

EVALUATING IS/IT PROJECTS: REVEALING THE CAUSES OF EQUIVOCALITY

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Abstract

Evaluating IS/IT projects and deciding on their continuation has been hampered by the problem of equivocality. Equivocal situations hinder decision-makers to clearly recognise potential problems and implications of these decisions, as well as to decide the course of action in a purposeful fashion. However, little attention has been devoted to examine the causes of such situations. Extant literature was analysed and synthesised to identify typical characteristics of equivocal situations and uncover the potential causes of equivocality. We developed a framework based on this review and used it further to assist the investigation and to corroborate the causes of equivocality through expert interviews. In this paper, we investigated the causes of equivocality in practice by eliciting insights from different perspectives of decision-makers and their perceptions toward equivocal situations. We found that equivocal situations prevailed are much strongly related to the Challenges in project management, the Complexity in process and the Sophistication of technology within the Content of evaluation. Intriguingly, we found less solid relations with the Lack of standards and the Failure of evaluation methods as these two factors did not emerge as dominant causes during our discussions with the experts.

Keywords: equivocality, information systems, technology, project management, evaluation, decision.

1 INTRODUCTION

During projects' execution, organisations need to evaluate projects that have already been justified to ensure why they should continue supporting them. As new information related to the projects is received, evaluation during projects' execution aims to: (1) provide indication of the projects' progress and likely success; (2) appraise worthiness of continuing the projects, and; (3) allow intervention to projects which deviate from their plan (Seddon, Graeser and Willcocks 2002; Snow and Keil 2002a; Thompson, Smith and Iacovou 2007). However, past studies have highlighted difficulty in evaluating progress of the projects and tendency to be trapped in equivocal situations particularly in relation to whether the expected benefits of continuing still outweigh the realisation costs (Abdel-Hamid, Sengupta and Ronan 1993; Mähring and Keil 2008; Tarek K 1988). Examination on project reports by Snow & Keil (2002a) and (2002b) indicated that information related to project execution often raises ambiguity in evaluating these projects.

Research pertaining to examine the causes of equivocal situations is still limited. Earlier studies were particularly focused on examining the projects' appraisal method (Chulkov and Desai 2008; Keil and Flatto 1999; Taudes, Feurstein and Mild 2000; Tiwana, Keil and Fichman 2006; Tiwana, Wang, Keil and Ahluwalia 2007). The causes of equivocal situations are then solely pointed to the drawbacks of traditional capital budgeting technique. Additionally, a discrepancy between academic research on evaluation and the actual evaluation practice within organisations has been reported (Serafeimidis and Smithson 1999); particularly, there have been a few studies that focus on the evaluation of the on-going projects. Thus, it still remains unclear on how and why evaluation of the on-going IS/IT projects are hampered by equivocal situations and what factors that would potentially lead to such conditions. This paper endeavours to fill this gap by addressing the following research question:

Why do equivocal situations occur when evaluating and deciding on the continuation of on-going IS/IT projects and what are the causing factors?

First, the equivocal situations and a-priori set of potential causes are defined based on the concept of equivocality from previous studies. Second, a framework to investigate equivocal situations in practice is formed by linking literature from IS/IT evaluation and IS/IT project decision. Third, the causes of equivocality when evaluating and deciding continuation of on-going IS/IT projects are investigated in extensive expert interviews using the framework drawn from Stockdale and Standing (2006), an extension of the content, context, and process (CCP) framework and of Goldkuhl and Lagsten (2012) conceptual practice model of evaluation (CPME). Perceptions toward equivocal situations from the perspective of different decision-makers or stakeholders are obtained. We aim at empirically examining equivocal situations to corroborate and refine the a-priori set of causes of equivocality in the context of IS/IT projects. This paper represents the second stage of exploratory phase (theory development and model building) of a larger research project.

