

# Risk mitigation for preconstruction phases of large scale development projects in developing countries

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## **Abstract**

*The aim of this article is to identify risk mitigation measures for preconstruction phases of large scale development projects in developing countries. As large scale projects are characterized by a high level of risk due to complexity of these projects, identifying risks of large scale projects along with associated mitigation measures is of high importance to project managers of the kind of projects under discussion as it will help them in identifying risks and assigning proper mitigation measures. This research was conducted for preconstruction phases as during these phases, managers have the highest level of control over their projects. In addition, current literature focuses on construction part of development projects rather than preconstruction phases.*

**Key Words** Risk management, Large scale projects, Project management, Mitigation measures, Development management, Developing countries

## **Introduction**

Large scale development projects are known for their high level of complexity due to the large number of disciplines and stakeholders that are involved in this type of projects. Disciplines related to the type of projects under discussion are inclusive and not exclusive to the following: urban design, architecture, infrastructure design, market analysis, finance, marketing, transportation planning, law and different engineering disciplines. In addition, involved stakeholders include developers, investors, end-users and a wide range of consultants and public authorities. The purpose of this paper is to identify different risks that fall under each risk category associated with large scale development projects in developing countries as well as risk mitigation measures for each identified risk, through analyzing selected case studies from MDI's projects, which is a professional development management company offering consulting services from inception to realization of large scale development projects. Despite the fact that its work is focused in the Middle East, lately its area of operation extended to Kazakhstan and Malaysia. Established ten years ago, MDI is known to be one of the first companies to provide this service in its zone of operation.

Despite the fact that development management service extends till the end of construction, the main work is conducted prior to construction. This is the period, during which the investment framework is defined and the most critical decisions are taken, and hence holds the highest level of risk. Partnership is established, consultants are appointed, funds are raised and approvals on studies are obtained prior to beginning of construction. Any wrong decision at this phase will have a ripple effect that might endanger the whole project. In addition, this is the period, during which the project manager have the highest level of control over the project as margin of change during later periods will be very limited. Therefore, identifying risks that might emerge during this period along with associated mitigation measures, which is the main focus of this research, is very critical.

## **Types of risks for large scale development projects in Literature**

As no references were found on risk management during preconstruction phases of large scale projects, literature focusing on the construction part of development was mainly investigated. Other complementary bodies of literature, namely, sustainability and private public partnership were investigated to reveal risk categories that are related to the type of projects under discussion. The identified list of risks was organized along the three identified risk environments of large scale projects that are applicable in the context of large scale development projects, namely, project environment, external environment and institutional arrangement. However, little was found on how to manage these risks. Hence, this represents a gap in literature to be covered.

Risks at the project environment level include market, financial, technological, management, technical and operational risks (Dey, 2009; Siebert, 1987; Datta and Mukherjee, 2001; Perera et al., 2009; Gil, 2009).

At the level of the external environment, the risks are political, social, environmental and economic risks (Datta and Mukherjee, 2001; Dey, 2009; Gil, 2009; Lehtonen, 2004; Perera et al., 2009; Senge and Carstedt, 2001; Senge et al., 2007; Siebert, 1987).

Risks at the institutional arrangement level include opposition of interest, multidisciplinary nature of projects under discussion, political conflicts, lack of approvals facilitation and over optimism. (Sagalyn, 2007; Koppenjan and Enserink, 2009; Vanmarrewijk et al., 2008).

## **Research methodology**

The main question of this research is: how to mitigate risks of large scale development projects in developing countries? As this is a 'how' question, this research falls under the category of qualitative research (Yin, 2009; Royce A., 1999). This research is a qualitative case study research as it does not require control over behavioral events

(Yin, 2009). Multiple case studies were used in order to formulate a 'cross-case' research conclusion.

Literature was reviewed in order to identify different risk environments along with categories of risk that fall under each environment in order to use it as a framework of analysis for different case studies. This framework was used to develop a guide for interviews with managers and assistant managers of selected projects and allowed for a consistent research methodology that enforced the research reliability (Yin, 2009). The purpose of interviews is to critical strategic risks that were faced in analyzed case studies along with adopted mitigation measures. Collected data on case studies were analyzed till saturation of different investigation issues. This technique is called theoretical saturation and is convenient for research of complex business environments. Results of interviews were complemented by personal observations and progress reports of selected projects.

