Evaluating and Mitigating Execution Risk in Indian Real Estate Development

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Abstract

Real estate development is a complex process in which developers and equity investors look to capitalize on favorable financial markets and economic forces to produce investment returns. Real estate development is a risky venture in even the most mature economies that possess transparent government regulations, reliable local and national legal systems, efficient capital markets, skilled labor markets and substantial market demand data. These issues are magnified in an emerging market where few of the above ingredients are readily available. However, the hypothesis of this thesis is that a developer can better assemble its development team, positively impact performance, and reduce execution risks by reorganizing project teams with the resources currently available in India.

This thesis contemplates the evolution of real estate development design and delivery methods as developers compete to deliver real estate assets; equity investors seek greater insulation from execution risk; and a growing stable of qualified construction professionals compete for contracts. However, demand for real estate assets, equity investment hurdles and increased competition are pressuring developers to consider design and delivery methods that decrease the time to market and contemplate risk allocation.

The analytic approach of this thesis is to: 1) document common delivery methods in India through a series of interview with developers, architects, project management consultants, quantity surveyors and contractors, 2) compare and contrast the delivery methods and allocation of execution risk in the United States and India and 3) propose a management plan to further mitigate execution risk through different risk allocation and delivery methods. The goal of this thesis is to provide developers and equity investors insight into the evolution of the Indian delivery process and identify emerging opportunities to mitigate execution risk.

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Preface

A real estate asset is a physical product of engineering, architecture and construction that is developed to take advantage of the perceived market demand required for the profitable operation of the asset. Buildings and land, two tangible components of a real estate asset, have some intrinsic value. However, the bulk of the value of any real estate asset is based upon the property owner's ability to secure payment for the leasehold, use or sale of the property. A real estate asset without a user can possesses a value that is significantly less than the sum of the financial resources assembled to develop the asset.

The process of developing a real estate asset is a time and capital-intensive process that requires the expertise of many disciplines. The developer takes on the task of promoting the project, securing the equity capital and debt financing, and assembling the resources to entitle, design, construct, lease and manage the asset. This process requires input from a wide variety of professionals including, financial analysts, economists, lawyers, architects, engineers, contractors, property managers and leasing representatives to name a few. Depending on the complexity of the entitlement process and project scope, it can take many years to transform a project from an idea to a stabilized real estate asset. Due to the lengthy delivery process, it is very likely that the economic climate, commodity pricing, labor markets, space market fundamentals and capital markets will vary widely over the time it requires to deliver an asset. This fact makes real estate development a risky venture fraught with entitlement risk, execution risk, market risk and exit risk. Each risk requires its own mitigation plan to minimize the likelihood of a negative impact on the financial returns of the project.

This thesis contemplates specifically the execution risks inherent in the design and construction of real estate assets in India. Execution risks, which includes the risks associated with labor markets, schedule, preconstruction decision-making, total project cost, quality and safety are allocated between the parties involved in the delivery of a real estate asset in many different ways. In India, construction costs account for approximately 50% of the total development cost excluding operating costs, and have historically suffered from cost and schedule overruns stemming from deficient project planning, inappropriate procurement methods and poor project management.[1] It is important to note that these risks cannot be eliminated. Rather, local the market resources dictate which entity is best equipped to bear these risks at the lowest price.[2] There is no single strategy that provides the solution. Rather, each project should be evaluated within the context, taking into consideration the micro market resources and the expertise of the parties involved.

This study documents the most common delivery methods employed in India and evaluates the allocation of execution risk between the participants. This documentation is the result of a series of interviews held with Indian developers, architects, project management consultants, and contractors. These parties have been studied to determine the resources each participant possesses to take on elements

of execution risk and evaluates whether passing elements of execution risk to other participants will be advantageous for the developer and equity investors.

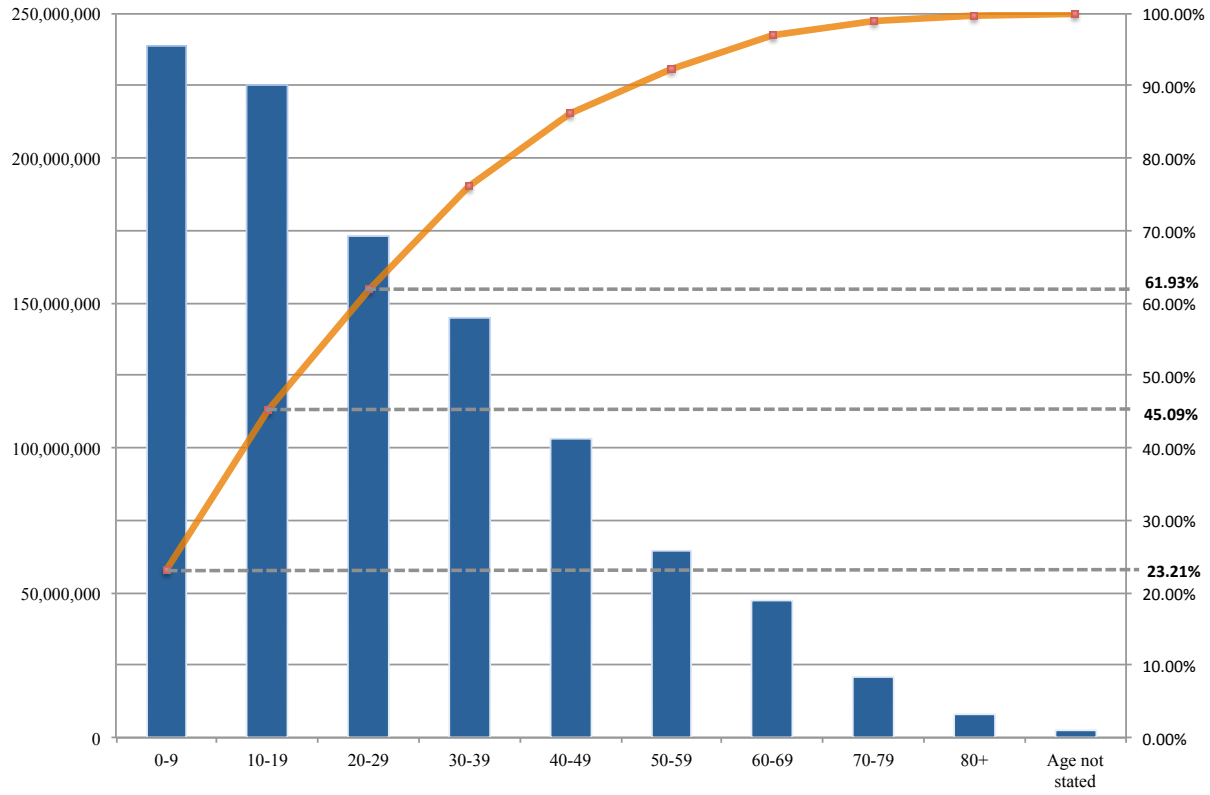
Chapter 1: Indian Market Fundamentals

India's emergence as an economic force is the result of the combination of several key factors: a booming services industry, a reformed economic policy that relaxed the regulations for foreign direct investment, and a large and growing English speaking population.[3] However, the growth experienced in India has been strong despite issues of corruption and bureaucracy in dealings with the federal and local governments and glaring deficiencies in infrastructure and basic services. Nevertheless, India is on an economic trajectory that has led some economists to believe that India could eclipse China as the world's third largest economy by 2030.[4] This chapter investigates the Indian macro economic climate and details key inputs that drive growth.

