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Procedia Economics and Finance 21 (2015) 548 – 554

Procedia Economics and Finance

www.elsevier.com/locate/procedia

8th Nordic Conference on Construction Economics and Organization

Take a chance on me? Construction client's perspectives on risk management

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Abstract

Having been overwhelmed with a strikingly large list of things that can go wrong, public clients have consistently found themselves subjected to many risks associated with construction projects. As the scale of projects increases, the severity of risks intensifies. This study sets out to highlight a particular set of risks associated with strategic decision making in public construction projects. Of particular importance stands the client organizations' capacity to properly manage risks rooted in poor decision making that leads to many types of project failure. To curb the negative effects of poor decision making, varying organisational configurations have been adopted by clients. This paper investigates the six Swedish public client organizations' risk management procedures, the risk types and the frequency by which they reference risk management in their internal documents. The purpose is to explore how organisational measures influence a client's ability to undertake major construction projects in a manner that is conducive to effective project delivery. The present study is part of an ongoing research project concerning the capabilities of public clients in managing large scale construction projects.

Selection and/ peer-review under responsibility of Tampere University of Technology, Department of Civil Engineering

Keywords: Client capability; public construction clients; risk management

1. Background

The construction process could, in a sense, be regarded as one big exercise in risk management. The level of risk has an impact on the quality of the project as well as on time, budget and performance. Not to mention the impact on

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Selection and/ peer-review under responsibility of Tampere University of Technology, Department of Civil Engineering
doi:10.1016/S2212-5671(15)00211-7

the willingness to try new and innovative methods and procedures. Risk is an inevitable part of the business professional's psyche, often taken for granted as a sort of truism, the discourse is not whether it can be eliminated, that point has long been conceded, instead the focus is on finding ways to minimize its occurrence or reduce its severity (Kangari, 1995). It is in this regard that the construction industry has been found to be lacking, Thompson and Perry (1992) mention the large occurrence of deviations from original planning as ample evidence for the inadequate use of risk analysis and management in the construction sector. Although their data sample is a few decades old, more recent data presented by Flyvbjerg et al. (2009) and Shrestha et al. (2013) show that cost overruns and time delays are as prevalent today as ever before. A large share of construction projects exceed their initial budgets with cost increases in the range of 50–100% being a regular occurrence and increases beyond 100% not uncommon, especially for larger more complex projects (Flyvbjerg, et al., 2009).

It is in this rather morose setting one finds construction, besieged by the relentless force of uncertainty and the struggle to grasp it. The uncertainty can be traced back to the dynamic nature of the construction industry, a line of reasoning that has been written about at great lengths by the likes of A.PC Chan and A.PL Chan (2004), Raiden and Dainty (2006) and Gann and Salter (2000). The industry represents one of the most complex and dynamic industrial environments, largely due to its reliance on manual labour in a fragmented and interconnected management and design process, from inception to completion. Larger construction projects will face sporadic changes throughout the lifespan of the project which affects the involvement of its many stakeholders including design, construction and supplier organizations (Dainty et al., 2002). The lack of a static environment further underlines the need for risk management procedures; either to be handled by the clients themselves or to be transferred to another party. The principal guideline behind this decision lies in whether or not the client possesses the competence to properly assess, minimize or control the risks of the project (Kangari, 1995). This is exemplified by the choice of a general contract or a design build contract and at times with risk sharing schemes in the guise of for example partnering.

The study presented in this paper sets out to highlight the particular set of risks associated with strategic decision making in public construction projects. Of particular importance stands the client organizations' capacity to properly manage the risks rooted in poor decision making which in turn leads to different types of project failure. Though a considerable amount of research has been dedicated to enumerating the various methods and tools that are available for assessing and managing risks in construction (e.g. Akintoye & MacLeod, 1997; Forbes, et al., 2008; Perry & Hayes, 1985; Tah & Carr, 2001), comparatively less research has set out to investigate what might be described as the root problem, i.e. the capability of the construction client to make strategic decisions that are risk-aware in character. In understanding how risk management capabilities develop, it is necessary to understand how capabilities in general develop. An early attempt to explain how capabilities emerge in firms was that of Nelson and Winter (1982) who regarded firms as bundles of path-dependent knowledge bases wherein capabilities could emerge through the repetitive processes of 'learning by doing' found embedded in organizational routines. Although this concept has been expanded upon by the likes of Cohen and Levinthal (1990), Teece et al. (1997) and Zollo and Winter (2002), the centrality of routines as one of the prime vehicles for capability development has endured. It is in this light that this paper investigates two sets out of organizational routines in order to ascertain how frequent public client organizations incorporate risk management into these routines, the two routines being; (i) the organization's annual report whereby comprehensive information is given to its shareholders and (ii) its official website through which internal documents is relayed to the wider public. The study presented here is part of an ongoing research project concerning the capabilities of public construction clients in managing large scale construction projects.

