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Case Study

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Risks Encountered By Leading Real Estate Developer in India During the Execution of LEED Certified Mall Project

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Introduction

The real estate sector in one of the growing sector in country and this growth is mainly attributed to large population base, rising income and rapid urbanization. The sector comprises of four subsectors namely – housing, retail, commercial and hospitality. In this case we are discussing the risks encountered by leading real estate developer in India during the execution of LEED certified mall project. The real estate project starts with project inception phase which comprises of selection of type of project, land acquisition followed by project design and planning and finally the construction work is taken up. This case throws light on various kinds of risks which were encountered by the developer from the project inception till construction phase of one of the biggest LEED certified mall project in India. All the risks encountered are shown in the form of a risk matrix in this study.

While going through this case, we have found that having clarity at the start of project is key to success of any real estate project . In this project phase 1 was planned for completion initially but got extended to phase 4 till completion and had a major impact on cost, quality and timelines of the project. Secondly there was a major delay in freezing the design it almost took five years to make final blueprint of mall with the help of two overseas architectural firms. The project started in 2004 and was launched in 2016, took around twelve years to complete and during this had to face change in government, change in building bye laws. Lastly the project launch got delayed by around two years due to notice by national green tribunal to stop all construction work within 10 km radius of bird sanctuary and environmental clearance was not given to project.

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The Mall was initially designed by principal architect from another country in 2004. However the developers were not satisfied with their design, so they hired second architect from different country in year 2008 to provide better solution. The local architects were based in India. The Mall is approximately 295 m long and 192 m wide. As such, the concept of the Mall was a linear concept with an axis of atrium that is running in the North-South direction. Shops were along the linear atrium at the focal ends. Anchored by anchor spaces which vary between 75 sqm to 5000 sqm (800 to 54000 sqft) in size. The proposed Mall comprised of 5 levels of shopping, one level food court and two entertainments levels.

Planning of Mall

Grid: The grid of 8400mmx 10200mm has been adopted that allows for efficient car parking and optimum shop front width.

Atrium: The atrium is a linear concept. Each floor plate area is about 17,000 sqm. And the average efficiency for the Mall is 75%.

Core: There are total 10 cores inside the building. 5 cores dedicated to guest, 2 cores located at centre of mall for services. 2 services core are near the loading unloading platform at the back side of mall.

Floor Height: Optimum heights between floors have been maintained. The basements B-02 & B-03 are 3.4m; B-01 5.2m, Lower Ground floor which contains the hyper mart is 5.0 m. The Ground Floor is 5.0m for grandness of experience upon entry and 4.5m till mall area and above floor more than 6M floor to floor height.

Services Planning: All services like plant room, electrical panel room, and transformer room, fan room placed in basement, and transformer & HT rooms are placed at lower ground floor level.

Lifts: There are 4 cluster (16 passenger) in two places 2 cluster (16 passenger) 3 places and single lift provided for cinema from cinema entry to cinema exit level. For services 3 cluster lift in 2 places & 2 cluster lift in 2 places.

Escalators: There are four escalator bank start from B03 to last floor and one escalator from L00 to food court level and another from ground to food court level placed in centre of atrium. Remaining escalator are placed in race way. We have additional express escalator start from B02 to L04 level.

Material Finishes inside the Mall

Public areas: The flooring for the Mall is Omani marble. False ceiling shall be gypsum having two hour fire rated promat board in fire exit corridor ceiling.

Shop front: Shop front will be glass and signage guidelines will be provided. There are glass fins between two shops and MS lintel to support rolling shutter. At ground floor level all the common area services are passing through the release area. To cover these services they are providing two hour fire rated promat board as a shop front bulk head.

Internal wall finishes: Common area shall be finished with plaster and paint.

Toilets: The wash basin shall be installed in corian counter. Urinals to have in-built automatic flushing sensor. Formaintenance purpose grid false ceiling will be provided.

Stair case finishes: Landing tread and risers shall be of Kota stone. In all internal staircases walls shall be finished withplaster and external staircases wall shall be finished with mridul tile. The handrail for the stair shall be mild steel.

Terrace/Refuge floor area: Floor finish to be Mosaic tile with white reflective paint as per LEED requirement. Thehandrail shall be mild steel.

Basements: The basement wall shall be concrete wall finish and painted. Ceiling shall be smooth form finish concreteand floor shall be IPS with required slope. Plant room floor finish is with trimix.