1.1 Population

Currently, the Indian population is estimated to be approximately 1.2 billion people. This makes India the second most populous country in the world behind China, accounting for over 17% of the world's population.[5] According to the 2001 Indian Census, the makeup of the India population possessed the age distribution as shown in Figure 1.

Figure 1 – Indian Population Age Distribution (2001 Census)



Source: 2001 Census data accessed via India Stat online database

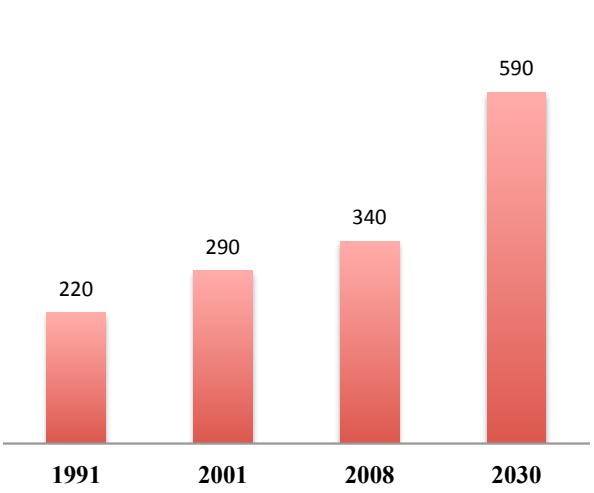
In 2001, nearly 62% of the population in 2001 was below the age of 30, 45% of the population under the age of 20, and 23% of the population under the age of 10. These statistics demonstrate the youth of the Indian population and are the basis for expected economic growth and subsequent rapid urbanization over the next several decades. McKinsey Global Institute anticipates that India will add 250 million people to its urban population between 2005 and 2025, an urban transformation scale and speed only outpaced by what is occurring in China.[6] However, the education and literacy level of this young workforce should temper some of the optimism over its rapid growth. According to the 2001 Indian census, the urban literacy rate was 79% in urban areas and 64% overall.[7] The urban population growth will be the result of the urbanization of the rural population, which had only a 54% literacy rate according to the 2001 census. This fact indicates that the urban migration is unlikely to improve the education level of the urban workforce and brings into question the quality and sustainability of the economic growth.

Due to India's large young working population, the country is faced with a different set of issues than most mature economies. While most of Western Europe, Japan, and the United States are faced with the issue of funding the entitlements of aging populations with decreasing working populations, India instead is challenged with fostering economic growth at a rate that will support the number of workers entering the workforce. McKinsey Global Institute projects that a 10% GDP growth rate is required to create enough employment for India's young and growing workforce.[8] However, according to the Economist Intelligence Unit, the Indian GDP growth, which had surpassed 10% in the early 2000s, is expected to grow between 7% and 9% annually[9]. With the expanding young workforce and a stabilizing economy, India is challenged with fostering economic growth at a pace that prevents significant problems stemming from unemployment.

1.2 Urbanization

India's population has historically been predominantly rural. However, following the trend of maturing economies throughout history, Indian cities have recently experienced a boom in population, a trend that is expected to continue. The urban population in India in 2001 was approximately 290 million people, representing 28% of the total Indian population.[10] According to the McKinsey Global Institute report, the estimated urban population grew to 340 million in 2008 and is estimated to grow to 590 million by 2030.[11] This estimate implies a yearly growth rate of 2.5%. This growth is projected to demand in aggregate between 700 and 900 million square meters of commercial and residential space each year; the equivalent of adding the space markets of two Mumbais or one Chicago every year.[12] Figure 2 shows the historic and projected urbanization trend in India.

Figure 2 – India's Urbanization Trend



	1991	2001	2008	2030
Total Poplution Million	856	1040	1155	1470
Ubranization rate[1] %	26	28	30	40

1 Defined as the ratio of urban popluation to total population based on the census definition of urban areas; population of >5,000; density > 400 persons per square kilometer, 75 percent of male workers in nonargicultural sectors; and other statutory urban areas.
Source: India Urbanization Econometric Model; McKinsey Global Institute

India's urbanization will occur with the expansion of existing Tier I, Tier II and Tier III cities in addition to the formation of new cities resulting largely from domestic rural migration.[13] In 2011, India has 35 cities with a population of 1 million or more people. According to the McKinsey Global Institute's economic model, this figure is expected to nearly double to 68 by the year 2030.[14] Over this period, McKinsey Global Institute projects that Indian states Tamil Nadu, Gujarat, Maharashtra, Karnataka, and Punjab for the first time will eclipse the 50% urbanization mark.

1.3 Economic Growth

India possesses strong economic growth fundamentals that should ensure steady GDP growth with little volatility.[15] The key metrics tracked by economists included high savings and investment rates, a rapidly expanding labor force, and a growing middle class.[16] As shown in Figure 4, the McKinsey Global Institute anticipates 100 million new middle class households, which represents a 48% increase, to emerge by 2030.

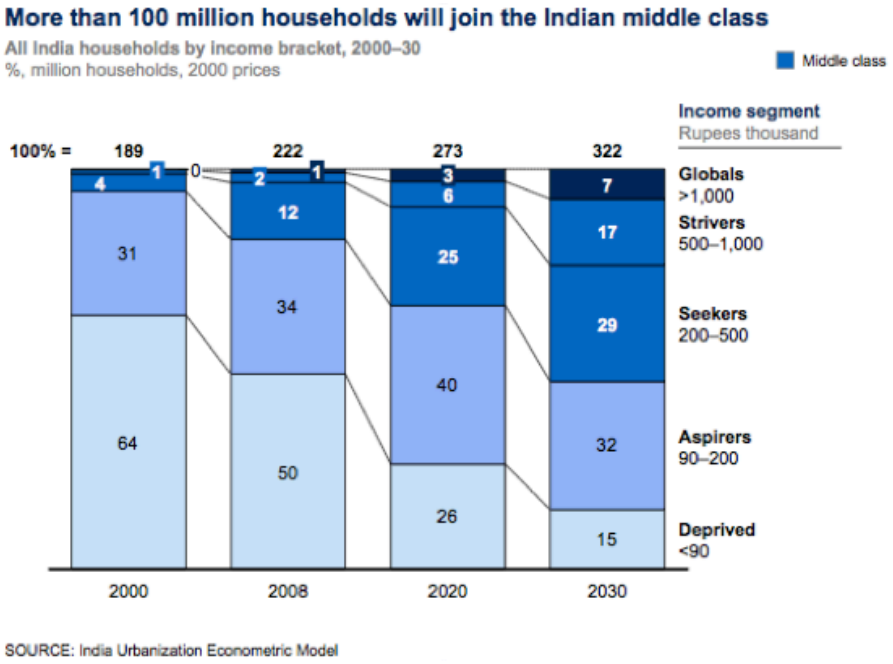
Figure 3 – India's Economic Forecast

Economic growth (%; fiscal years beginning Apr 1st)	2010[a]	2011[b]	2012[b]	2013[b]	2014[b]	2015[b]
GDP	8.8	7.9	8.4	8.3	8.7	8.5
Private consumption	8.6	7.9	7.6	7.1	6.8	7.0
Government consumption	4.8	8.8	8.5	8.7	9.7	8.5
Gross fixed investment	9.0	10.6	11.0	11.5	12.4	12.0
Exports of goods & services	17.6	13.6	12.0	12.0	12.5	13.1
Imports of goods & services	9.2	7.6	11.1	12.2	12.3	13.3
Domestic demand	8.3	7.2	8.5	8.6	8.9	8.8
Agriculture	6.6	2.9	2.5	2.3	2.2	2.2
Industry	7.9	8.1	9.0	8.0	7.9	7.9
Services	9.4	9.5	9.3	9.2	9.0	9.0

[a] Actual. [b] Economist Intelligence Unit forecasts.