2. Theoretical framework

Although risk is a somewhat multi-layered concept, in a construction context, it typically refers to the likelihood of a detrimental event/factor occurring during the lifespan of a construction project (Wang et al., 2004). Accordingly, risk management is concerned with the identification of risks and the execution of plans aimed at minimizing, sharing, transferring, or accepting those risks (Jergeas & Put, 2001). In order to reach the targets set up for the construction projects, the risks associated with the project need to be managed on a proactive basis 8Goh et al., 2012). This in turn necessities that project related risks have been identified and classified prior to the commencement of the construction project.

There are numerous ways in which risks can be classified. A typical convention in risk management is to consider risks as belonging to either an internal group wherein one possess some amount of control or an external group where one is subjected to circumstances beyond control. This is established in the works of Tah and Carr (2001) who in addition to categorizing risks as internal and external also assign risks with respect to whether they occur in a local context or a global. Aside from this sort of grouping, risk factors are also identified and placed in the specific phase in the construction process where they typically are relevant; examples of these include development risks, construction risks, operational risks and ongoing financial risks (Songer et al., 1997). When assessing these risks, Hopkinson (2012) stresses the importance of not relying on a single risk management tool and warns that the common approach of applying the same risk management method to every new project is contrary to best practices. Instead, Hopkinson (2012) insists that best practices would entail the intelligent application of principles and the selection of appropriate techniques to each individual project.

Traditionally, quantitative methods for risk analysis have constituted the dominant paradigm for assessing and managing risks. However, due to the inherent subjectivity that is integral to risk management and the biases that result therein, mounting dissatisfaction has fueled research into different approaches to handling risk (Tah & Carr, 2001). In particular, the allocation that occurs of the probabilities of occurrence in each of the variables included in the risk analysis is by its very nature subjective (Thompson & Perry, 1992). A prevalent issue of concern is the communication of construction projects risks which tends to be poorly delivered, incomplete in its delivery and thoroughly inconsistent.

Consequently, the various contributors to the construction project lack the necessary shared understanding of risks and are therefore unable to enact any effective early warning measures or strategies for mitigating risks that stem from problems rooted in decisions taken elsewhere in the organizational structure (Tah & Carr, 2001). Furthermore, as Kutsch and Hall (2010) point out, a large share of the research on risk management in projects focuses on developing methods for conducting risk analysis whereas relatively few studies evaluate the effectiveness of said methods. Nonetheless, Shenhar et al. (1996) establish that there is a striking need for risk management procedures, a need that is greater the more grand and complex the project becomes.

2.1. Capability maturity models

To understand how capabilities emerge and grow, models can be constructed. The IT sector saw the development of the Capability Maturity Model (CMM) which has spawned a number of similar models that have been applied in such varied industries as Manufacturing, Health Care and Construction (Curtis, et al., 2009). In essence, the model was originally developed to identify strengths, weaknesses and risks of an organization's software processes (Paulk, 1993). Later variants have been used to suit mega construction projects, however, according to Jia et al. (2011) these have not been adapted adequately to the construction context. Additionally, the evidence base that constitutes the foundation for many maturity models have been characterized as thin (Grant & Pennypacker, 2006).

2.2. Risk management capability

Risk management maturity refers to the level of sophistication that a particular organization has in understanding its risk portfolio, managing the risks in question and dealing with the eventual ramification of those risks through its internal business continuity systems (Zou et al., 2009). The maturity is assessed through the use of different models that claim to measure degrees of capability in different areas, such as risk. These models include the Organisational Project Management Maturity Model (OPM3®) offered by the Project Management Institute (PMI®), the Portfolio, Programme and Project Management maturity Model (P3M3®) and the PRINCE2 Maturity Model (P2MM®), both by the UK Office for Government Commerce, and the International Project Management Association (IPMA) which has developed its own Project Excellence Model (Hopkinson, 2012).The goal is to objectively benchmark the organizations risk management capabilities against a set of standard criteria, a generally accepted framework, in order to assist progress towards increasing maturity (Hillson, 1997). Although different maturity models exist, what they have in common is the partitioning of maturity into distinct levels, often four or five, typically including an initial and ad hoc level, a repeatable level, a managed level and finally an optimized level. Each stage signifies the capability of the organization to handle risks.