The case studies were selected based on their scale, international recognition and wide coverage of development phases. The selected case studies are the following: Al Shamiyah project in Makkah, Saudi Arabia (one million four hundred thousand square meters project with a construction cost of around two billion USD), Aktau New City project in Aktau, Kazakhstan (five million square meters project), Jabal Omar project in Makkah, Saudi Arabia (one million square meters project and the first real-estate project to be listed in the Saudi stock exchange market), Medini Development project in South Johor, Malaysia (one and half billion USD investment), Bandar Jissah project (two million square meters project) and Al Dariyah project (six hundred thousand square meters project with a construction cost of around six hundred million USD).

### **Risk categories and mitigation measures**

Critical risks of different projects and measures that were used to overcome these risks were investigated along the three environments that were identified in literature, namely, project environment, external environment and institutional arrangement. Some additional risks that were not covered in literature were revealed along with their mitigation measures, and some risks were found to be irrelevant to the context of analyzed case studies. Furthermore, due to high level of complexity and riskiness of projects under discussion, some risk categories entailed sub-categories of risk that contains its own set of risks. In the following, we will illustrate risks that were revealed along with associated mitigation measures.

## **Level of project environment**

### **Market and financial risks**

Risk sub-categories that were identified under this category are risks of land prices, construction costs, revenue, need for entering the market before competitors and attracting international investors to a risky market.

#### ***Risks of land prices***

Risks of land prices can be related to either increase of land prices leading to higher compensation for land acquisition or compensation on the basis of revenue stream. In some locations, specifically prime ones, value of real estate properties continuously increases, which increases the capital required for land acquisition. Hence, the acquisitions budget could not be fixed early on, especially if the inflation of real estate prices cannot be projected due to irregular increase of prices in previous years. Furthermore, public authorities might enforce compensation to local residents on the basis of discounted income stream of the property and not on asset value basis, in order to ensure a fair compensation. This also can lead to increase of capital required for acquisitions. In order to overcome these risks, major land owners in the project area can be invited to enter the project as contributors in kind with their land value. Despite the fact that such measure will increase the number of shareholders and reduce the percentage of ownership of initial developers, it will help in keeping the project feasible. Nevertheless, the initial developers need to keep the majority of shares in order to keep control over the project.

#### ***Risks of construction cost***

Construction cost is always subject to changes based on international demand on construction materials. Four solutions were identified to overcome such risk: appointment of a cost control consultant, continuously updating the market study, inviting suppliers to build factories for construction materials and asking for government's support for development of infrastructure. When adopting the first solution, the cost estimators will continuously revisit the cost of the project in order to make sure that it is still within the budget. In case, the project exceeds the budget, they can recommend certain solutions that allow reducing the cost while keeping the project within the intended level of quality. As an example, the cost estimators can recommend new finishing materials that are not affected by increase of cost of construction materials and have a quality that is similar to initially selected material. The second solution will help in continuously updating cost assumptions to make sure that the basis of cost estimation is up to date. This solution can be seen as complementary to the first one. As far as the third solution, it is applicable when the cost of local construction materials is much higher than international benchmarks, and the project size is

substantial enough to justify building factories for the sake of supplying it with necessary construction materials. Such measure will allow overcoming local constraints in respect to construction materials and allow for protecting the project against fluctuation in availability and prices of construction materials. The fourth solution is to ask for the government's support for development of infrastructure. It is a common practice in large scale projects that governments provide support for infrastructure investments and improvements in order to attract private investors. However, sometimes governments do not have the financial capability to provide such help.

### **Revenue risks**

Risks that fall under this sub-category are large size of the project and incompatibility between provided product and needs of end users.

From a market perspective, the size of large scale projects is a risk by itself as the market might not be able to absorb such projects, especially if these projects are unprecedented within their context. This risk is part of the nature of projects under discussion; however, it can be reduced by phasing out the project. When adopting the first solution, we need to keep in mind that phase one of the project needs to be substantial enough in size in order to achieve the statement that the developer is looking for and close the door for competition. However, risks related to the need of entering the market before competitors need to be considered. The details of such risk are discussed in the next section.