Source – Economist Intelligence Unit, Country Report - India

Figure 4 – All India households by income bracket, 2000-2030



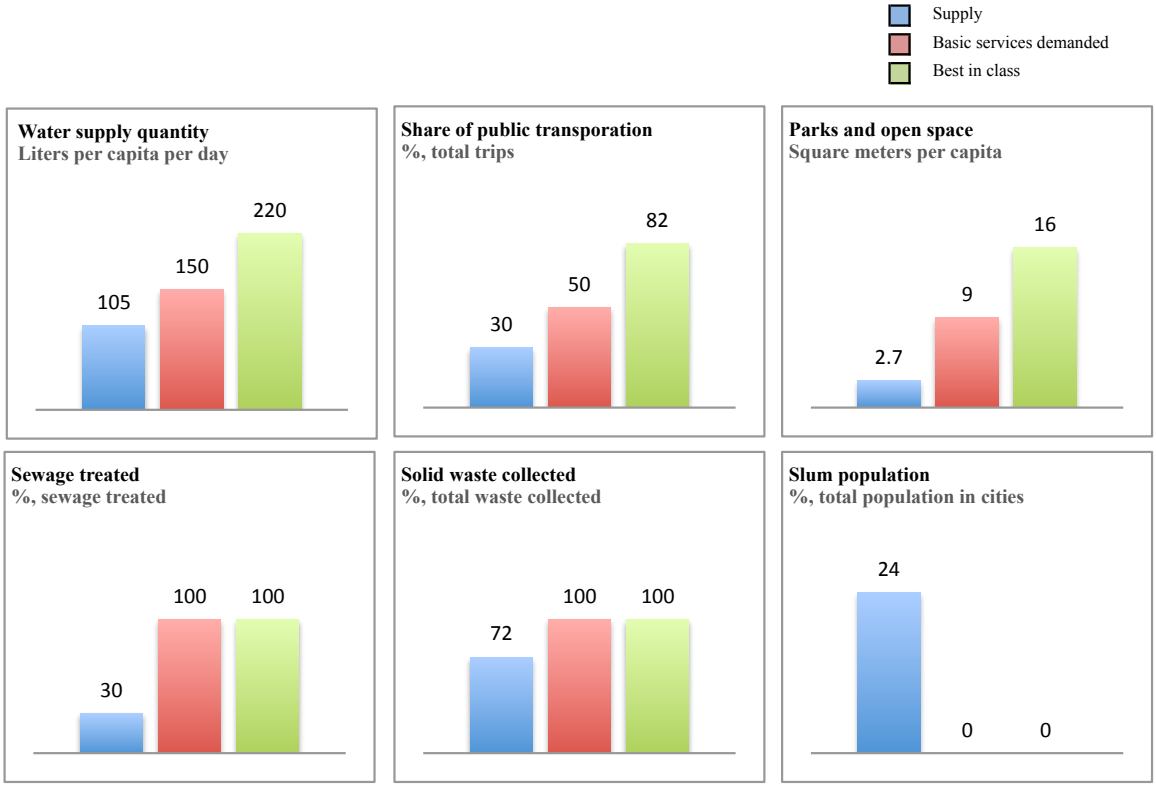
Source: Data excerpted from McKinsey Global Institute, "India's urban awakening: Building inclusive cities, sustaining economic growth." p. 45, Exhibit 7.[17]

Together, the expected urbanization, strong economic fundamentals, growing middle class, and expected domestic demand paint a compelling forecast for the Indian economy. However, economic growth will be constrained by inadequate infrastructure, skilled labor shortage, and cultural difficulties in shifting resources from an agricultural based economy to an industrialized economy.[18] For these reasons, many economists project 8% GDP growth rather than the Indian government's double-digit projections in the short run.[19]

1.4 Infrastructure

One of the largest barriers standing between India and lasting economic growth is the glaring deficiency in the country's transportation and utilities infrastructure. India already suffers from infrastructure, utilities and affordable housing deficits. These issues will only be exacerbated by the rapid urbanization of the Indian population. Figure 5 displays current Indian supply, basic services demand and best in class public services metrics for basic services and quality of life attributes.

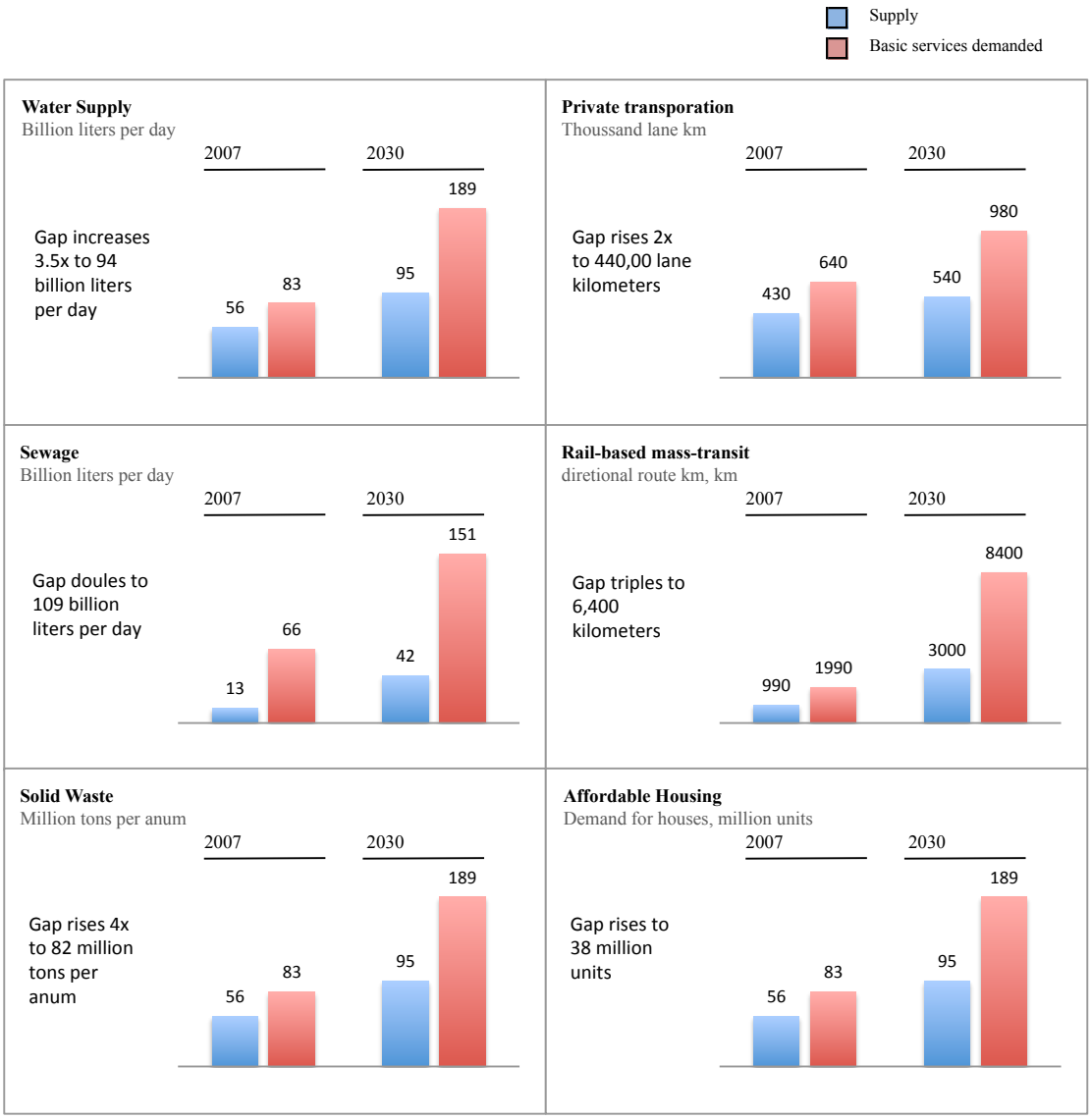
Figure 5 – India's current basic services, infrastructure and quality of life deficits