In order to determine which level an organization has reached, a questionnaire is typically filled out where one is prompted to grade certain risk related attributes on a rated scale. The weighted averages are then used to assign the results to one of the aforementioned levels (Zou et al. 2009). Hopkinson's (2012) Project Risk Maturity Model (RMM) follows a similar trajectory, it is divided into four levels: Naïve (Level 1), Novice (Level 2), Normalised (Level 3) and Natural (Level 4). The first level a project risk management process is easy to reach but it is fundamentally flawed and most likely does not add value. In the novice state, the project risk management process has an impact on decisions that leads to improvements measured against project objectives. Although value maybe added, weaknesses in either the design of the process or in its implementation hinder it from achieving more significant benefits. In the normalized level, the risk management process has been formalized and is implemented in a systematic fashion. Value is gained by the implementation of effective management responses to significant sources of uncertainty that might affect the achievement of the project's objectives. In the fourth and final level, the risk management process has led to the selection of risk-efficient strategic decisions in formulating project objectives and deciding between different project solutions or delivery (Hopkinson, 2012).

3. Research method

The purpose of this study is to map the current landscape in the development and fostering of risk management capabilities for public construction clients. In pursuit of this aim, a total list of six Swedish public construction clients have been studied with respect to how much content these organisations allocate to risk management in their internal documents. The two specific sources used for information are as follows:

- The most recent annual report for each of the organizations (year 2013)
- Publicly available documents that are accessed through the organizations' official websites.

The selection criteria for the organisations listed includes exclusively public client organizations in Sweden with annual turnover greater than 1,000 MSEK that are either publicly owned housing companies or governmental agencies, excluding municipalities (Table 1).

Table 1. List of selected client organizations,

Organisation	Type
Akademiska Hus	Public housing company
Familjebostäder	Public housing company
Fortifikationsverket	Governmental agency
LKAB	Publicly owned mining company
Svenska bostäder	Public housing company
Trafikverket	Governmental agency

4. Results and discussion

The table below shows the types of the risks that were discussed in the annual reports of the selected client organisations. A particular risk is deemed to be emphasised if the written description of it spans about one or more pages in the annual report for 2013.

Mentioned by all and emphasized by most, financial risks stand as the most discussed type of risks among the covered organizations. It is hardly surprising given the immense importance of controlling financial risks in order to avoid limiting the negative impact on projects' expected cash flow or their profitability (De Marco & Mangano, 2013). It may be prudent to keep in mind that the mere mention of risk management procedures in written publications should hardly be regarded as a substitute for developing and fostering risk management capabilities. It does however offer an indication of how important the organization views risk related issues. Of particular interest is the emphasis placed on financial risks over other risk categories. Although this was to be expected due to the importance of financial concerns, it nevertheless raises questions about the adequacy of the emphasis placed on other types of risks.

Table 2. Types of the risks emphasised in the respective annual reports of 2013.

Organisation	Type of risks		
	Financial	Operational	Safety
Akademiska Hus	Emphasised	Mentioned	Mentioned
Familjebostäder	Mentioned	Mentioned	Mentioned
Fortifikationsverket	Mentioned	-	-
LKAB	Emphasised	Emphasised	Emphasised
Svenska bostäder	Emphasised	Mentioned	Mentioned
Trafikverket	Metioned	Emphasised	Emphasised

Is it possible that by overemphasizing the financial aspects, client organizations have neglected the core operational risks that often carry substantial impact on both financial and other organizational outcomes? Although it is not possible to decisively state that this is indeed so, there certainly seems to be room for an interpretation along these lines. Further research grounded on a larger sample size that allows for extrapolations would be needed to uncover whether an overemphasis on financial risks is a predominant occurrence in the documentation of client organizations and whether this correlates with how risk management is actually handled in these organizations.

LKAB seems to be the public client that emphasis risk management the most from the selection of organizations included in the list. This might in part be attributable to the industry in which it operates. The mining industry is volatile in nature and subject to a barrage of uncertainties ranging from price fluctuations, project related risks, hazard related risks and an extreme sensitivity to changes in demand (McClain, et al., 1996). It is also the only company listed that explicitly states that it employs a Chief Risk Officer (CRO) to handle risk related matters. Although Fortifikationsverket seems to have omitted a risk management perspective in their annual rapport, the agency nonetheless frequently mentions risk management in its published documents, as evident by Table 3. Its annual report is closer to a financial statement than a comprehensive report.

It is also to be noted that all of the public housing companies included had a relatively low emphasis on operational and safety related risks. This in contrast to Trafikverket and LKAB who both shared a high emphasis on operational and safety related risks. This might be explained by the latter two being involved in projects that are technically more complex and often prone to accidents, hence making them more risk sensitive in those areas.

