the development of the information system. The second meeting was to meet with the committee. The committee consisted of stakeholders in middle management level.

This meeting also had at least one manager who was deferred to as having the highest rank in the organisation. The second meeting was held to understand the requirements from the committee for development of the system. This meeting was also used by the systems analysts to establish familiarity with the committee members. After this second meeting the systems analysts began to request access with system users to elicit requirements and understand the problems of any current systems.

After eliciting requirements, systems analysts designed the interface of the new systems. They started designing the input and output screens of the new systems to present back to their clients. The screens and reports of the prototypes were used to elicit more requirements. This group of systems analysts believed that by using prototypes, their clients gained more understanding of the systems and they provided systems analysts with more requirements. It was a relatively good practice for them to show their clients the prototypes. This was so because the systems analysts suggested that because some of their clients had never had experience with computerised information systems before. Therefore, this would help them to understand the computerised information systems and then hopefully lead to provide systems analysts with correct requirements.

After all of the input screens, output screens, and reports were approved by clients, system analysts then sent the screens and reports to their programmer/analysts counterparts to construct requirements specification and encode the new information systems. The specification contained the flow of information of the new systems using DFDs. However, using the specification as the only document to construct the system was not the reality. The system analysts suggested that there were a lot of communication between them, the programmer analysts, and the programmers using other information not necessarily stated in any documents. The only documents used for requirements specification were the reports written after the meetings. Systems analysts at the TS Group did not employ any guidelines for constructing the requirements specification. They only constructed requirements specification if their clients asked them too. They used previous requirements specification as their template to write up their requirements specification.

Developed prototypes were then sent back to their clients for approval. Systems analysts required their clients to use the improved prototypes for at least a month to gain familiarity with the system. During the testing period, their clients wrote down their list of requirements to improve the prototypes. This approach was believed to assist system analyst at TS Group to achieve their goals for developing information systems to better meet their client requirements.

One TS Group systems analysts concentrated with the new information systems requirements specification. The other group concentrated on software and hardware needed for the new information system. Some systems analysts argued that they could not construct the requirements specification because they needed to finish the system first. This was necessary before they could understand the limitation of the system and thus its specification. One of the TS Group Directors suggested that requirements specification was important. He tried to force his subordinates to construct requirements specifications while they developed the information systems. However, at the same time, he did not mind if his subordinates did not put all of the necessary details required in the requirements specification. The management of the Requirements Engineering process was not orderedⁱ nor rational. The process was cyclical, but not iterativeⁱⁱ. It was not ordered and clearly structured. Rather the process depended on the whims of the Manager, the differential development process in separate

sections of the organization and according to the systems analysts interpretation of requirements gathered in the Requirements Engineering process.