Risk of incompatibility between provided product and needs of end users is highly relevant to projects, part of which relies on land development. In such projects, part of the parcels will be sold to second layer of investors to develop buildings based on detailed development guidelines that need to be provided by the development manager. For these properties to be appealing to second layer of investors, the provided product or its development guidelines need to be in line with the requirements of end-users, for it to be sellable. However, developers in these projects tend to disregard needs of end-users as they will be selling the land to second layer of investors and not to end-users. The problem arises when second layer of investors try to test the marketability of the provided product to end-users, as they will discover that some discrepancies exist between their requirements and the qualities of the product. This can be a major risk that can affect the whole project and stop the sales deal of these parcels. Such risk can be either avoided by testing the market ground of the project to end-users and not only second layer of investors or overcome in case of occurrence by implementing necessary design modifications on the expense of providing some additional time and budget for the studies. As large scale development projects are long term in nature and as studies budget is minimal when compared to total development cost, it is usually reasonable to allocate some additional time and budget for studies in order to overcome

this risk by better understanding needs of end-users and modifying development guidelines accordingly.

### ***Need for entering the market before competitors***

Sometimes, the project is related to a specific market gap that needs to be filled before other competitors do. This can limit the phasing options for the developer, which will increase the initial capital that is required for the project. In this case, the developer will have to secure required capital to initiate a major chunk of the project if not all of it. In order to overcome such risk, the developer does not need to pay all costs of the project from his equity as he can rely on inviting investors, self financing and debt. When inviting new owners we need to make sure that the percentage of their shares does not threaten the majority of initial developers. As far as self-financing, it is based on launching presales during the construction process. However, such tool cannot be used at early stages of the project when nothing is yet implemented on the ground. The third tool relies on availability of debt sources that is related to general economic conditions. When adopting this measure, we need to make sure that the cost of debt does not constitute a major burden on the project.

The three risk mitigation measures are not mutually exclusive; therefore, different sources of equity, self-financing and debt financing might be adopted simultaneously in a balanced manner in order to achieve the highest possible return for the project.

### ***Attracting international investors to a risky market***

Real estate markets in developing countries are usually considered as immature. This immaturity allows for a high margin of profit due to instauration of such markets. However, it also entails a high level of risk as rules and regulations of such markets are not fully set and the investor cannot count a lot on previous trends in such markets as they are newly emerging. This presents a major risk for financing of these projects as investors might be reluctant to invest in a risky market despite the fact that it might bring a high level of profit. Such risk can be overcome by asking the government to provide financial incentives that cannot be found in mature markets. As an example, such incentives can entail tax exemptions and custom duties exemptions. These incentives are sometimes considered as prerequisites for such projects in markets that are newly emerging, therefore, these incentives need to be clearly listed in the development agreement with the government along with a detailed timeframe for implementation.

## **Technological risks**

Sometimes public authorities require adaptation of new technologies in order to reflect a sense of modernity in this city. However, these technologies might not be convenient to the context of the city or too expensive for the budget of the project. In order to overcome such risk, implementation of such technologies can be delayed and simpler technologies could be adopted. As an example, the adaptation of a mass transit system in a development project does not make sense from a transportation perspective unless it is applied on the whole city in order to have the necessary critical mass to benefit from its efficiency. Meanwhile, buses could be adopted as they can operate within any existing road network. When adopting such measures we need to keep in mind that an educational process is necessary in order to raise the awareness of public authorities on the prerequisites of such technologies.

## **Management risks**

Sub-categories of risk that fall under this category are conflicts between consultants and quality control.

### ***Conflicts between consultants***

As large scale development projects are multidisciplinary by nature, many conflicts were observed between specialists in different disciplines. Typologically, two main types of conflicts were observed: technical conflicts and conflicts of interest.