Source: Data excerpted from McKinsey Global Institute, "India's urban awakening: Building inclusive cities, sustaining economic growth.", p. 19, Exhibit 7.[20]

However, the current infrastructure and quality of life metrics are anticipated to deteriorate further if India does not respond to this need with significant investment in infrastructure and basic services. McKinsey Global Institute estimates that $1.2 trillion must be invested in India infrastructure to meet the growing demand.[21] $600 billion of this investment represents the capital expenditure needed to close the current deficit and estimates that another $600 billion is necessary to foster future growth. This level of spending is eight times the current per capita spending on infrastructure.[22] Figure 6 projects the deterioration of infrastructure and basic services in 2030 at the current rate of investment.

Figure 6 – Projected deterioration of India's basic services, infrastructure and quality of life by 2030



Source: Data excerpted from McKinsey Global Institute, "India's urban awakening: Building inclusive cities, sustaining economic growth." p. 19, Exhibit 7.[23]

Though many economists' projections for India's growth take into account the current infrastructure deficit, the importance of this infrastructure investment cannot be understated. The growth of the Indian economy will be directly correlated to how well the government plans and executes infrastructure project in the next few decades. As established earlier, the expected urbanization trend in India will only be outpaced with what has occurred in China. However, the spending on infrastructure in China is $116 while infrastructure spending in India is only $17 per capita.[24] This fact highlights the importance of infrastructure investment as a means to take advantage of strong economic fundamentals.

1.5 Opportunities in Indian Real Estate

With an aggregate demand for 700-900 square meters of new residential and commercial space each year for the next 20 years, Indian cities possess huge upside for real estate development. The increasingly educated, urbanizing, young working population will demand retail, housing and commercial office space. This will in turn demand distribution, manufacturing and other real estate products.

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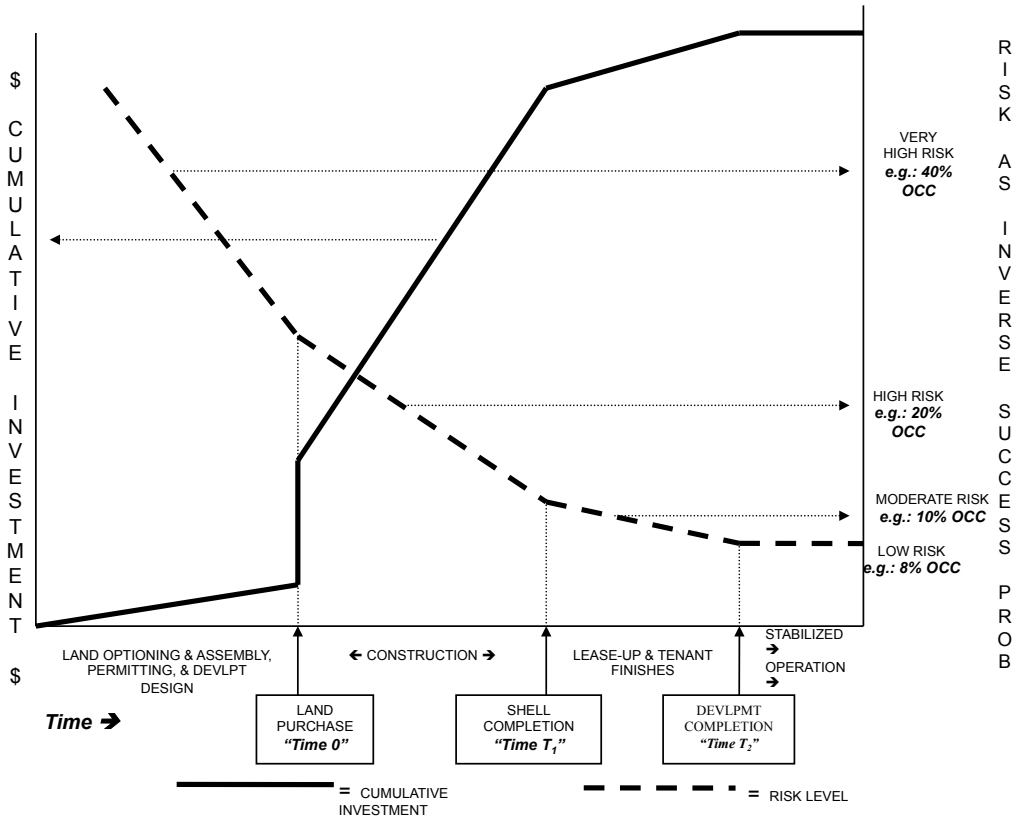
Chapter 2: Execution Risk

Real estate development is a risky venture fraught with entitlement risk, execution risk, market risk, and exit risk. The most risky investment in a real estate project is the capital spent in feasibility analysis, market analysis, conceptual design and in due diligence. Spending on this phase of development is largely speculative and therefore the opportunity cost of capital is estimated to be as be as high as 40% (Geltner et al. 2007, p. 759).[25] However, at each decision to advance the project to the next phase the probability of project completion increases and the opportunity cost of capital decreases as the inverse the success probability. Figure 7 models the opportunity cost of capital over the span of the development process against the cumulative investment in a stylized real estate development project.

Figure 7 – Cumulative Investment vs. OCC (Geltner et al, 2007)



For this study, execution risk is defined as the risk associated with the design, preconstruction and construction activities required to complete a new development project proceeding from the resolution of the entitlement process.

2.1 Overview of Development Risks

Prior to an analysis of execution risk in the development phase, the benchmark from which planning and construction performance is measured must be defined. A typical development project undergoes a series of financial feasibility studies that measures the demand for the space, establishes a market rent, projects an absorption rate, estimates the cost and schedule for the project delivery, and evaluates capital markets to develop a capital structure for the project. Once the developer decides to develop the asset, it faces entitlement risk, execution risk and market risk in order to meets its debt obligations, deliver equity returns and assemble a successful project. Below is a brief outline of these risks:

2.1.1 Entitlement Risk

Entitlement risk is defined as the uncertainty that the developer will not be able to obtain the necessary approvals for the proposed project scope. This type of approval often includes zoning use changes, increased floor-area-ratios, maximum building height variances, and other public approvals. Typically, the developer would close on a development parcel only after the results of the entitlement process are known. This fact makes entitlement risk a unique risk separate from the broader execution risk. The entitlement process is highly politicized and the outcome is difficult to predict. This fact is why initial planning, due diligence and land options are very risky investments, often reaching the 40% OCC as mentioned above.