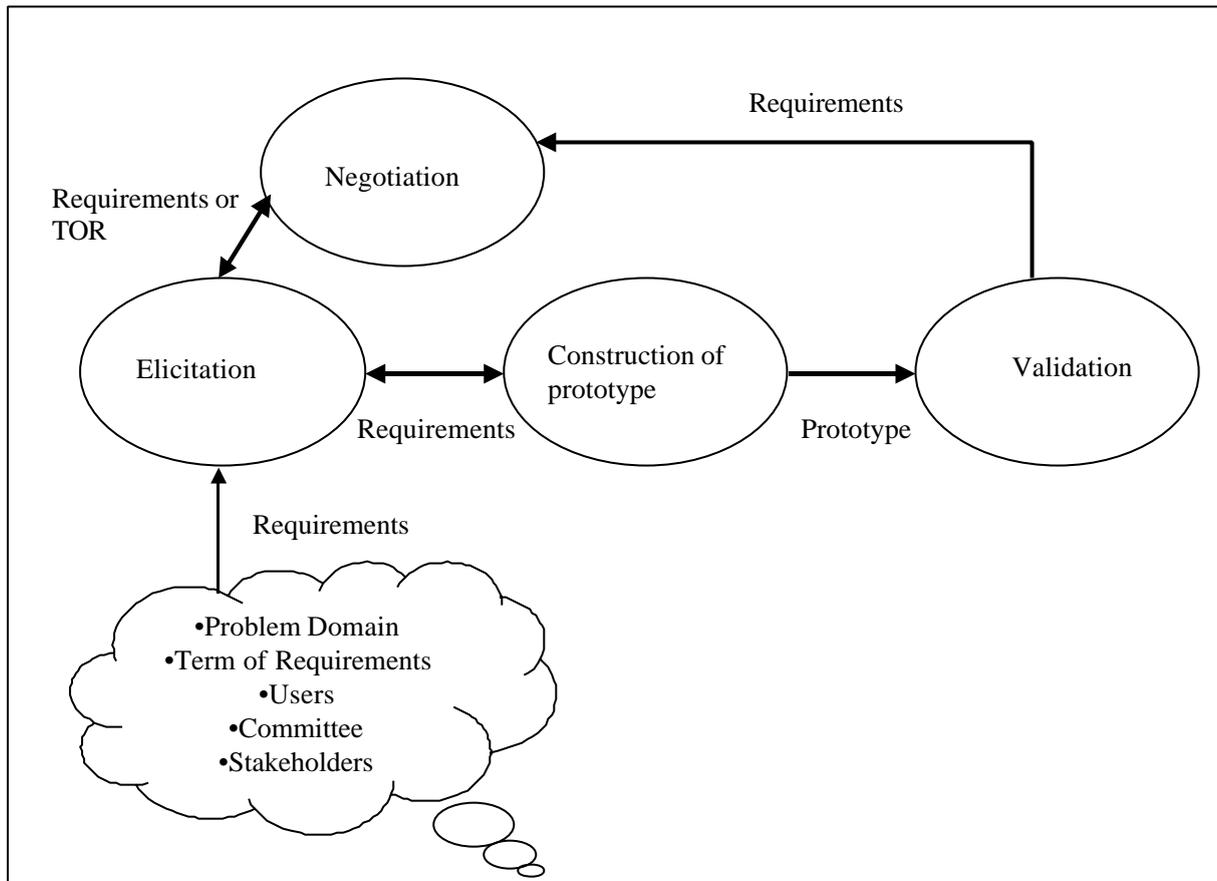


Figure 2: TS Group requirements engineering processes.

In the following discussion, the responses of the systems analysts are used to highlight the issues which affected the management of the Requirements Engineering process. The issues identified highlight that the process is neither rational nor ordered and influenced by the social context in which it is constructed to such an extent that previous models of the Requirements Engineering process reflective of studies in ‘western’ cultures have to be significantly reviewed in a non-western context.

Problems encountered by systems analysts at TS Group

Many problems were encountered by systems analysts during the requirements engineering processes at the TS Group. The problems came from both technical and social areas. These problems impacted on the management process and created the sense of disorder, and non-rationality already referred to.

- **Lack of methodology employed at TS Group**

The TS Group did not have a particular methodology for development of information systems for its staff to follow. The organisation provided its staff with training and explained the responsibilities of a systems analyst. This training only covered a very simple life cycle of systems development. The training also focused on requirements. However, it did not prescribe any methods for eliciting requirements. The training documents only stated that gathering requirements was important and that systems analysts needed to gather “all of the requirements.”

Interviewer : When you went out to elicit requirements, did your organisation employ rules or guidelines for gathering requirements from clients?

SA : Not really. We have a guide, it was more likely to be a training course for what systems analysts responsibilities are. It was more likely to be a development cycle guide to tell us where should I start and try to follow the development cycle.

The techniques/tools employed by systems analysts at TS Group were inherited from senior systems analysts. These techniques were those they already used to work with or which they were currently using. The techniques employed for elicitation were meetings, one to one interviews, personal observation, and questionnaires. The process used in each elicitation technique/tool were passed down by the senior systems analysts and systems development manager.

The requirements specification standards employed by the TS Group came from previous projects. It was reported in the interviews that often systems analysts did not employ any standards at all. Systems analysts used them as guidelines to construct requirements specification. Construction of requirements specification was needed only when their clients requested.