2 RELATED RESEARCH

In IS/IT evaluation literature, deciding the projects' next course of action is a matter of evaluating and justifying the investment expenditure, specifically through the use of appraisal methods and techniques. Irani, Sharif and Love (2005) illustrated that "*IS evaluation is a decision-making technique that allows an organization to benchmark and define costs, benefits, risks and implications of investing in IT/IS systems and infrastructures*" (p. 213). Within this stream, a project review or evaluation is conducted as a process of describing the realization of resources for their merit and worth through judging and comparing a set of standards suitable for its context, followed by a decision (Remenyi, Money and Bannister 2007)

Furthermore, Bowen (1987) coined the term of equivocal information which refers to information for which multiple (positive or negative) interpretations can be constructed. According to the theory, equivocal situations may lead to escalation (Bowen 1987). Intriguingly, comparable situations exist when evaluating IS/IT projects. Conducting evaluations of IS/IT are often encountered by having multiple interpretations that fosters disagreement among decision-makers and also encourages negotiation regarding the next course of action (Irani 2002; Smithson and Hirschheim 1998). Decision-makers might interpret the projects' worthiness from unclear indications and get trapped in dilemmatic situations due to lack of understanding of the situations. Thus, decisions are often made in equivocal conditions and rely upon personal experiences and judgements (Bannister and Remenyi 2000).

Most studies concerning the equivocality of evaluation have been mainly focused on common use of capital budgeting techniques (Chulkov and Desai 2008; Keil and Flatto 1999; Taudes et al. 2000; Tiwana et al. 2006; Tiwana et al. 2007). For instance, evaluation using these techniques is argued having tendency to systematically underestimate the true value of IS projects (Keil and Flatto 1999). Difficult quantification of benefits associated to the projects has made these techniques not always adequate to evaluate such projects and likely to create confusion of the projects' worthiness. Real option theory is adapted to view IS/IT investments in the projects and suggested to balance the traditional cost-benefit measurement (Chulkov and Desai 2008). In certain cases, escalating a project is needed and considered to be rational based on this view (Tiwana et al. 2006).

However, these studies have several limitations. First, the studies have been limited to a single appraisal method (i.e. traditional NPV as a capital budgeting method). There is a series of taxonomies of techniques and tools propagated as part of evaluation beside the traditional capital budgeting methods in IS/IT literature. It was reported that using a combination of techniques will alleviate deficiencies compare to utilising a single technique (Love and Irani 2001; Milis and Mercken 2004). Causes of equivocality, thus, are often linked to drawbacks of traditional capital budgeting technique. Second, previous studies have not specifically examined the underlying conditions that cause equivocal situations when evaluating and deciding the project next course of action in practice through the IS/IT evaluation lens. The practice of evaluation aims to appraise particular type of IS/IT projects and typically covers (1) establishment of criteria to be measured, (2) utilisation of techniques and tools to analyse and compare the criteria, and (3) requirement of particular project data as well as (4) involvement of diverse decision-makers or evaluators in the process (Bowen 1987; Farbey, Land and Targett 1995; Serafeimidis and Smithson 2003; Stockdale and Standing 2006).

Equivocality has also been studied in psychology. This stream of study uses experimental settings to examine effects of equivocality on escalation and abandonment decisions (Bragger, Bragger, Hantula and Kirnan 1998; Bragger, Hantula, Bragger, Kirnan and Kutcher 2003). However, the main limitation of these studies is that they do not specifically examine the causes of equivocality. In these studies, equivocality is the independent variable which was given and manipulated, leaving the causes of such situations a question mark.

The evaluation which shown the past performance and future attainment of the projects is a reference point when deciding escalation or abandonment of IS/IT projects (Snow and Keil 2002a; Thompson et al. 2007). Meanwhile, decision-makers need to be aware of the potential problems and implication of equivocal situations to the decisions (i.e. unwarranted continuation and premature termination), and they need to clearly understand the causes to decide the course of action in purposeful fashion (Drummond 2005; Tiwana et al. 2006).

3 RESEARCH METHODOLOGY

The study was conducted in two parts. First, a literature review of publications examining equivocality with the connection to IS/IT project evaluations and decisions was conducted to build a theoretical foundation for the equivocality concept and its causes. The key word query of (escalat* OR abandon*)

AND (information equivocal*) was used in two databases: EBSCOhost and SciVerse Scopus. A review of prior studies conducted was resulting 24 publications which are used as the basis for developing the concept of equivocality and the a-priori potential causes of equivocality.