Due to the high number of disciplines involved, many technical conflicts were observed between different consultants as the work of each consultant is dependent on the work of other consultants. In order to solve conflicts on this front, the development manager needs to organize a meeting that joins conflicting parties for the purpose of finding a compromise that suits both parties. Using his multidisciplinary team with expertise in different technical disciplines, the development manager can find a compromise that brings the best for the project and not only to a particular study of the project.

As far as conflict of interest, sometimes it can take place even between consultants that are responsible for different studies for the same project. Such conflict might arise when the spectrum of services of a certain consultant includes a service that is being provided by a different consultant for the sake of the project. In such case, mutual unreasonable criticism might lead to an unhealthy relation between these consultants, which can have a negative impact on the project. For the purpose of overcoming such conflict, the

development manager needs not to allow for any direct correspondences between such consultants and force both of them to communicate through him.

### **Quality control**

Risks related to quality control are lack of balance between quality of design and financial return, delays in delivery and low quality of work.

In many cases, quality of design is found to be contradictory with achieving a high financial return. For the sake of raising the quality of the development area, master planners may suggest the introduction of major open spaces. Despite the fact that these spaces can enhance the marketability of the project, it adds a substantial load on the project cost. The multidisciplinary team of the development manager can overcome this risk by identifying the ultimate size of these open spaces in order to achieve the highest possible rate of return through balancing between increase of cost and increase in selling prices.

As far as risk of delays in delivery, it is always present as the development manager does not have full control over the production process. In such occasions, the development manager needs to find additional time to make necessary enhancements using available slack time or through advancing dates of later deadlines where possible.

The risk of having a low quality of work can be overcome by the development manager through using quality control measures. This quality control can be achieved through the following procedures: continuous follow-up on queries and processes of studies, interim reviews and comprehensive review of final submissions. The development manager needs to continuously follow up with consultants in order to make sure that their queries are answered and provide them with necessary guidance. Furthermore, interim reviews sessions need to be conducted at important milestones in order not to be surprised with a final outcome that is not in light with given instructions. In addition, final submissions need to be reviewed in a comprehensive way in order to make sure that all deliverables are submitted with a quality that meets standard norms of the discipline, to which each study belongs.

### **Technical risks**

Technical risks might emerge out of the complexity of large scale development projects leading to technical deficiencies in any of the project's studies. The risks that were found to have a strategic importance under this category are related to regulations and requirements of public authorities and link to surrounding.



### ***Risks of regulations and requirements of public authorities***

Risks under this sub-category basically include conflict between planning regulations and presence of qualitative regulations that can be interpreted in different ways.

In many events, conflict between planning regulations was noticed. In order to overcome this conflict, balance between different requirements needs to be achieved and/or exceptions need to be requested if possible. As an example, conflict between road slopes and cut and fill requirements was observed in one of the investigated case studies. The authorities required that road slopes should not exceed 6-8%. From a transportation perspective, this is considered to be a gentle slope. In order to achieve this slope in a hilly area, major cut needs to be made, which is contradictory with the minimal cut requirement. The other option would be extending length of roads in order to turn around steep hills. However such measure will decrease sellable areas of the master, which is problematic for a financial perspective. In order to solve this conflict, the development manager optimized length of road network by using the maximum allowable slope where possible and making all roads double loaded. This way he minimized area to be allocated for road network while staying within the ceiling of regulations.

Presence of qualitative regulations that can be interpreted in different ways can be a major problem as it gives the public authority the ability to maneuver at its convenience to delay the approvals process. In order to overcome this risk, qualitative regulations need to be quantified and recorded in minutes of meetings that shall be signed by different participants. As an example, in one of analyzed case studies, regulations stated that cut should not be 'significant'. The definition of what is significant could vary from one person to another, which constituted a major problem that can impact the whole approval process. For the purpose of overcoming this risk, this qualitative regulation was quantified and recorded in minutes of meeting that was signed by different participants in order to create a clear reference for satisfaction of this requirement.

### ***Link to surrounding***

Risks that are related to link to surrounding are related to unfinished design of infrastructure elements that are essential to the project and that fall under the jurisdictions of public authorities and limited capacity of existing infrastructure.