In India, clear land title is difficult to obtain, provides little assurance that a project will not be delayed by other's claim to the land and varies widely between Indian states. As evidence to this fact, Tata, one of India's largest and most powerful companies, was forced to abandon a proposed car manufacturing plant in West Bengal and move it to another state due to delays stemming from local farmer opposition.[26] Similarly, after a 5-year review process, South Korean steel producer POSCO Steel received approval from the Environmental Ministry in May 2011 for its $12 billion steel plant, marking the largest single foreign direct investment in Indian history. However, by June opposition from local farmers and rural residents had stalled this project indefinitely.[27]

While the entitlement process is risky in any environment requiring government and public approvals, it is particularly risky in India due to unclear land title and the lack of transparency and consistency of the historic resolutions of land disputes. For this reason, entitlement risk is not included in the analysis of execution risk.

2.1.2 Execution Risk

Assuming that the development team has isolated entitlement risk as outlined above, execution risk includes the risks associated with the remaining preconstruction and construction activities required

to complete the project. The proforma at the time of the land acquisition acts as the benchmark from which to measure project schedule and budget performance.

In India, the preconstruction and construction phases mark the period in the project when 50% of the total development cost is deployed. Equity returns are very sensitive to cost and schedule overruns, and a developer's failure these elements can be devastating to the project's equity returns. This risk is reflected in an opportunity cost of capital of approximately 20% as shown in Figure 7.

2.1.3 Market Risk

Market risk describes the uncertainty that the developer will be successful in obtaining the rents and absorption underwritten in the initial proforma. The initial proforma sets forth the expectations for absorption and rents at the project completion and estimates an exit cap rate for the reversion after a specified hold period. Equity returns are very sensitive to timing. For this reason, initial in-place below proforma rents and slow absorption can each have significant negative impacts on the equity returns of the project.

2.2 Execution Risk Factors

The preconstruction and construction phases of the project carry different forms of execution risk. In order to understand the delivery method that is most capable of managing these risks, one must fully understand the risk associated with the project. The following factors determine the amount of risk inherent in a project and are ultimately the factors that determine the quantitative and qualitative measurements of execution risk.

2.2.1 Team Size

Larger team sizes make the flow of information and coordination activities more complex. The development team must evaluate its in house capabilities to manage large teams and accept the risks associated with document control, coordination of construction activities, and the ultimate responsibility for the project schedule.

2.2.2 Preconstruction Approach

Real estate development is an iterative process, which responds to ever changing space markets, capital markets, commodities markets, and labor markets. In the preconstruction phase of the development process, the building's design, scope, and systems are developed to best take advantage of the current circumstances. The preconstruction phase is when the bulk of the decisions are made and is the point in the project where the project's success can be greatly impacted by effective decision-making. It is also the point in the project where the expectations for total cost and schedule are crystallized, making it a vital time in any development.

2.2.3 Construction Systems

Choosing the appropriate construction method is critical to a project's success. Construction methods that are not common in a particular market present unique execution risks as the processes have not been refined and the labor market is likely untrained in executing the new method. Conversely, construction methods that are common in a particular market present fewer risks to the development team because of the availability of equipment, material and a trained labor force. Thus, a careful evaluation of the available resources is imperative during preconstruction and a detailed management plan for unique systems is the foundation for field execution.

2.2.4 Schedule

An accelerated construction schedule magnifies all of the above risks and significantly emphasizes the importance of the appropriateness of the constructions systems for the compressed duration. Compressed schedules can lead to cost overruns in overtime labor and extensive rework stemming for improper sequencing. Improper sequencing often results from material and equipment delays.

2.2.5 Material Lead Times

Specialty materials and equipment with long lead times require careful planning and present risk to the overall schedule. These items often present schedule constraints and delayed delivery from suppliers for items on the critical path of a CPM schedule will delay the overall project. Projects that require imported specialty materials and equipment often experience problems with these items clearing customs. Often, developers will opt to purchase long lead items in advance in order to negotiate with the material supplier directly and ensure availability.

2.2.6 Contract Type

Each contract type defines the scope, schedule, responsibilities, and payment differently. The form used for the project must provide reasonable remedies for failure to perform while providing meaningful performance incentives. Poorly structured contracts can leave a developer with a project behind schedule, and over budget without meaningful remedies available.

Nearly all contracts in India between the subcontractors and developer are unit price contracts. These contracts are typically fixed price contracts based on a bill of quantities with certain pass through provisions that relieve the subcontractors of price escalations common in the commodity markets. The bid packages include information regarding scope, schedule, execution requirements and a bill of quantities. The bid package is written by the project management consultant or developer and relies the bill of quantities prepared by the quantity surveyor.

2.2.7 Coordination

The coordination of deliveries, long lead-time items, and field operations are an essential component of successful project management. Failure to effectively manage the coordination of construction activity can lead to increased project costs and schedule delay.

2.2.8 Safety

Safety is a large component of construction risk management. The party responsible for implementing the physical and procedural safety programs carries with it the risk associated with negligence, improper training and poor safety practices. Loss time injuries, in addition to the unneeded injury to the worker, introduce risk to the total project cost and schedule.

2.2.9 Quality

Quality is difficult to define and the inputs vary based upon the project parameters. Developers make design decisions in order to make a statement and to extract the highest value from the land. At times this is of the upmost importance, other times real estate is considered a commodity and the market standard for quality is acceptable in inelastic space markets. Regardless proper material selection and execution are two fundamental inputs of the perception of quality.

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Chapter 3: Indian Delivery Methods

Indian real estate development and construction processes have historically lacked substantial organization. However, in the past decade, increasingly professional developers, contractors and subcontractors have introduced some structure to the process. Historically, the Indian developer has also played the role of the general contractor: contracting directly with multiple subcontractors and managing the construction activity. However, as the Indian economy has matured, new twists to this procurement and delivery method have emerged. This chapter documents the current delivery methods observed in Indian private development and assesses the risk allocation from the perspective of the developer and equity investors. The information used to prepare this analysis was gathered via on site interviews with local Indian equity investors, developers, architects, contractors, and project management consultants in Bangalore and New Delhi.

The lists of consultants and development team members in India are slightly different than those customary in the United States. Figure 8 includes a list of the typical members of a development team including details of each of the entities primary responsibilities.

Figure 8 – Project Team Members and Responsibilities

Project Phase	Entity	Primary Responsibilities
Planning Phase Entities & List of Responsibilities	Developer	• Assemble debt and equity financing • Assemble and manage team of consultants • Guide project scope and project type within proforma parameters • Provide the leadership for entire planning process • Define project constraints regarding scope, cost, schedule, and quality • Act as the ultimate decision maker
	Architect	• Prepare schematic, design development and construction architectural drawings • Act as the leader of the design team and coordinate other consultants • Assist in permitting and entitlement issues
	Civil Engineer	• Prepare schematic, design development and construction civil drawings • Consult on environmental issues
	Structural Engineer	• Schematic, design development and construction structural drawings
	MEP Engineer	• Schematic, design development and construction mechanical, electrical & plumbing drawings
	Misc. Consultants	• Misc. consultants provide due diligence and design input information. Typical examples include parking consultants, traffic consultants,