ATLAS.ti was used to assist the analysis and synthesis of the literature. The publications formed as source documents, in which codes were assigned to the paragraphs or the sentences (Wolfswinkel, Furtmueller and Wilderom 2011). During the iterative process and analysis, several codes and categories were developed, extended and merged in order to make decent conceptually substantiated categories (Miles and Huberman 1994). Notes of the analysis have been maintained in the memos feature of ATLAS.ti to provide opportunity for reinterpretation of the data and for further development of the investigated area. Table 1 illustrates this process.

| Excerpt | Category and Code |
|---|--|
| <p><i>“Managers are not certain what questions to ask, and if questions are posed there is no store of objective data to provide an answer.”</i></p> <p><i>“..it is difficult to ask any questions, as the organization is not aware of the variables that may affect the decision making process.”</i></p> | <p>Concept of Equivocality: Deficiency: Particular type of data/information</p> <p>Concept of Equivocality: Deficiency: Influencing variable</p> |
| <p><i>“..large differences between the departments is a source of high equivocality based on the fact that the departments would have very different interpretations of the same ambiguous situation..”</i></p> | <p>Causes of Equivocality: Frames of reference: Department difference</p> |

Table 1. Coding process.

Second, semi-structured extensive expert interviews were conducted to: (1) examine why and how equivocal situations are hampering the evaluation and decision of the on-going IS/IT projects, (2) gain insights of factors that would potentially lead to the conditions, (3) corroborate and refine the a-priori factors identified in the literature review, and (4) elicit information needed to assist and support the design of the next confirmation phase of the research project.

Preliminary introductions of the study, which specified the requirements and the value of the study, were sent to potential organisations. Additionally, an initial web-based questionnaire link was also sent to the potential and interested interviewees. Before the on-site interviews are held, the interviewees were first asked to complete this initial web-based questionnaire. They needed to recall one of their challenging IS/IT projects. Their experience in managing and reviewing particular aspects or areas of evaluation were shared through this questionnaire. The initial questionnaire is opted to attract potential interviewees and to draw the interviewees’ attention to a particular project which will be discussed further in the interviews.

The appropriateness of the projects and interviewees’ profile was briefly reviewed. The following criteria are used to select the suitable interviewees along with their projects: (1) appropriate IS/IT projects that have already been assessed, (2) the interviewees were involved in the evaluation, (3) relative years of interviewees’ experience in their industries, and (4) interviewees’ position in the organisations and in the projects. It is important to obtain multiple perspectives to enable triangulation. The factors identified to affect equivocality may largely depend upon who describes the situations. Different stakeholders might view equivocal situations from different perspectives; this spawns the need to triangulate by approaching multiple stakeholders.

Next, follow-up schedules for face-to-face interviews were sent to the interested interviewees along with brief overviews of the study and the interview content. Each of the interviews took approximately one to one and a half hours. The interviews were recorded and research notes were taken properly. The interviews were transcribed and sent to interviewees for clarification of unclear matters.

Subsequently, the transcriptions were coded and analysed in the same approach as we did in the literature review. Through this approach, the causes of equivocality and the a-priori factors identified were corroborated and refined based on the insights from the extensive expert interviews.

4 THEORY DEVELOPMENT - FINDINGS AND DISCUSSION

4.1 Insights from the Literature Review

By untangling the concept of equivocality into distinct characteristics, four categories emerged from the analysis. These categories are (1) denotations of equivocality, (2) deficiencies in equivocal situations, (3) data/information in equivocal situations, and (4) actions toward equivocality. Based on the analysis, equivocal situations are described as states where lack of knowledge or diverse knowledge exists to process/understand pieces of information. The states are indicated by the existence of multiple interpretations, conveyed meanings or perceptions. As more tangible data/information becomes limited and different frames of reference exist, analysing objective data becomes neither determinable nor effective to support decision-making. Disagreements occur through diverse arguments, solutions or conclusions that seem reasonable for particular problems. Decision-makers, then, might involve in reaping consensus by exchanging views and judgments through social interactions.