Surrounding infrastructure elements like bridges or tunnels constitute major assumptions, based on which different studies need to be based. Incompletion of studies related to these elements might have a major impact on the project if adopted assumptions were incompatible with later design of these elements. In order to overcome this risk, the development manager needs to be proactive and provide

designs for these elements that are convenient to the project in coordination with public authorities. Such move will be most probably welcomed by public authorities as it cuts down on their expenses. As far as the client is concerned, the costs of these studies are usually negligible when compared to benefits that can be generated from such measure.

As far as capacity of existing infrastructure networks, sometimes these networks cannot accommodate the heavy demand to be generated from large scale development projects. This might require developing new infrastructure utilities that will have a major impact on the project's cost. In case the project is developed in partnership with the government, this risk can be overcome by allocating provision of infrastructure connections with the required capacities under the government's responsibility. Otherwise, the project can be phased out in order to fit the size of phase one to the additional load that can be carried by existing networks. Once this phase is implemented and sold, the project can afford establishing new infrastructure utilities.

## **Operational risks**

The major risk that falls under this category is not meeting the requirements of the operators. Operators usually have specific requirements regarding size of rooms, types of facilities and their sizes. Meeting such requirements post execution would not be possible. For the purpose of avoiding such risk, the development manager needs to recommend engaging the operator from early stages of the design development in order to take his requirements into consideration. This implies finalizing contractual agreements with operators prior to design development phase.

## **Legal risks**

Risks that are related to legal issues are not entitling foreigners for free hold ownership and difficult issuance of working permits for foreigners.

Not entitling foreigners for free hold ownership is a risk that can limit the target clientele of the project, and hence impact its financial feasibility. Such risk can be overcome through either asking the government to introduce a free hold law allowing foreign ownership of land and real estate or using long term lease as an alternative.

In some countries, we can find some constraints on issuance of work permits for foreigners. This risk can be overcome through relying on local consultants for field work and/or asking the government to facilitate residency visas and work permits through a one stop shop, if possible.

## **Level of external environment**

### **Political risks**

Political risks that were identified are relying on a key politician to secure the project and change in major decisions. Relying on a key politician to secure the project and reduce its risk is risky by itself, as a higher level decision maker can always intervene to stop the project. Despite the fact that such politician will help the developer in facilitating necessary approvals; every person has somebody above him no matter how influential he is. Furthermore, the decision maker that is being considered as the project guard can always turnaround and change major decisions based on which the project strategy was set due to many reasons, one of which can be personal interest with other investors. However, this risk is part of the nature of large scale development projects as such projects cannot be implemented without a political cover. Nevertheless, the investor needs to decide on how much money he accepts to lose in such investment. In this case, he needs to decide ahead the point at which he is willing to retrieve from the project or adapt the development strategy of the project to the new change.

### **Social risks**

Social risks that were identified are relocation of people during the construction period and unwillingness to stay in the area.

Relocation of people during the construction period is an issue of major concern for public authorities as these authorities do not want to wipe local residents from a prime location to the advantage of the developer. This can have an impact on both permanent and transient population. Mitigation measures were found to be different for each of these two categories of population.

As far as the permanent population is concerned, it needs to be either compensated to live elsewhere or relocated temporarily during the construction period till their new accommodations are completed. In the first scenario, it will be their responsibility to find an alternative accommodation. In the second scenario, their place of residency has to be secured during the construction period by the developer. In such case, temporary off-site accommodations need to be constructed. The location of such accommodations needs to be outside the central district of the city in order to minimize their cost; however, it needs to be within an acceptable proximity to such district in order to allow for relocated residents to be within a reachable distance of their work. In addition, construction phasing of the project can help in avoiding major relocations at once. This will also minimize the number of temporary accommodations to be constructed.

As far as the transient population is concerned, such risk can be overcome by phasing the construction in order not to evacuate the area at once. Phasing needs to be

designed in a way that allows remaining part of the site to be operational while construction is ongoing. Such measure can minimize the gap in transient accommodations like hotels, which allows for balanced transformation of the project area.