TS Group systems analysts employed prototyping only for validation. This technique/tool was passed on through systems development management at the TS Group. However, the Systems Analysts believed that by using prototyping, they could gather more requirements from their clients to improve the systems to meet their client’s requirements. One systems analyst reported:

SA : I talk with my clients many times. The first couple of meetings, my clients add a lot of requirements. However, in the later meetings the requirements from the users become less. Until the users actually see the systems or the prototypes, which operate close to the real systems. Then they have better vision about the systems and the requirements then emerge. However, we do not add all the new requirements immediately to the systems. Only after the users use the systems for about one month. Then they collect all the requests and add more to the systems for what they want, to get more from the systems. Like we let them collect all the requirements and get back to us after they actually use the systems. This then is the point from where we can improve the system to meet 100% requirements from the

users.

...

Interviewer : They have more requests for you?

SA : Yes they have. They have problems, like changing and improving the systems many times until they are satisfied.

In essence there was a difference between TS management and the systems analysts about the worth of iterating requirements gathering. Management wanted that process to be limited. The systems analysts wanted it to be as frequently as necessary. Perhaps this difference reflects separate views of the senior systems analysts from their younger subordinates. Inevitably conflict emerged. However in the Thai context, it is the superior who holds the authority and the subordinates will accept that even if it means their objectives are not met.

- **Lack of cooperation when constructing the TOR**

The system analysts started a project by studying the TOR, which was given to them by their manager. The TOR was the agreement to develop information systems to meet the client's requirements. The systems analysts did not have any involvement in constructing the TOR nor did their manager. The TOR was constructed by the Sales Department. The System Analysts stated that after they studied the TOR, some found that there were many functions and requirements stated in the TOR which they could not perform using current software and technology.

SA : Firstly, I had to study the TOR, which was agreed between the Sales Department and my clients such as agreements, conditions and I had to look at the possibility for developing the system to meet my clients requirements.

Interviewer : I see.

SA : I had to try to develop the system as closet as possible with the TOR. If I could not develop any functions or features then I had to explain to my clients the reasons why I could not develop the system.

Therefore, at the first meeting with their clients they often had to explain to them why they could not perform some functions stated in the TOR. Systems analysts had to talk about the problems openly and directly to their clients. However, most of their clients were repeat clients, having used TS previously. The system analysts stated that it was easier for them to negotiate with their clients about the terms and conditions, rather than the Sales staff. Their clients understood them and usually agreed and listened to them about why they could not perform certain of the requirements in the TOR. The systems analysts suggested that good relationships, built up with their clients, eased the difficulties.

Interviewer : Why happened when you could not follow the TOR? Did you speak openly and directly to your clients?

SA : Uh! I talked to them directly and openly, because I can talk with my clients much easier. Like we understand each other. Because my clients have been in contact with me for a long time. So there are some problems I can tell our clients directly and openly. However, if the problems are major ones then I

have to ask my superior to talk to my clients.

Thai culture is built on relationships and trust. Therefore the process of dealing with discrepancies between what was desired and what was possible to deliver was able to be dealt with because of the trust that had already been established. However, the management problem still remained and created difficulties for the systems analysts which proved to be a distraction from more efficient systems development.

- **Lack of cooperation from users**

There was also a problem with lack of cooperation with some of users. One group of users was expected to perform parallel jobs at one time. These users were instructed by their superiors to cooperate with systems analysts by providing them with requirements, documents, and assistance. These users had to both perform their current tasks and also assist in the development of the new systems. These development tasks became a burden to them. The users did not have enough spare time to assist the systems analysts. Therefore, they only provided the systems analysts with requirements and necessary documents only when the systems analysts asked for them. They tended not to provide systems analysts with extra information or detailed requirements. One systems analyst reported:

SA : *There was a major impact here. The impact towards the actual operational users. Just make this easy and straight forward, especially in public sectors, there were impacts on a group of users, who have to perform their daily routine and they have to perform more complex work during the development of the system. They complain a lot just because we put more work for them to do. They already have a lot of work to do. This is a problem that I face all the time.*

To overcome this problem the systems analysts needed to ask the users' superior to intervene, because it was not possible for SAs to try to get cooperation with this group of users.

Interviewer : How did you solve the problem about lack of cooperation?

SA : *We need to let their Pu Yai (boss) force them. Because we cannot fully manage this problem by ourselves.*

Interviewer : I see.