Moreover, the publications have given insights implicitly and explicitly on the causes of equivocality. However, some studies merely implied the existence of the factors that might influence the equivocal situations. Due to limitations of empirical evidences concerning the cause of equivocality in IS/IT projects, closely related or analogous contexts were analysed and factors that were explicitly or implicitly mentioned were extracted for the basis of further investigation. Specifically, a-priori causes of equivocality were established, these categories were developed further by delineating their definitions. Eight categories of potential causes of equivocality are formed from the analysis.

Complexity in process is defined as the extent of intricacy in the process of developing the intended IS/IT. This complexity often leads to difficulty in accomplishing the project. The problems are usually found during the development phase and “imported” when the projects are evaluated. The selected publications for this category are Brun and Saetre (2008); Chang and Tien (2006); Fazlollahi and Tanniru (1991); Jones and Kydd (1988); Koufteros, Vonderembse and Jayaram (2005); Lim and Benbasat (2000).

Sophistication of technology is defined as the extent of sophistication in the IS/IT products or solutions. This is reflected by the primary purpose or management objectives of the intended IS/IT investments that were undertaken in the projects. Equivocal situations might emerge when sophisticated technologies are facing evaluations. The selected publications for this category are Brun and Saetre (2008); Fazlollahi and Tanniru (1991); Kydd (1989).

Challenges in project management refers to the extent of challenges in managing the IS/IT projects rooted in the nature of IS/IT products or solutions. This includes on how projects are planned and defined in the project charter. Equivocal situations might emerge within managing and reviewing such projects. For instance, volatility of requirements associated with ever changing expectations from numerous stakeholders (Chen, Jiang, Klein and Chen 2009), lack of clear objectives and measurable goals, and absence of important assumptions and constraints of the projects (Mähring and Keil 2008). The selected publications for this category are Hantula and DeNicolis Bragger (1999); Jones and Kydd (1988); Kydd (1989); Levander, Engström, Sardén and Stehn (2011); Mähring and Keil (2008); Pan and Pan (2006).

Lack of standards refers to the use of evaluation standards or criteria to ascertain the projects’ value. There are several difficulties when establishing credible standards or criteria to pinpoint the worth of continuing the projects. Decision-makers might experience insufficient knowledge to determine what

or which criteria are important for evaluating and asserting the projects' worth (Bowen 1987). For instance, organisations' vague criteria of success and failure might induce this condition (Hantula and DeNicolis Bragger 1999). The selected publications for this category are Bowen (1987); Hantula and DeNicolis Bragger (1999).

Changes in external state refers as the extent of organisational environmental dynamics. Strong environmental dynamics might impose major alteration to the project. Particular type of IS/IT projects might be contingent, affected or driven significantly by these changes. For instance, technological/business trends or requirements, corporate politics, changes in organisational management, and favourability of business conditions. The selected publications for this category are Carson, Madhok and Wu (2006); Chang and Tien (2006); Fazlollahi and Tanniru (1991)

Different frames of reference refers to the extent of diverse viewpoints used to interpret particular situations. Varying interests and functional background among different departments as well as interdepartmental relations are suspected to be the backdrop of this cause. This factor is also induced by issues related with the project team members, such as enrolment of new members at later stages and personal conflicts (Frishammar, Floren and Wincent 2011). The selected publications for this category are Daft, Lengel and Trevino (1987); Fazlollahi and Tanniru (1991); Frishammar et al. (2011); Jones and Kydd (1988); Levander et al. (2011); Zack (2007).

Failure of evaluation methods refers to the use of techniques and tools by decision-makers to evaluate the projects. Bowen (1987) implicitly said that equivocal situations might emerge when the decision-makers fail to compare data to a set of criteria. This condition is interpreted as disability to mechanise the comparing process. In IS/IT evaluation literature, the comparison typically involves particular techniques and tools to assist decision-making. In line with the interpretation, limitation and resultant of such methods has been indicated as the potential cause of equivocal situation (Keil and Flatto 1999). The selected publications for this category are Bowen (1987); Keil and Flatto (1999); Tiwana et al. (2006).

