

Systemizing Reactive Risk Management of Large-Scale Development Projects in Developing Countries

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Introduction

The last two decades saw the 'development sector' booming worldwide, especially in developing countries that are rich in natural resources. This boom increased the pressure on governments to develop large-scale urban projects that can accommodate the newly emerging developments. Due to lack of necessary expertise and financing, governments in most developing countries found partnership with the private sector to be the way forward for developing these projects and having them delivered in time (Koppenjan and Enserink 2009).

The research presented in this article is based on case studies of development projects managed by Millennium Development International (MDI), a leading company in the field of development management. Established in 2000, MDI is known to be one of the first companies in the Middle East to provide this service. Despite the fact that MDI has set a highly sophisticated management approach, this approach does not include specific guidelines for the management of risks that the large-scale projects might face. Analysing the projects that were accomplished during the last ten years for the purpose of revealing best practices in risk management and in developing a risk management system will help in guiding project managers and enhancing their efficiency when facing risks in the execution of large-scale projects.



Literature review

This section explores the types of risks faced by large-scale projects, the risk management approach to be followed and the stage-gate system that is found to be beneficial in the context of projects under discussion.

Types of risks in large-scale development projects

As risk identification is the initial step in risk management, understanding risks and their categories is essential to come up with an effective risk management system. Therefore, a comprehensive list of risks was formulated based on the review of literature. The identified list was organized along the three identified risk levels that were found to be applicable to the context of large-scale development projects, namely, project environment (Datta and Mukherjee 2001; Dey 2009; Gil 2009; Perera, Dhanasinghe and Rameezdeen 2009; Siebert 1987), external environment (Datta and Mukherjee 2001; Dey 2009; Gil 2009; Lehtonen 2004; Perera, Dhanasinghe and Rameezdeen 2009; Senge and Carstedt 2001; Senge et al. 2007; Siebert 1987) and institutional arrangement (Koppenjan and Enserink 2009; Sagalyn 2007; Vanmarrewijk et al. 2008). However, little was found on how to mitigate these risks. Risk categories that were found to be relevant to the case studies are indicated in the section Findings. The risk management system.

Approaches of risk management

The review of the literature shows the classic approach of risk management to be inappropriate for application to large-scale projects (Charette 1996; Pavlak 2004; Pitsis et al. 2007). The classical approach of risk management focuses on using databases of previous projects in order to predict potential risks. Based on that, an action plan is established to overcome these risks and a contingency budget is accordingly allocated. While this can be true for small-scale projects with limited number of parameters, it does not apply to large-scale ones. Large-scale projects are complex, with a high level of unpredictability and uniqueness, which renders databases from previous projects inadequate. Furthermore, allocating a contingency budget for every possible risk within such projects that are full of uncertainty is not cost-effective.

The literature on risk management of large-scale projects promotes reactive risk management as opposed to the classical proactive risk management (Charette 1996; Pavlak 2004; Pitsis et al. 2007). This new approach focuses on reacting to risks as soon as they emerge and on investigating different alternative solutions that need not be part of databases containing tested solutions. When following this approach, the project manager will have to address all processes related to risk management (planning, implementation and monitoring) as part of his/her daily activities, rather than merely focusing on monitoring the implementation of a predetermined risk management plan.

Stage-gate systems

Stage-gate is a strategic management system that aims to assess risk at conjunctural instances of product development, which are considered as high-risk projects (Cooper and Edgett 1996). This system acknowledges the inapplicability of classical risk management in high-risk projects and promotes identification of critical milestones of the project, at which reactive risk management is practiced instead of counting on a plan that is set prior to project initiation (Cooper 2008, 2009; Cooper and Edgett 2008). Such a system can be beneficial for formalizing the identified risk management approach by enabling identification of the critical instances of the project.

This system has its own set of challenges that need to be listed in order to understand its risks (Cooper 2008, 2009; Cooper and Edgett 1996, 2008). These risks are the following: 'killing' decision might not be an option as this can be considered as a mismanagement problem; decisions at gates might not be taken seriously; first-tier managers might not be included, which can affect implementation of decisions; and gatekeepers might not be committed to gatekeeping meetings.

Research methodology

The main question of this research is the following: how to manage risks of large-scale development projects in developing countries? As this is a 'how' question, this research falls under the category of qualitative research (Royce and Bruce 1999; Yin 2009). This research is a qualitative case-study research as it does not require control over behavioural events (Yin 2009). Multiple case studies were used in order to formulate a 'cross-case' research conclusion. Data was collected from interviews with managers and assistant managers of selected projects. Results of the interviews were supplemented with personal observations and progress reports of selected projects.