		environmental consultants, etc.
	Quantity Surveyor	• Measures the drawings and prepares a bill of quantities. The BOQ is used by the developer in soliciting bids from contractors for specific scopes of work
	Project Management Consultant (PMC)	• Preconstruction services consulting on cost, schedule and constructability • Prepares bid packages, solicit bids and make recommendations for subcontract award • Service for a fee extension of the developer's staff
Construction Execution Entities & List of Responsibilities	Developer	• Directly contracts with subcontracting entities to perform individual scopes of work • Purchase directly, on the behalf of select subcontracting entities certain materials. This list often includes reinforcing steel, concrete, and mechanical, electrical and plumbing fixtures and equipment
	Civil Engineer	• Support developer with contract administration • Act as fiduciary to developer during construction • Respond to requests for information from structural and civil contractor.
	Architect	• Support developer with contract administration • Act as fiduciary to developer during construction • Respond to requests for information from subcontractors
	Structural Engineer	• Support developer with contract administration • Act as fiduciary to developer during construction • Respond to requests for information from subcontractors
	Mechanical Engineer	• Support developer with contract administration • Act as fiduciary to developer during construction • Respond to requests for information from subcontractors
	Misc. Consultants	• Support developer with contract administration • Act as fiduciary to developer during construction • Respond to requests for information from subcontractors
	Quantity Surveyor	• Reviews quantities in place and subcontractor billing and provide verification of work in place prior to payment.
	Project Management Consultant	• Manages project schedule • Provide onsite supervision and field coordination of construction activity. • Manage field documentation and RFI process. • Approve subcontractor payment requisitions. • Provide reporting to development team regarding schedule and project cost.

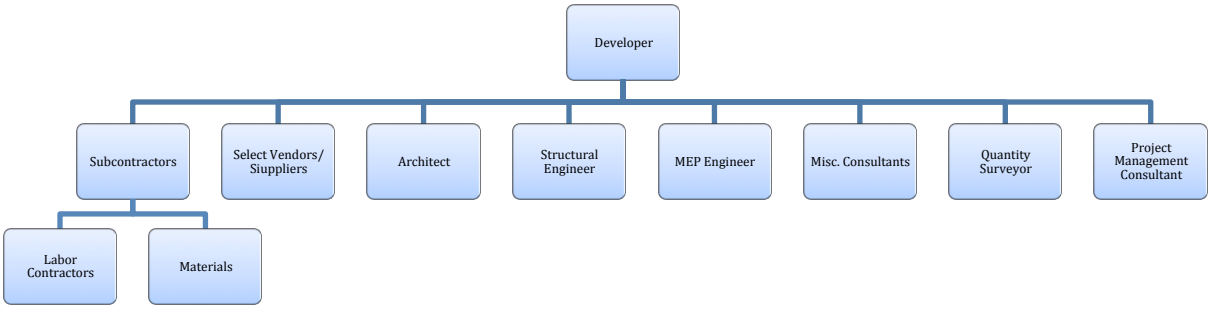
Structural & Civil Contractor	• Provide labor, materials and equipment for earthwork, foundations, structural frame and exterior CMU walls. This scope of work typically represents approximately 25% of the total development cost. • Considered by many as the "main contractor"
Subcontractors	• Individual subcontractors provide the labor and materials for specific scopes of work needed to complete the project. The total number of subcontractors can range from 20-30 depending on the size, scope and complexity of the development

This group of professionals, consultants and contractors are typically assembled in one of three primary method defined in sections 3.1, 3.2 and 3.3. Each of the delivery methods packages responsibilities differently, demands differing levels of project management expertise from the development entity, and yields a different execution risk profile. It is important to note that other forms of delivery exist and this thesis does not describe the entire array of possible delivery methods, but rather details the forms most common for the development of private real estate assets. The capabilities for design-build and turnkey procurement methods exist in India at the most sophisticated levels. However, these methods are most used in public projects and are not common in private development at this time.

3.1 Multiple Prime Contractors– Base Case

Historically the most common delivery method for private real estate assets in India has been the use of multiple prime contractors. In this delivery method, the developer contracts directly with multiple contractors or subcontractors to perform a unique scope of work on the same project. In the base case, the developer contracts directly with designers, consultants, and between 20 - 30 individual subcontractors required complete the asset. The project organization chart for this delivery method is detailed in Figure 9.

Figure 9 – Multiple Prime Contractors Organization Chart – Base Case



Multiple Prime Contractors – Base Case Risk Profile

This section evaluates each of the execution risk factors established in section 2.2 and details the advantages, disadvantages, and risk profile for the base case multiple prime contracts delivery method observed in India.

Team Size

Advantages:

- This approach provides the developer the lowest direct cost for individual scopes of work because there is no super subcontractor or main contractor mark up on subcontracted work. This approach is likely to provide the lowest cost for subcontracting but is offset by the expense of the management burden placed on the developer.

Disadvantages:

- Requires a larger and more sophisticated development staff capable of managing both the design team and the large stable of subcontractors, all of which rely on the developer to be both the macro decision maker and the micro manager.

- The developer often pays 2% - 4% of the total hard cost to a project management consultant to act as an extension of its staff to fulfill management duties without cost, schedule or performance guarantees.

Risk Profile:

- The developer bears directly, or passively through the effectiveness of the fee-for-service project management consultant, the execution risks associated with the larger development team size.

Preconstruction Approach

Advantages:

- The developer is able to freely select design professionals.
- Independent design professionals act as the owner's fiduciary during design and construction.
- A design-bid-build process allows for competitive bidding each scope of work.
- Owner benefits directly from project savings.
- Project costs are transparent.

Disadvantages:

- The developer and design team do not have input from obligated contracting entities on pricing and constructability issues during design.
- The total guaranteed construction price for bid documents is not known prior to breaking ground.

Risk Profile:

- The developer bears the risk for the final construction cost, including commodity risks.
- The developer cannot guarantee maximum project cost prior to completion of design adding additional risk to the financial underwriting of the project.
- The developer accepts the risk that the project will be over-budget and the project will need to be redesigned or require an additional capital call.
- Value engineering during construction as a means to resolve budget issues lacks transparency and makes it difficult for the developer to recover the total value of the incomplete scope diminishing the utility of this approach.

Schedule

Advantages:

- The project schedule can be dictated to subcontracting entities in the bid package. The construction schedule is prepared during preconstruction by the developer's staff or by fee-for-service project management consulting firms.

Disadvantages:

- A detailed project schedule contains many tasks and the awarded subcontractors schedule commitments for the project are limited to small scopes of work.
- Requires in-house staff or a project management consultant to manage the schedule and subsequent changes to construction activity sequencing resulting from subcontractor and material delays.

Risk Profile:

- The developer accepts the significant risk for the schedule. Individual subcontractor delays can lead to delay claims from other subcontractors and future overtime charges. Small subcontractors with limited resources leave the developer with fewer remedies at the subcontractor entity level.

Long Lead Items

Advantages:

- The developer can carve out certain materials, equipment or scope from any package in order to negotiate prices directly with the vendor. This provides the developer confidence that it is paying the lowest price possible and eliminates subcontractor mark-up.
- Direct procurement gives the developer control over long lead items by purchasing directly from the vendors. This allows the developer time to negotiate the price and secure delivery commitments for long lead items prior to subcontractor selection.
- The developer possesses the flexibility to remove a subcontractor for non-performance with fewer concerns over materials and equipment lead times.

Disadvantages

- The developer may need to arrange for the warehousing of long lead items if just-in-time delivery is unavailable. This responsibility carries with it the additional cost of management staff and potential off-site storage costs.
- Failure to deliver long lead items on time and in sequence exposes the developer to subcontractor delay claims and claims for re-sequence construction activity.