Lack of evaluation data/information refers to the use of data surrounding the projects to support the decision-making. Information surrounding the projects, such as their past performance, might contribute to equivocality, especially related to their validity and reliability (Brun and Saetre 2008; Newman and Sabherwal 1996). The selected publications for this category are Bowen (1987); Newman and Sabherwal (1996).

Furthermore, prior research in IS/IT evaluation literature suggested viewing evaluation in the perspective of organisational change. Several earlier studies on evaluation in practice have used the framework of content, context, and process (CCP) to examine constituents of evaluation as well as their interactions (Serafeimidis and Smithson 2000; Stockdale and Standing 2006). The content of evaluation, the context which evaluation is employed, and the process on how the evaluation is conducted are interrelated and sometimes intertwined. Drawing from Stockdale and Standing (2006), an extension of the CCP framework and using Goldkuhl and Lagsten (2012)' conceptual practice model of evaluation (CPME), the evaluation frames and their associated causes of equivocality are depicted in Figure 1. Jointly with the insights gained from the synthesis of the literature, this framework was used further to design a semi-structured interview protocol.

In the interviews, the four characteristics of equivocality were distinguished and used to define and pinpoint to the interviewees the proper conditions that occurred during evaluation of the IS/IT projects. Interviewees were asked to recall challenged projects in which their reviews or evaluations had one of those characteristics that closely resemble equivocal situations. The interview structure allows interviewees to provide their experience in evaluating the chosen IS/IT projects and expresses their view related to the cause of equivocality through the framework.

4.2 Insights from the Expert Interviews

To gain insights from a wide-ranging perspective among different decision-makers or stakeholders, seven experts were interviewed from four different projects. Most of them have more than ten years of experience in their industries. They work in medium to large sized organisations within healthcare and government organisation. Their roles in the project cover the project management structure, such as corporate or programme management, the project board, the project manager as well as the delivery team. Most of cases, the evaluation and decision-making were conducted in relatively small teams. The relative size and the people involved would be more or less dependent on the nature of the projects (Fitzgerald 1998). Types of projects range from development and implementation of Electronic Health Record (EHR) in hospitals to development of intelligent/smart digital forms in a government office. The projects had undergone comparable decisions, (i.e. to continue with additional resources). However, opinions toward the actual implementations (i.e. degree of success) were quite different. The projects duration range from 1 to 3 years and one of the projects is still running. Compared to other IS/IT projects undertaken in their organisations, the chosen projects were mostly above the average scale. This scale is based on size (e.g. impact, budget) and the duration. Table 2 summarises the roles, projects and the number of participants involved in the interviews.

To corroborate and refine the a-priori set of causes of equivocality, we have gone through their experiences using the aforementioned framework. Most of the factors in the a-priori set were mentioned explicitly and implicitly by the interviewees. However, there are several dominant factors. Here below, we discuss several findings based on the framework.