Type of occupancy as per National Building Code, 2005

As per national building code 2005, the mall building falls under TYPE-I, D6 category (Assembly, Cinema, Shops, Entertainment) so we are providing design method below.

No exit doorway shall be less than 1000mm in width except assembly buildings where door width shall be not less than 2000 mm. Doorways shall be no less than 2000mm in height.

Fire / Exit Doors

There shall be two hour rating fire door at all exits, one hour rating access door for shaft. Two hour rating access door for PNG shaft. In basement / lobby the building has zero hour fire rated glass as we need two hour fire rated to LEED (Leadership in energy and environmental design) .

Exit Calculation

For single unit width, 40 people can exit. They have 2 m wide staircase so total no of persons at exit is 40X4 i.e. 160 no's. Initially the calculation was 160X1.5 i.e. 240 persons but finally to meet type 1 building requirements, the additional staircases at exterior of building were made.

We have 2 m wide staircase so total no of person can exit =40x4=160

Basement Ventilation

Single compartmentation for 1125sqm was done as per national building code.

Structure

The slab was three hour fire rated. All staircase structural members were threehour fire rated with vermiculite spray. Column sizes are as per NBC Norms. Drive way 6.0 M driveway is maintained almost all around as per Fire Code requirement.

1 LEED (Leadership in Energy and Environmental Design) is the green building rating system established by U.S Green Building Council.

2 NBC:A building code (also building control or building regulations) is a set of rules that specify the standards for constructed objects such as buildings and non-building structure

Overview of real estate developer

The developer has over 70 years of track record of sustained growth, customer satisfaction and innovation. The company has 213 msf of development potential with 6 msf of projects under construction. They pioneered the retail revolution in the country and brought about a paradigm shift in the industry by redefining shopping, recreation and leisure experiences. They continue to actively create new shopping and entertainment spaces all over the country. The lease business presently has 38 msf of development potential.

Risks encountered during execution of project

The excavation work of the project started in 2004 by company. Developer wanted to have company having international presence to work in this project so they can deliver that expertise to develop a world class mall which is compared with Dubai mall. The acquiring of land in itself was lengthy process. Since the project work lasted for more than a decade there were change in government in that region which led to delays in statutory approvals from authorities from time to time due to change in government policies. The initial land cost was also high around 300 crore because of location at heart of city. There was challenge of pollution risk from site activity as the project was in heart of city but this was mitigated by making this a LEED certified building. There were initially difficulties in design due to dewatering problem from the boundary as well as basement. While making the diaphragm walls the walls were falling inside so the third basement was made smaller in area than other basement to get more space for anchoring for diaphragm wall. The next problem which came was that the initial design for foundation was pile type foundation but the pile type foundation failed for such a big area so there came need to redesign the foundation, this led to difficulty in design as well as execution of the project. The basement work as well as the making of diaphragm walls work finished by year 2008. After that there was change of architect in 2008 as the developer was not satisfied by design of principal architect so second architect got reintroduced. It took around one year to do the replanning of project by second architect. There were global issues also which led to delay in form of recession in economies globally in year 2008 and the project work slowed down during 2008-2010. The work again started in year 2010 and developer carried out construction work on its own. In Year 2011, developer introduced main contractor as the agency responsible for construction activity because of inexperienced contractors and errors in execution. The type of construction was design and built type in which developer was responsible to provide design in consultation with consultants and main contractor implemented that design to execution at site.

The construction of Mall was divided in three zones and it was found that the balance area to be completed in zone A was 520 sqm and in zone B was 4736 Sqm and in zone c was 5465 sqm in November 2012 . The work of services was to be concurrently started for the areas where structure work was over. The finalization and issuing of work orders was done in the year by November 2011 and the procurement of material with less lead time was done in weeks' time but there were long lead equipment's also which had 8-12 weeks of lead time. The projected completion of services work was also taken till March 2013 .The services work

involved mainly electrical, plumbing and HVAC work. The works related to fire no objection certificate were to be completed by December 2012.

Although the project was scheduled for completion by March 2013 but there was change in scope of works. The developer got additional FAR area which were named as phase 2 and phase 3 works. The additional area was development of additional 9000 sqm area approximately. There were number of other factors which led to delay in completion due to scope changes which were quality of drawings for execution, quality of construction as it involved lot of rework, type of building, change in floor area ratio, change in ventilation requirements, non availability of information at the start of project. There was compromise done in quality to meet the objective of project completion. The budgeted cost at the end of December 2012 was 1311.47 crore and by the end of December 2013 was 1497.28 crore.