Risk profile

- The developer accepts the schedule and cost implications associated with directly sourcing materials from suppliers. The benefits are fixed at the amount saved by sourcing directly while the potential costs associated with delayed material deliveries are unknown.
- The developer accepts liability for the performance and quality of the materials and equipment that it sources directly.

Procurement Method – Unit Rate Contracts

Advantages:

- The procurement approach allows the developer to carefully plan the execution strategy and prepare the bid packages at the subcontractor entity level. This helps ensure that construction activity meets the developer's requirements regarding phasing, sequencing and quality.
- Ensures that all subcontractors are bidding on the same scope of work
- Likely to provide the lowest construction cost at the time of bid.
- The developer can make subcontractor selections on the best combination of price and performance on a unit price basis before the design is complete.

Disadvantages:

- Creates the opportunity for the developer to overpay for a scope of work. This could stem from mistakes in the bill of quantity or subcontractor disputes over quantity in place.
- May foster a false sense of security with the developer regarding scope and price. The developer may feel that design changes are more fluid and easily resolved if payment made on a unit rate, however this attitude can lead to escalating project costs due to poor project planning.
- The final price is not guaranteed.
- Billing approval processes are labor and time intensive.

Risk profile

- The developer carries the risk for the accuracy of the bill of quantities, which is the basis for subcontractor bids.
- This procurement method is most susceptible to disputes regarding reimbursement and carries with it the risk of work stoppage and additional costs required to settle such disputes.

Coordination

Advantages:

- Provides developers with ample in-house capabilities and local market expertise the opportunity to manage the project with the developer's best interests in mind, which helps any conflict of interest regarding cost, schedule, and transparency. Developers may also choose to hire an agency project management consultant to provide this service.

Disadvantages:

- Requires that the developer carry the expense of a larger staff or assemble a project management staff for specific projects. This is especially problematic if the developer's investments cover a wide geographic region.

- The developer bears the responsibility for the costs for the resolution of inevitable field coordination issues.

Risk Profile:

- The developer bears the schedule and financial risk for the coordination of construction activities. This is a significant responsibility with a large number of subcontractors performing smaller scopes of work.

Safety

Advantages:

- Presents the opportunity for the developer to be an industry leader and implement progressive safety programs and practices.

Disadvantages:

- Makes the developer, or its project management consultant responsible for the means and methods of project safety. This demands more staff and exposes the developer to the risks association with construction safety.

Risk Profile:

- The developer as the contracting entity is responsible to provide a safe work environment and is subsequently at risk for claims resulting from negligence and poor safety practices.

Quality

Advantages:

- The developer is able to set expectations for quality through monitoring of construction sequencing and execution.

Disadvantages:

- Requires a large staff to monitor quality and construction activity sequencing.
- Must have a large management staff to ensure that the punchlist is properly executed in timely fashion.

Risk Profile:

- The developer assumes the financial and schedule risks that arise due to poor craftsmanship and must mediate disputes between subcontractors.

Summary

The base case of the multiple prime procurement method requires the highest level of sophistication from the developer. By hiring the subcontractors directly, the developer has essentially assumed the role of the construction manager or general contractor and carries the sole responsibility for preconstruction services, total project cost, schedule, safety, quality, and field coordination.

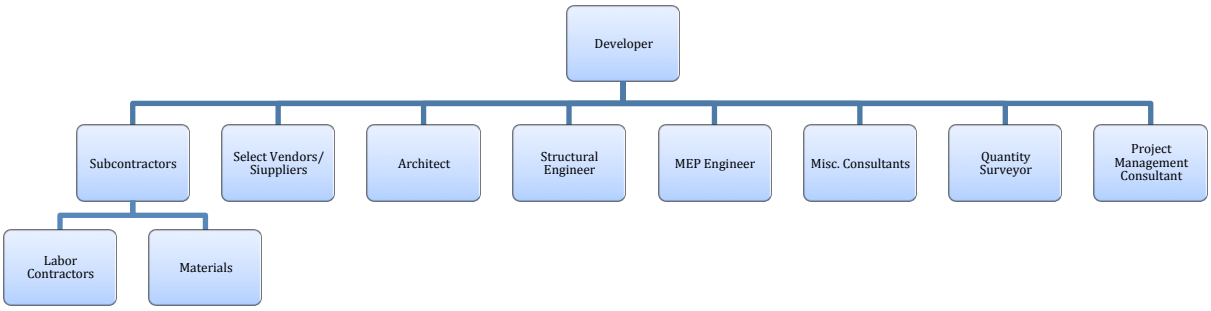
Over the last decade project management consultants have emerged and provide fee-for-service agency construction management and acts as an extension of the developer's staff. Project management consultants add value to the developer by providing local market expertise and the experience needed to deliver a real estate asset, but do little to shift the risk profile of the delivery method.

3.2 Multiple Prime Contractors – Super Subcontractors

In this model, the number of subcontractors decreases from 20-30 to 8-10 depending on the size, scope and complexity of the project. Though the delivery of the project is similar to the base case described in section 3.1, the use of super-subcontractors provides a slightly different risk profile.

A super subcontractor is a subcontractor that assembles the labor, materials and second tier subcontractors required to perform a larger scope of work. For example, it is common in India to package interior finishes into a single scope of work. A typical interiors package would include partition walls, flooring, painting, wallcovering, finish carpentry and ceilings in a single package rather than separate contracts for each task. This approach allows for the developer to outsource a larger percentage of the contracting, procurement, organization of labor, and other resources to a smaller group of subcontractors responsible for larger scopes of work, thereby reducing the demand on the developer's management staff.

Figure 10 – Multiple Prime Contractors Organization Chart – Super Subs



Multiple Prime Contractors – Super Subcontractors Risk Profile

This section evaluates each of the execution risk factors established in section 2.2 and details the advantages, disadvantages and risk profile for the multiple prime contracts delivery method when employing super subcontractors.

Team Size

Advantages:

- This approach packages complimentary scopes of work into larger packages reducing the total number of subcontractors and outsources some project management responsibilities to the super subcontractor.
- Reduces the developer's management burden by increasing the size and scope of work in a single package.

Disadvantages:

- The developer pays a premium to the super subcontractor for the management and coordination of a larger scope of work. However, the level of outsourcing of management and coordination responsibly in this delivery method does not eliminate the need for a larger staff or project management consultant seen in the base case model, and therefore adds another layer of cost.

Risk Profile:

- By contracting fewer entities, the developer has reduced its exposure to execution risk regarding to the size of the team. However, the ultimate responsibilities for execution risk as it pertains to overall project cost, schedule, and quality remain with the developer.

Preconstruction Approach

Advantages:

- The developer is able to freely select design professionals.
- Independent design professionals act as the owner's fiduciary during design and construction.
- A design-bid-build process allows for competitive bidding of each scope of work a high degree of flexibility in subcontractor selection. However, packaging larger scopes in super subcontracts does limit the developer from selecting what become 2nd tier subcontractors in this model.
- The developer benefits directly from project savings.
- Project costs maintain a high level of transparency.
- Allows for fast-track schedule.

Disadvantages:

- The developer and design team do not have input from obligated contracting entities on pricing and constructability issues during design.
- Due to fast-track schedules common in India, a guaranteed total construction price for bid documents is not typically known prior to breaking ground.

Risk Profile:

- The developer bears the risk for the final construction cost, including commodity risks.
- The developer cannot guarantee maximum project cost prior to completion of design, which adds additional risk to the financial underwriting of the project.
- The developer accepts the risk that the project will be over-budget and the project will need to be redesigned or require an additional capital call.
- Value engineering during construction as a means to resolve budget issues lacks transparency and often makes it difficult for the developer to recover the total value of the incomplete scope diminishing the utility of this approach.