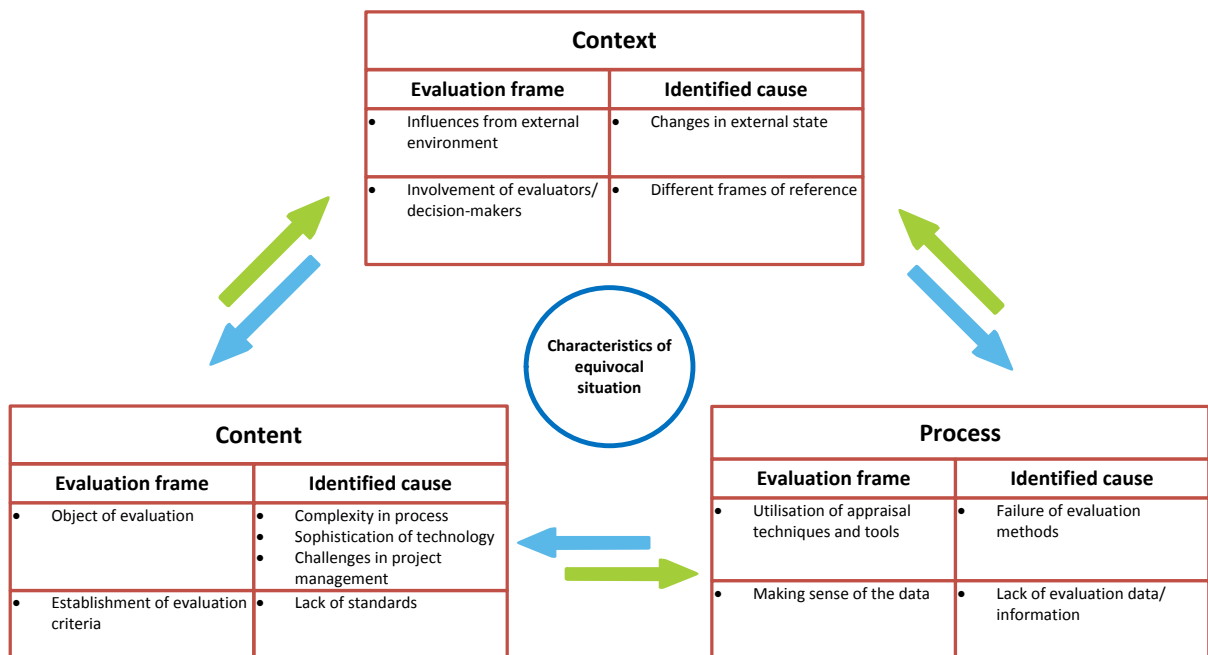


Figure 1. Framework of causes of equivocality in IS/IT projects decision and evaluation (adapted from Stockdale and Standing (2006) and Goldkuhl and Lagsten (2012)).

| Role | Project | Number of participants |
|-----------------------------------|---------|------------------------|
| Corporate or programme management | A, B | 2 |
| Project board | A | 2 |
| Project manager | A, C | 2 |
| Project team | D | 1 |

Table 2 Roles, projects and number of participants.

Content

The content of evaluation refers to the constituents within the “*what*” of evaluation. The identified causes within this frame are Complexity in process, Sophistication of technology, Challenges in project management, and Lack of standards.

Complexity in process. Most of the interviewees referred to this factor during the discussion. Several problems related to this factor were identified. First, the problem was the result of a lack of knowledge regarding the organisations’ internal process. Second, the problem was the result of difficulty in dealing with large groups of stakeholders. The existence of a dominance stakeholder is also inherent in this problem. Third, the problem was related to the challenging technical aspects to realise the intended IS/IT. Finally, the problem was caused by the lack of experience with the innovation involved in the IS/IT project. One of the project managers said: “...[*the situation*] was actually [*occurred because*] the amount of stakeholders is too big to organise in that certain time limit...”. In another project, one of the corporate managers added: “..One of the reason is that our internal organisation is very complex, so to make [*the project*] you need.. let me think.. one, two, three, four, five, six, at least six different business units I would say. Quite big business units, who all have their own managers and their budget cycles, and their own planning cycles and their own portfolio cycles, so that's one of the reasons..”

Sophistication of technology. This factor was also one of the most referred factors by the interviewees. The problem was the result of involving high technologies, heavy innovations or new ideas. Lack of valuable exemplars of the technologies was also mentioned as part of the problem. This problem led to unstable and diverse views toward the concept or theme of the technologies. As one of the programme managers expressed: “...[*the conflicting interpretations were*] because we're talking about [*theme of the technology*] and if you ask ten people what is your definition about [*the theme*], you will get ten different opinions, so everyone has expectations [*as their own view of the theme*] I think, if you talk to suppliers or you talk to [*institutional stakeholders*] or you talk to [*another stakeholder*], they have all a very different kind of idea of [*the theme*]...”. The project manager added: “...there is no other project that comparable with our project in whole [*region*] based on [*the theme*]...”. “...but all the other regions are coming to us and asking how we do it...”. Likewise, one of the project boards stated: “...but in the same time no body who's really investing in it.. we were able to invest in it.. and what you see, we are very early with [*the*] discussion but too early...” In another part: “...one of the most interesting [*things*] because it was.. we were very.. pioneer[ing].. ahead of the discussion in [*the region*] but it had some interesting things to deal with...”