Although the annual report is often regarded as the primary venue to disclose information to stakeholders (Buhr, 1998), it is not the only internal document of relevance. The table below looks at the frequency by which risk management/analysis is mentioned in all of the internal documents that the different organizations have published on their respective websites.

Table 3. Relative occurrence of the keywords “riskhantering” (*risk management*) and/or “riskanalys” (*risk analysis*) in the websites of the selected construction clients

Organisation	Total No. indexed webpages	Results containing “risk management” and/or “risk analysis”	Share of results containing “risk management” and/or “risk analysis” (‰)
Akademiska Hus	6,050	72	11.90 ‰
Familjebostäder	550	8	14.90 ‰
Fortifikationsverket	573	16	27.92 ‰
LKAB	2,840	53	18.66 ‰
Svenska bostäder	2,040	6	2.94 ‰
Trafikverket	328,000	2,490	6.52 ‰

To calculate the relative occurrence of the keywords risk management and risk analysis, a search query was performed on Google Search using the search operator “site”:

‖ site:websiteurl “riskhantering OR “riskanalys”

The results were then compared to the total number of indexed pages for the web domain in question. Most notably, Fortifikationsverket has in comparison to the others, the highest frequency of mentioning risk related issues in its internal web documents. It is perhaps to be expected as the agency is involved in military and defense associated projects, much of which is prone to high levels of risk taking.

5. Conclusion

The construction process is, as is well known, embedded with hazards and risks. The perhaps most common ones, and the most well-known, are the health and safety issues, delivery scheduling and aspects related to finances. However, the sector is full of risks that relate to planning, execution, communication and interaction with the surrounding society, to mention a few. With the emphasis we found in official communication on financial issues, there is a clear focus on presenting business stability and indicate commercial opportunities to the business community interested in construction. The risks entailed in every day work in both design and production are affected by the fragmentation between specialists, control by authorities, and an absence of business drivers executed on an operative level. None of which is addressed described or mentioned in annual reports nor related to risk management.

When studying a design phase of a construction project today we may find some 15 to 20 consultants engaged in the project depending on complexity. When looking at the actual construction of a building we see a vast and distributed supply chain of suppliers and sub-contractors as well as the staffing companies supplying workforce. In a situation where the client has little or no capability to run their projects, the responsibilities are distributed to a layer of managers, or in worst case, to no one. These issues are often addressed in contracts where responsibility is assigned and distributed to the parties. With the fragmented flow of information, based on number of persons engaged, however, the quality of communication is affected and not everyone who is engaged, from top to bottom, has a clear picture of what is exactly their responsibility in everyday work. This can be seen as a simple issue of distributing risk in contracts. It can also be seen as a question of capability in understanding what a project really entails on an everyday basis. The importance of this may be illustrated by the observation that extra costs often are incurred by underdeveloped drawings and specifications produced under the conditions of the design process as noted earlier in this section. This could of course be seen as an argument that there is a need for a longer and more detailed design phase. Increasing the time allocated to design would probably solve some of these issues; the main point here though, is that the level of competencies and the capability of an organization to make relevant decisions likely are of higher importance.

With the strive to implement communication support with information management systems like BIM, more information is made available both in the design and production phases. One of the arguments to engage projects in this, if not new but broadly disseminated, digital environment is that it enables identification of risks. This is further underlined by the decision in some countries, among them Denmark, Finland and Norway, that BIM should be utilized in projects funded by public finances. In order for this sharing of information to be embedded over all organizational levels and roles, rather than a system managed and owned by its staff and related stakeholders, it needs to be open and accessible. This is an ambition already today where there is a development towards implementing BIM and other digital tools to enable access and sharing of information and by doing so reducing risk.

Now, an interesting gap appears. With the drive to implement project management systems, digital detailed plans with a continuum into projects, BIM supported design and construction, checking of workforce on site, health and safety management systems and laws, RFIDs on equipment and material, 3D visualization during design and before entering the construction site etc, an effective, lean and sustainable construction process is strived for. This is all good. But, when coupled with employing, or rather, sub-contracting the cheapest workforce and sourcing the cheapest materials from suppliers outside the realm of control there is a gap between the ambitions to control performance, and thus containing risk, and the reality of execution. One could ask, what capability is need to manage these projects on a satisfactory level, what capability is needed to manage without imposing so many restriction that flexibility and innovation is hindered, a classic problem indeed. Perhaps the picture drawn above is too much of a black and white one. It, however, leads to a number of interesting research questions related to the capability of organization engaged in construction and their capability to foresee, analyse and manage risk. In this study we have focused on the clients. As they are required to understand and control more of the construction process, or delegate it to a contractor, there has to be somewhere in the clients organization the capability to understand the consequences of a project. There has to be an understanding of the reality of construction.

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