As far as unwillingness of local population to stay in the area, despite the trials of public authorities to keep local residents in their area of origin, sometimes those residents might not be willing to stay due to nature of economic evolution of the city. Prices of real estate in prime city centers are continuously increasing. This is mainly due to increase in demand caused by growth of population (permanent and transient) and limited supply caused by limited area of developable land. At a certain point, the accommodation will be perceived as an income generating property rather than a residency place. Hence, local residents might either rent or sell their accommodations and reside outside the city center. Such phenomenon is part of the economic dynamics of the city that cannot be controlled.

### **Economic risks**

Due to changes in economic dynamics at the national or international level, some changes in economic rates can take place, which might affect the project. In order to overcome such risk, it might be wise to put the project on hold for a limited period of time till such change is settled. Once the vision is clearer, the business plan can be revisited based on the new economic assumptions.

### **Environmental risks**

Environmental risks that were identified are negative environmental impacts and lack of vegetation cover.

Due to large volumes of development that are introduced in large scale development projects, it is always expected that the project will have a negative impact on its environment. In order to overcome this risk, an environmental impact assessment study needs to be conducted in order to identify the negative impacts of the project along with necessary measures that need to be adopted.

Lack of vegetation cover is a burden for pollution reduction and landscape design. The absence of plantation does not allow for reducing the second dioxide of carbon and transforming it into oxygen. Furthermore, this represents a burden in front of landscape design as natural elements that are present within the site constitute the bases of such design. In order to overcome this risk, plantation that is convenient to the site climate can be investigated in order to boost the current natural environment, allow for better reduction of pollution and provide a better base for landscape design.

## ***Institutional arrangement***

### **Multidisciplinary nature of projects**

Sometimes lack of required expertise for the administration of the project from the part of the public sector constitutes a major risk especially for the approvals process. In order to overcome this risk, the government can be asked to establish a special administrative entity for the sake of the project through the key politician that is sponsoring the project. If such measure is not possible, issues related to expertise that are not covered within the public authority with the approval authority needs to be hammered in presentations in order to keep it within the consideration of decision makers. This risk is particularly important for financial dimension of the project, as in analyzed case studies, planning authorities did not include specialists in finance, which can be a major risk that could endanger the financial feasibility of the project as authorities might raise some technical requests that are not financially viable. Therefore, the development manager has to always bring this dimension to the discussions with public authorities and present the financial implication of any suggested design modification.

### **Lack of approvals facilitation**

Risks related to lack of approvals facilitation that were identified are internal conflicts in public authorities and lack of previous experience for public authorities in a large scale project.

Sometimes within the same authority, parties of different interest might be found, which risks delaying the approvals process. Such risk might be present as usually public authorities have its own internal political dynamics. In order to mitigate this risk, these dynamics need to be continuously analyzed in order to understand the zone of influence of each player and implement necessary lobbying accordingly.

In case of lack of previous experience for public authorities in a large scale project, these authorities have to pass through an educational process before approving the master plan, which will increase the required time for final approval. For the purpose of overcoming such risk, the development manager needs to be proactive in proposing solutions for issues that are not covered by available regulations while emphasizing the public benefits of these solutions in addition to private ones. This way, the development manager can fasten this educational process, which helps in fastening the approval process.

## **Dependency on governmental support**

Sometimes the business strategy of large scale development projects is dependent on governmental support like tax incentives or providing certain public facilities. Such support might be delayed, which will constitute a major risk for the project. In order to overcome this risk, the date of activation of such incentives needs to be clearly stated in the agreement with the government along with penalties in case of delays.

## **Conclusion**

This paper contributed mainly to the risk management body of literature through the identified risks along with associated mitigation measures. This contribution focused on risk management during preconstruction phases of large scale development projects in developing countries as currently; there is a gap in literature on risk mitigation during preconstruction phases of large scale development projects. Through analyzing case studies from projects managed by MDI, risks that were faced in these projects along with adopted mitigation measures were identified. These risks along with associated mitigation measures shall help managers of projects under discussion in gearing their projects through different risk environments. Despite the fact that in this type of projects each new project might entail new risks or require new mitigation measures that were not tested earlier, the identified risk mitigation measures can inspire and guide project managers to come up with new solutions if the identified measures in this research were found not to be applicable to a certain project. The result of this research should be perceived as a flexible road map that shall be continuously updated after completion of each project.

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