Challenges in project management. Most of the interviewees referred to this factor as the cause of equivocal situation they had. Several problems related to this factor were identified. First, the problem caused by the undefined project charters, for instance existence of different objectives within one project. Second, the problem was the result of difficulty in specifying the requirements as well as in keeping up with their changes. Third, the problem was the result of the perception or expectation gaps rooted in the intangible nature of IS/IT products. Finally, the problem was related to a dysfunctioning of project teams as one of the corporate management stated: “..but well, if you have a not very experienced project manager which is in this case, what is going on, then the one who is doing his executive role can't play his or her part either.. so then it's like the beginning of the end because without smart roles and without well written down project description, and no reports, then yeah, these things start to evolve, and the funny part is every expert wants to do the best, but like all together they just make suboptimal products..”

Lack of standards. The experiences, specifically when evaluating aspects of costs, benefits and risks, were shared by the interviewees. Most of the interviewees felt that they did not face significant equivocal problems when evaluating costs. However, most of them felt to certain extent the presence of equivocal situations when evaluating risks and benefits. The identified problem is that particular type of IS/IT projects were more difficult in extracting value as one of the project managers expressed: “...the outcome of the project was not good measurable [*whether*] it has the right outcome, because it

was quite [an] innovative project, when you [are] working on [the theme], you cannot make a simple decision based on money, because your return of investment in this certain moment is quite unclear, and that is the problem with innovation, based on which outcome you make your decision to stop the project or to go along with it..”

Context

The context of evaluation refers to the constituents within the contextual setting of the organisations. The identified causes within this frame are Changes in external state and Different frames of reference.

Changes in external state. Several interviewees mentioned how this factor was influencing the equivocal situations they had in different forms, such as corporate politics, changes in regulations, pressures from outside of the project management structures, and pressures from particular technology or software markets. One of the project board members stated: “...[the conflicting interpretation on how to do the project] makes it sometimes hard in the decision-making path, when you say okay we [are] clear that situation A is better than B, but B will be chosen.. and that's politics, hard to explain why but there're some power in that kind of [stakeholders]..”. In another project, one of the corporate management commented “...there're a lot of political pressures as well in the project [which] makes people quite nervous [be]cause of [the] political pressure...”

Different frames of reference. Many of the interviewees referred to this factor during the interview. The problem was the result of heterogeneity of the decision-makers or stakeholders involved. For instance, different user groups, diverse institutions or companies, and different knowledge backgrounds. One of the project managers stated: “...you have different stakeholders and different user groups.. and they have different [backgrounds].. So their evaluation is different.. So you have conflicting interests during that project..”. In another project, one of the project boards expressed: “...the project was a big project with a lot of stakeholders from different companies with different approached, different views on one hand, and the other hand. Even so, [it] was one big project with a lot of small sub-projects...”. In another part, the project board commented: “...I have seen this, [it] seems [the] problem [occurred] because other stakeholders had a lot of problems to understand the technical side of the project [because of their limited knowledge]. If you don't have knowledge about architecture it is hard to understand architecture.. So, that was sometimes hard to exactly give them the right information to make the decision...”

Process

The process of evaluation refers to the constituents within the “how” of evaluation. The identified causes within this frame are Failure of evaluation methods and Lack of evaluation data/information.