The case studies were selected based on the largeness of scale, international recognition and coverage of a wide spectrum of development phases. The following are the selected case studies: Al Shamiyah Project in Makkah, Saudi Arabia (a 1,400,000 m² project with a construction cost of around two billion USD); Aktau New City Project in Aktau, Kazakhstan (a 5,000,000 m² project); Jabal Omar Project in Makkah, Saudi Arabia (a 1,000,000 m² project and the first real-estate project to be listed in the Saudi Stock Exchange market); Medini Development Project in South Johor, Malaysia (a one-and-a-half billion USD investment); Bandar Jissah Project (a 2,000,000 m² project); and Al Dariyah Project (a 600,000 m² project with a construction cost of around six hundred million USD).

Findings: The risk management system

The collected data were analysed and interpreted in order to come up with a risk management system that answers the main question of this research. As risk identification is the initial step in risk management, we will go through different categories of identified risks before illustrating the suggested risk management system.

Categories of risk in large-scale development projects

The risks discovered in the case studies were found to be spread along the three levels that were identified in literature, namely, project environment, institutional arrangement and external environment (Figure 1). At the level of project environment, the identified categories of risk are market, financial, technological, management risks, completion, technical risks, operational, armed conflicts and legal risks. At the level of institutional arrangement, the risk categories are lack of multidisciplinary expertise in public authorities, conflicts between different authorities, lack of approvals facilitation and delay of incentives to be provided by the government. At the level of external environment, the identified risk categories are political, social, economic and environmental risks.

Each of these risk categories contains a subset of risks that contributes to the high complexity and riskiness of large-scale development projects. For example, the category of market risks includes risks of land prices, risks of construction costs and revenue risks. Furthermore, each subcategory contains its own subset of risks. This variety of risks shows the high level of complexity and riskiness that are associated with large-scale development projects. Furthermore, it confirms that the classical approach of risk management, which is based on predicting risks associated with each project and allocating necessary budget thereof, is inefficient. This together with the results of the interviews conducted for the study suggests that reactive risk management would be more appropriate as an approach to the management of risk in large-scale development projects.

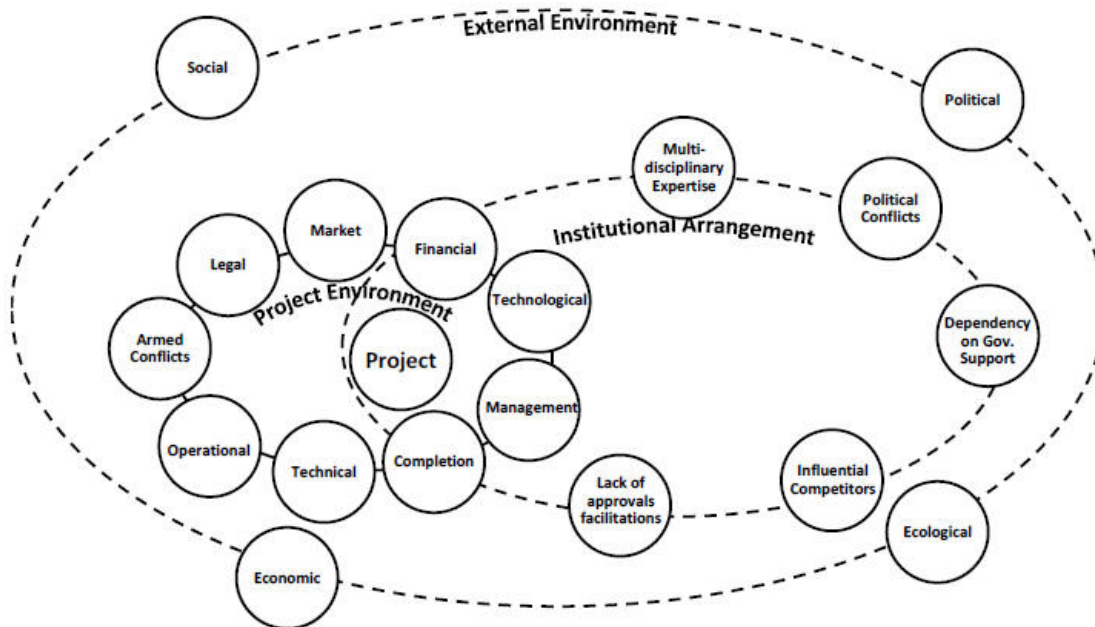


Figure 1: Relation between different environments that can impact the project along with their set of risks. Source: Baydoun (2011), p.243.