The increase in cost was due to additional floor area ratio approved by the government authorities which led to increase in the budgeted cost. The construction cost increased from 984 crore to 1159 crore. The major increases in costs were finishing, services and fit out costs. Due to additional floor area ratio the additional scope of work was as mentioned below.

- Addition of three floors in tower A due to increase in floor area ratio.
- Change in cinema from 5 screens to 7 screens
- Two big escalators were made connecting food court at seventh floor to ground floor level.
- For making mall as type 1 building structurally it was required to make all slabs 3 hour fire rating and for which gyproc work was carried on all slabs in 19.6 lakh gross leasable area of mall.
- Additional 12 staircases had to be provided on the external periphery of the mall to ease the evacuation of the people from premises which was not in the design earlier as per type 1 building norms
- Changes in ventilation scheme for basement as per change in NBC code for basement ventilation requirements.
- New escalators as well augmentation in services asked by tenants on occupying the mall.

3 FAR: Floor area Ratio is the ratio of a building's total floor area (gross floor area) to the size of the piece of land upon which it is built.

There was also increase in cost, quality and timelines due to getting this building as LEED gold certified. There was additional cost of ten crore incurred to make this LEED certified by achieving 40 points for this certification.

The project got further delayed with addition of new floor area ratio in phase 4, around 2000 sqm. Further in October 2013, due tonational green tribunal the project served notice to stop all construction activities as it

was within 10 km radius of bird sanctuary and environmental clearance was not given to project. This led to delay in getting occupancy certificate for this project.

Due to delay in occupancy certificates the brands who had taken leased area inside the mall, did not start their fit out works which further added to project delay .The national green tribunal gave clearance in August 2015 to issue occupancy certificates and after that the fit out works commenced inside the mall. Some additional escalators as well as staircases were also made for anchors who had taken leased space on two consecutive floors. Going through this project the initial cost to complete was 1311.47 crore while the project finally completed on 1819.26 crore .These all changes resulted in increase in cost, timelines as well as the quality of construction got impacted significantly as in order to get these all works done it resulted in lot of rework as well making changes in existing structure of the building. The budgeted cost for completion at the end of November 2015 was 1821.95 crore and actual cost which was found at the time of completion was 1819.26 crore. The project got completed on 31.03.2016. We have made a risk matrix as shown below based on this study from project inception till construction phase of mall project.

Real Estate Life Cycle	Different kinds of risks encountered during execution of LEED certified mall project
Project Inception	
Economic	Global Economic Crisis
Regulatory and Urban Planning	Lengthy Approval Process
Lack of Urban Planning	Lack of availability of urban land
Political	Government Policies
	Political Instability
Location	Land Prices
	Scarcity of Land
	Location Effect
Selection	Type of project (Commercial or Residential)
Environmental	Frequency of Pollution risk
	Consequence of site in appropriateness
Land Acquisition	

Political	Political Turmoil
	Government policy
	Delay in Approval Process
Environmental	Clearance from Environmental Impact Assessment Authority
Construction Phase	
Cost of Construction	Cost overruns in projects
	Effective estimation of costs
	Quality of Construction
	Change in scope
	Non availability of information at start of project
Shortage of Labour	Frequency of workforce unavailable
Lack of clarity on building Bye laws	Type of building to be constructed
	Changes in Floor Area Ratio
	Changes in ventilation requirement
Bidding	Short Bid preparation Time
	Aggressive competition at construction stage
	Project Documents
	Contract Clauses
	Conversations
Contract Duration	Delay in payment
	Inaccurate Schedule
Quality	Quality of GFC drawings
	Approach of Project Manager and project participants
	Compromising quality to meet schedule and cost objectives

Site Management	Inefficient site management.
	Lack of clarity of scope.
	Inexperienced contractors
	Slow decision from owner
	Errors in Execution
Safety	Poor interface of design and safety
	Lack of use of technology
Design	Designed concepts mismatch with customers requirements
	Frequent changes in design
	Change in Architectural Firm responsible for design
Procurement of materials	Variation of construction material price
	Lack of sophistication across supply chain
	Delay in delivery of material
	Improper handling of materials
	Price escalation of materials
Environmental	Environmental Impact
Technological	Difficulties in Design
	Difficulty in project delivery
	Difficulty in project execution or construction.