Failure of evaluation methods. None of them specified certain methods to appraise different evaluation aspects or criteria when reviewing the projects. It was argued that utilising the evaluation methods was problematic for projects with heavy innovations, as one of the project managers highlighted: “...measuring success of innovation, how you wanna do it, making a return of investment, forget it, it's not gonna work...”. There was also a sense of simplification related to the evaluation process. In different project, one of the project managers said: “...so I tried to balance, actually it's a mixed of impact of the problem and the size of the problem, it's not an official tool but that's about what I did..”. Additionally, it seems that the evaluation methods were not appealing to use or they were reluctant to utilise them, as one of the corporate management commented: “No no nothing.. no no.. there was a zero method here.. Yes [we have certain method], just choose not to use it.. of course [it] is there.. we have everything, all methods all tools..”. However, most of them acknowledged that they used a particular methodology in managing their IS/IT projects, such as PRINCE2, and adhered to these methodologies by reviewing their on-going projects.

Lack of evaluation data/information. This factor was cited less frequently by the interviewees. They mentioned several problems related to this factor when formulating the decisions, such as the availability, the sufficiency, and the provision of data/information with regard to the right level and the right detail. One of the corporate management expressed: “..there was an evaluation moment but there

was really like very little materials to make the.. that you could use to make a decision..”. In another part: “..so the decision had to be made, but well actually we didn't have enough data to decide upon, so it was more a feeling, more like experience, always sound very great.. experience based solution..”. In another project, one of the project boards commented: “...we tried to play it as open as possible but it's not always possible.. it is always hard to be sure that it is the right information, you don't want to put things behind so they don't know...”

| Causing factor | Project | | | |
|-------------------------------------|---------|---|---|---|
| | 1 | 2 | 3 | 4 |
| Content | | | | |
| Lack of standards | | | | |
| Complexity in process | | v | v | v |
| Sophistication of technology | v | v | | v |
| Challenges in project management | v | v | v | v |
| Context | | | | |
| Changes in external state | | v | v | |
| Different frames of reference | v | v | | v |
| Process | | | | |
| Failure of evaluation methods | | | | |
| Lack of evaluation data/information | | v | v | |

Table 3. Dominant causes of equivocal situations across the projects.

5 CONCLUSION

Although most of the factors in the a-priori set were mentioned explicitly and implicitly, we found that equivocal situations prevailed when evaluating IS/IT projects are much strongly related to the Challenges in project management, the Complexity in process and the Sophistication of technology within the Content of evaluation. Even so, within the Context of evaluation, Different frames of reference have a substantial contribution to induce equivocality. Within the Process of evaluation, the Lack of evaluation data/information has a fair contribution to the problematic situations occurred when evaluating IS/IT projects. Intriguingly, we found less solid relations with the Lack of standards and the Failure of evaluation methods as these two factors did not emerge as dominant causes during our discussions with the experts.

Moreover, problems exhibited in the unique nature of IS/IT products or solutions and the challenging processes to realise them emerged mainly in the analysis. These problems, such as difficulty in requirements and intangibility of work process and output, are somewhat connected to the innovativeness of the intended IS/IT. In one of the projects, the Sophistication of technology was the initial and primary driver to the equivocal situations. The innovative nature of the IS/IT has influenced the other causing factors and given ample of equivocality to the project and its evaluation. The equivocal situations were even amplified by the fluctuations of external environment outside the project (Changes in external state). The Sophistication of technology was (1) making difficulty in composing the project charters and fluctuating the requirements (Challenges in project management), (2) rising more intricacy in realising the product (Complexity in process), and (2) increasing the diverse views of stakeholders in the evaluation (Different frames of reference).

However, the challenge in this study is that the causes are interrelated and intertwined, which is problematic to isolate and determine their superiority. The selected organisations within healthcare and government also limit generalisability of the findings. The contribution from this study is the framework that maps and shows how equivocal situations might emerge when evaluating and deciding the IS/IT projects. The understanding of concept and the causes of equivocality that have been corroborated in this study will make a contribution to the existing project management literature and

will provide the basis for further research endeavours. Moreover, we elicited the information to assist and support the design of the next confirmation phase of the research project during the interviews. For further examination, literature will be searched for similar constructs and comparable indicators or measurements. The expected outcome of the research project is a model to forestall the phenomena of equivocality and to prescribe how to handle vulnerable equivocal situations that typically lead to unwarranted escalation or premature abandonment.

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