Risk management system

As per the value chain of MDI that reflects different phases of development, the end of each phase is considered to be a major milestone at which clear objectives are achieved. The next phase cannot start unless the objectives of the previous one are met. Hence, these milestones can be considered as key junctions at which the level of risk of the project needs to be assessed in order to decide whether the project is to be continued or stopped. As discussed earlier, due to the complexity and riskiness of large-scale development projects, such decisions cannot be made early on. At each of these milestones, the decision-makers are better informed as new information about the project is provided, which will allow for better risk assessment exercise. In risk management meetings to be held at these milestones, decision-makers assess whether risks that emerged during the completed phase or expected to emerge in the coming phase can be mitigated or not, based on the information provided. If risks can be mitigated, the cost of mitigation can be assessed to check the feasibility of the project. If the project is still feasible, a 'go' decision is taken. Otherwise, the 'kill' decision will prevail. Such approach is similar to the risk management approach that is followed in the stage-gate system. Furthermore, this approach allows formalization of MDI's current risk management approach in order to make it more efficient through identification of the critical instances of the project at which risk needs to be assessed. Similar to the stage-gate system, the key milestones can be called 'gates'.

Similar to MDI's current practice in risk management meetings, in gate meetings everyone would be allowed to express his/her opinion freely. The focus of these meetings is to brainstorm solutions for a set of risks not confronted in previous projects.

As per the literature, a stage-gate system has some challenges that need to be considered. As risk management is not currently institutionalized in MDI, these challenges were not revealed in the case studies. Hence, the challenges identified in the literature would need to be considered when implementing this system.

Despite the fact that the MDI's phases of development were followed in different case studies, the business opportunity development phase was found to contain sub-phases that might vary from one project to another. The main reason behind these variations was found to be related to the risk behaviour of the client. A risk-taking client would expedite the process through running phases in parallel (as observed in the case studies) and collapsing sub-phases of the business opportunity development phase. On the other hand, a risk-averse client would take the project step by step in order not to venture into advanced phases before securing a solid ground for the project. Different scenarios for the development phases were categorized in order to create different versions for the system under discussion, depending on the level of risk the client is willing to take. Figure 2 and Figure 3 illustrate examples of these versions.

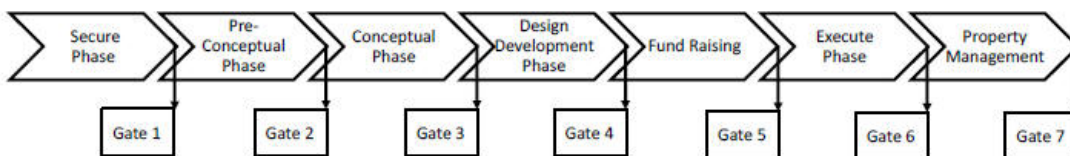


Figure 2: Conservative risk-taking version of risk management system

Source: Baydoun (2011), p.246.

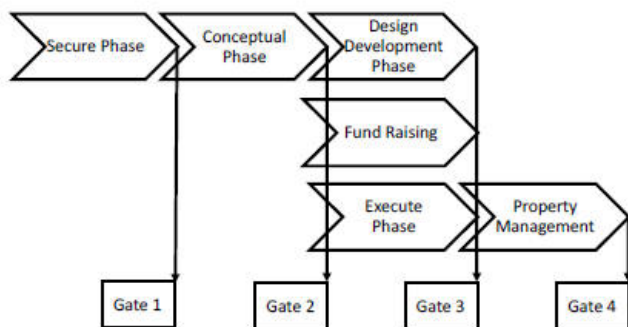


Figure 3: Very high risk version of risk management system. Source: Baydoun (2011), p.247.

Conclusion

This paper contributes to the risk management literature through the risk management system formulated for large-scale development projects in developing countries. Currently, the reactive risk management approach promoted for application to the large-scale projects does not call for identification of key milestones, at which enough information for risk assessment

and mitigation would be available. By analysing case studies from projects managed by MDI, these milestones were identified and formalized in a risk management system. This system contains gates of risk management of large-scale development projects along with its different versions. These versions depend on the levels of risk to be taken by the client. Furthermore, through identification of key milestones, this system will help in making the necessary coordination early on, in order to bring key decision-makers on the same table for risk assessment at different gates. A list of potential risks that might be faced in the type of projects under discussion was also identified to be used as a guide for risk identification in risk management gates.

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