SA : *We needed our clients to help us as well...*

Another group of users in organisations were the ones who did not want the current systems to change. While systems analysts asked them questions and tried to gather requirements from them, these users did not provide the systems analysts with all the detail and information needed. They only answered and provided details for systems analysts when they asked them. If the systems analysts missed any important questions, then the users would not provide such details back to them, even though these users knew that the detail and information were important, even vital, for development of the new information system. This evasion resulted from lack of skills with computers, English language and a lack of certainty about the future. In Thai culture uncertainty is dealt with by evasion. This would rather only deliver information they were told to and not admit to a lack of knowledge or admit any feelings of uncertainty. Such a lack of cooperation make the Requirements Engineering process difficult

and makes the management of that process more complex because the systems analysts are unsure about how to deal with their own managers knowing they most probably do not have all of the required information.

- **Uncertainty and fear of failure and responsibility**

During the requirements gathering meetings, systems analysts at the TS Group did not tape the proceedings. They asked their Programmer Analyst to write down the requirements raised during the meetings. They suggested that the reason for not taping the meetings was because sometimes users were afraid about what they said. They felt those statements could be used as evidence if the systems did not come out right. They were also afraid about saying something that their superiors did not want them to say.

Interviewer : When you talk to your clients, did you write down the requirements as well?

SA : I talk to the clients, I let the Programmer Analyst write down because if I talk to the clients and write the requirements at the same time, I don't think it is convenient.

Interviewer : Do you tape the meetings?

SA : No, because sometimes the users are afraid. In taping they did not want to provide us with some details. Because they did not know what I was going to do with the tape, something like this.

Interviewer : Aren't you afraid then because I am taping you.

SA : This is a different matter. I don't mind this at all. You know, because the users have their superiors or bosses. When the systems came out with different results, the boss might say why did you say something like that to the systems analyst. Therefore, they are afraid to say. Or the users did not get along with the others or their boss, so they cannot say what they really want to say. They afraid to say it. Sometimes we want real detail but they would not say that.

For the systems analyst the Requirements Engineering process becomes flawed because of this unwillingness to take responsibility. As part of managing this process and dealing with incomplete requirements within the system development process, the systems analysts report back what they have learnt and ensure that they are operating in a climate where everyone knows what is known and what has been disclosed. This uncertainty, accepted by the systems analysts, makes the management of the Requirements Engineering process difficult and possibly incomplete. However, there is an acceptance that this is the norm. The TS Systems Development Manager states that:

SA : I can tell you right away that for gathering requirements to 100% is not possible. For us at least when we have 90% of the requirements we can use that to build our system. We then send it back to our client for confirmation. At this stage more requirements will emerge.

The Thai system developer would rather get the system developed than wait for completeness and exactness. It is just as important to complete the product as it is to get all of the required

information. Thai clients want quick results. They want to see the product⁴. The management process must heed that.

- **Conflict between users**

Managing the Requirements Engineering process was also made difficult because there were often conflicts between users during meetings. Therefore, the systems analysts preferred to invite another person who was at a higher rank in the client organisation. It was users responsibility to come with conflict free requirements. During resolution of the conflicts, the systems analysts preferred to sit quietly and let the users resolve the issues among themselves. Therefore, to reduce the time to resolve the conflicts and come out with an accepted set of requirements, the highest rank person, who was not necessarily the Project Manager, should be there to make decision.

SA : ... for example I experienced this in one of my projects. One user wanted this and another user wanted that and both of the users were at the same level. When I talk with other users and needed the two conflicted users to come to the meetings, it was very difficult.

Interviewer : How did you solve the problem then?

SA : Yes, I needed a person who higher rank than them to help me to solve the problems.

Interviewer : So you talked to one of the users and asked his/her superior to solve the problem then.

Interviewer : I see, like the head of Accounting Department made the decision and therefore no one else wanted to argue.

SA : Yes, they have to follow the head.

In the Thai context, the superior will make decisions and everyone must accept them without question. This paternalistic trait within Thai culture effectively meant that to make the management of the Requirements Engineering process more effective, it was often necessary to include another manager from the client organisation.

- **Constant change of requirements**

One final implication for the management of the Requirements Engineering process in Thai software houses is the impact of constantly changing requirements. If the changes were not significant then systems analysts often allowed their clients to change, because they needed to build good relationships with their clients. Systems analysts were often faced with difficulties with some major changes, especially from the top management. It was hard for systems analysts to say no to the changes. If the changes effected the timeframe of the projects then systems analysts needed to explain to their clients and ask them for an extension of time and an acceptance of cost overruns. Thais base their relationships upon trust and emotion. Conflict between individuals is kept to minimum or is avoided if possible. Thais prefer to have stable social relationships and maintain surface harmony. They want relationships be smooth, kind, pleasant, conflict-free, non-assertive, polite and humble.