Discussion

Going through the case we find that there are many risks which were encountered from the project initiation till construction phase of mall project. We have summarized major risks based on risk severity which were of medium or serious risk type in tabular form as shown below.

Stage of Project	Type of Risk	Severity of Risk	Risk owner	Risk Response
Initiation	Global economic crisis	Serious	Developer	Had to delay the project from 2008 to 2010
	Lengthy approval process	Medium	Developer	It took around 36 months for approval from government authorities. During execution of project due to change in building bye laws additional approvals had to be taken for additional floor area ratio
	Land Prices	Medium	Developer	The land cost was very high around 300 crore which was a big amount for developer
Design and planning	Designed concepts mismatch with customers' requirements	Serious	Developer	The design Architect initially was principal architect but was changed to second architect. This delayed the planning process by around one year
	Frequent changes in design	Serious	Second architect	These were due to getting of additional floor area ratios
	Difficulties in design	Serious	Principal architect	Third basement was made smaller for making the outer diaphragm wall. Also redesign of pile type foundation was done.
	Poor interface of design and safety	Medium	Main contractor	As this was LEED certified building, there were lot of glass area at top for sunlight and in order to execute them at site it was highly unsafe to do this activity. Special platforms were made to carry out this activity.

	Environmental	Medium	Main contractor	As this was LEED certified building so most of the left over material were recycled or reused.
	Environmental clearance	Serious	Developer	The occupancy certificates got delayed for around one and half years due to stay by national green tribunal as the site was within 10 km from bird sanctuary
Execution	Change in scope	Serious	Developer	Addition of scope of works due to Ph2, Ph3 and Ph4 because of additional floor area ratio.
	Cost overruns in projects	Serious	Developer	cost increase of around 500 cr due to change in scope of works
	Compromising quality to meet schedule and cost objectives	Serious	Developer	Mall was ready to open by March 2013 but due to change in scope it led to lot of rework by extending and finishing existing structures.

Conclusion

We can understand that different projects undergo different kinds of risks depending upon the political conditions, the topography of the area, the economic conditions, the regulatory conditions, project design, the quality of contractors and stakeholders involved in the project. This case gives us first-hand experience of what kinds of risks we face while executing a mall project. We are summarising these risks as mentioned below.

- The first and foremost risk came during excavation stage only when it took lot of time to make basement of building because of lot of water ingress through the soil.
- The second thing which delayed the project was economic recession globally from Year 2008 till Year 2010 and there was no progress on this project for these years.
- Thirdly it was type of contract also which delayed the project progress, initially developer had hired overseas contracting company to take care of construction activity but their overheads were very high and so they decided to bring local main contractor into action. The handing over from overseas contractor to local main contractor also delayed the execution work as all commercials had to be settled with them.

- After that we witnessed a number of design changes which impacted time of completion as well as cost and quality of project. The quality got impacted because by December 2012 most of the civil work related to structure and slabs were over and the approval of additional floor area ratio came after that, so the existing structure had to be dismantled and then made as per the new design which has affected quality of project.
- Apart from this we also found that environmental clearance also impacted the receiving of occupancy certificate and in this project delayed by one-and-a-half years due to the national green tribunal order of restraining the construction around 10 km area nearbird sanctuary . The national green tribunal refrained authorities from issuing occupancy certificates in October 2013 and finally cleared the project in August 2015.
- Due to delay in receiving the occupancy certificates the fit out works to be carried out by retailers inside their leased premises got delayed and finally the Mall opened in April 2016.
- Based on this we can say that all projects are unique in nature, having definable purpose and largely unfamiliar. Going through this case we also came to understand there are some issues like regulatory, political and global economic crisis which have led to delay in completion of project and where developer was dependent on the government authorities or global economy.
- But there are other factors where developer could have mitigated risks like design of mall, project scope, environmental clearance and project quality to prevent the delay in project completion due to these issues.
- We also get this understanding that the main role is played by developer who is the decision maker for the project and he is the guiding force for ensuring project is delivered in time within budget.
- This case is beneficial for industry as well as academia as they can keep in mind the various risks as shown in risk matrix in this case study while planning for developing a new mall and develop mitigation strategies to mitigate these risks depending on their severity beforehand.