⁴ Pers Comm Khun

, Systems Director, Siam University, Thailand

IMPLICATIONS OF THAI SOCIAL CONTEXT ON MANAGING THE REQUIREMENTS ENGINEERING PROCESSES AND FOR FURTHER RESEARCH

The management of the Requirements Engineering process in Thailand is not the ordered, rational process the 'western' management models would suggest. Rather the management process is certainly less iterative, there is an acceptance of enough is good enough to begin the process. The avoidance of conflict means that Thai systems analysts will accept that completeness is less important than delivering some form of a product. The management of the Requirements Engineering process is further facilitated by the search for harmony and stable social relationships. Management is not seen as an adversarial engagement. Rather, a sense of acceptance and belongingness are considered to be far more important than total effectiveness or greater efficiency.

In this case study the rational order suggested by the Loucopoulos and Karakostas Requirements Engineering model is challenged by the apparent lack of iteration and lack of order in the Requirements Engineering process. There is an acceptance in the Thai context that imperfections will result from the degree of incomplete information that is provided. The end result is an Requirements Engineering process that accepts incompleteness. This Requirements Engineering process is also affected by management practices. Thai software houses, like the TS Group, must ensure that their client relationships are maintained. Social harmony is accepted as being more important than conflict. As a result projects are managed to ensure outcomes are generated. The training of the software analysts suggests that the production of an information systems should emerge from a complete Requirements Engineering process. However, the expectations of Thai clients is generally towards production of a system, even a prototype as quickly as possible. Thus projects are often management with shortcuts to meet these demands.

The differentiation of the project management process with different organisational sections being responsible for production of the project results in a lack of coordination. Each of the sections, Sales, Systems Analysts and Analyst/programmers are undertaking different parts of each project. There is little agreement about how the process can be managed overall. As a result the iterative, ordered process suggested by the structured Requirements Engineering and management models is replaced by deviant models where process is rather more ad hocⁱⁱⁱ and suggestive of seeking to accept cultural demands rather than rational, or accepted management demands regarding efficiency and effective development of information systems. Cultural differences cited in this paper may appear directly explainable by contextual differences in the working environment, rather than an external, national culture, such as implied by values derived from nationality. However such an assumption is inherently flawed as much of what influences behavior and challenges rational behaviour and order lies in the implicitness of national culture. It is often unstated and accepted. In this case study the apparent organizational context is as much a reflection of the cultural implicitness which underpins it as it is of any textual representations of the organization itself. Other studies of the requirements process have demonstrated the influence of changing user values resulting in iterative development as users adjust their requirements. In common with users everywhere they are able to elaborate their needs more accurately once they see a real system. However, what we report in this study is a deeper understanding of what might drive such behavior. The implicit reality of national culture and value systems is inclusive in organizational behavior. In the Thai context the changing of user requirements was as much about the search for the 'real systems' as it was about the nature of Thai people and the organizational and personal relationships that exist. What is different and what this brief study shows is that users and

user requirements can be altered as much by the intricacies of person to person interaction in Thai cultural contexts as it can be forced by evolving systems.

This study has concentrated on Thai software houses. Further research is needed in other cultural contexts. Burn *et al* (1995) has suggested that there are other differences evident at a more macro scale amongst South East Asian nations. Detailed comparative studies that enable comparison of the Requirements Engineering process in different cultural contexts will enable better development of models which are more indicative of the real Requirements Engineering process used. This will have significant implications for the large indigenous and multi-national consulting companies seeking to provide Information Systems services within those cultures.

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ⁱ 'Ordered' refers to a process which reflects consistency and a prescribed form of action.

ⁱⁱ 'Iterative' refers to repetition or repeating of process/ requirements gathering/policy implementation etc until user satisfaction/ client satisfaction or implementation has reached an agreed point of finality (see Corbitt, 1998)

ⁱⁱⁱ 'ad hoc' refers to a state of randomness and impulsiveness. Action occurs without order.