Schedule

Advantages:

- The project schedule can be dictated to subcontracting entities in the bid package. The construction schedule is prepared during preconstruction by the developer's staff or by fee-for-service project management consulting firms.

Disadvantages:

- A detailed project schedule contains many tasks and the awarded subcontractors schedule commitments for the project are limited to small scopes of work.
- Requires in-house staff or a project management consultant to manage the schedule and subsequent changes to construction activity sequencing resulting from subcontractor and material delays.

Risk Profile:

- The developer accepts the significant risk for the schedule. Individual subcontractor delays can lead to delay claims from other subcontractors and future overtime charges. Small subcontractors with limited resources leave the developer with fewer remedies at the subcontractor entity level.

Long Lead Items

Advantages:

- The developer can carve out certain materials, equipment or scope from any package in order to negotiate prices directly with the vendor. This provides the developer confidence that it is paying the lowest price possible and eliminates subcontractor mark-up for expensive items.
- Procurement by the developer gives direct control over long lead items by purchasing directly from the vendors. This allows the developer time to negotiate price and secure delivery commitments for long lead items prior to subcontractor selection.
- The developer possesses the flexibility to remove a subcontractor for non-performance with fewer concerns over materials and equipment lead times.

Disadvantages

- The developer may need to arrange for the warehousing of long lead items if just-in-time delivery is unavailable. This responsibility carries with it the additional cost of management staff and potential off-site storage costs.
- Failure to deliver long lead items on time and in sequence exposes the developer to subcontractor delay claims and claims for re-sequence construction activity.

Risk profile

- The developer accepts the schedule and cost implications associated with directly sourcing materials from suppliers. The benefits are fixed at the amount saved by sourcing directly while the potential costs associated with delayed material deliveries are unknown.
- The developer accepts liability for the performance and quality of the materials and equipment that it sources directly.

Procurement Method – Unit Rate Contract

Advantages:

- The procurement approach allows the developer to carefully plan the execution strategy and prepare the bid packages at the subcontractor entity level. This helps ensure that construction activity meets the developer's requirements regarding phasing, sequencing and quality.
- Ensures that all subcontractors are bidding on the same scope of work
- Likely to provide the lowest construction cost at the time of bid.
- The developer can make subcontractor selections on the best combination of price and performance on a unit price basis before the design is complete.

Disadvantages

- Creates the opportunity for the developer to overpay for a scope of work. This could stem from mistakes in the bill of quantity or subcontractor disputes over the quantity in place.
- May foster a false sense of security with the developer regarding scope and price. The developer may feel that design changes are more fluid and easily resolved if payment made on a unit rate, however this attitude can lead to escalating project costs due to poor project planning.
- The final price is not guaranteed.
- Billing approval processes are labor and time intensive.

Risk profile

- The developer carries the risk for the accuracy of the bill of quantities, which is the basis for anticipated total project cost.
- This procurement method is most susceptible to disputes regarding reimbursements. It carries with it the risk of work stoppage and additional costs required to settle such disputes.

Coordination

Advantages:

- Provides developers with ample in house capabilities and local market expertise the opportunity to manage the project with the developer's best interests in mind, which helps solve any conflict of

interest regarding cost, schedule, and transparency. Developers may also choose to hire an agency project management consultant to fill this role.

Disadvantages:

- Requires that the developer carry the expense of a larger staff or assemble a project management staff for specific projects. This is especially problematic if the developer's investments cover a wide geographic region.
- The developer bears the responsibility for the costs of inevitable field coordination issues.

Risk Profile:

- The directly bears the schedule and financial risk for the coordination of construction activities. This is a significant responsibility with the large number of subcontractors performing smaller scopes of work.

Safety

Advantages:

- Presents the opportunity for the developer to be an industry leader and implement progressive safety programs and practices.

Disadvantages:

- Makes the developer, or its project management consultant responsible for the means and methods of project safety. This demands more staff and exposes the developer to the risks association with construction safety.

Risk Profile:

- The developer as the contracting entity is responsible to provide a safe work environment and is subsequently at risk for claims resulting from negligence and poor safety practices.

Quality

Advantages:

- The developer is able to set expectations for quality through monitoring of construction sequencing and execution.

Disadvantages:

- Requires a large staff to monitor quality and construction activity sequencing.
- Must have a large management staff to ensure that the punchlist is properly executed in timely fashion.

Risk Profile:

- The developer assumes the financial and schedule risks that arise due to poor craftsmanship and must mediate disputes between subcontractors.

Summary

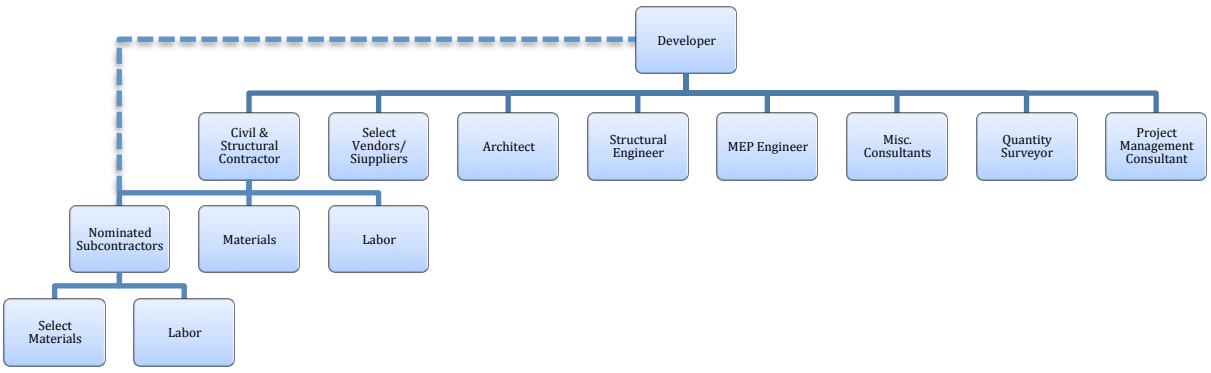
When coupled with the use of super subcontractors, the multiple prime contracts delivery method reduces some of the burden on the development staff's responsibilities for project management, cost, quality, and safety by increasing the scope of subcontracts and reducing the number of subcontractors. However, this program still holds the developer responsible for a significant amount of execution risk while doing little to eliminate the need for on-site construction management staff or a project management consultant. This delivery method is a natural progression from the base case, however it does not take advantage of the resources available in the market to best mitigate execution risk.

3.3 Main Contractor with Nominated Subcontractors

In recent years, the combination of expanded services offered by the civil and structural contractors and the willingness of the developer to push execution risk down the organization chart has fostered the emergence of the main contractor concept in Indian private development. The main contractor is the same class of contractor that performs the civil and structural scope of work in the multiple prime contracts delivery methods. However, in this delivery method, the main contractor contracts directly with the nominated subcontractors and is responsible for the cost, schedule and quality of the subcontracted work in addition to the performance of the civil and structural scopes. The contracts used to establish this relationship vary. For example, one of the developers participating in this study is using the International Federation of Consulting Engineers FIDIC contract forms, though a range of other internationally accepted forms exist in addition to proprietary forms.[28]

Through this approach the developer assembles a project team that is similar to a general contractor, providing the developer a single contractual relationship for the construction of the entire scope of work while preserving the developer's ability to maintain a high level of control over the subcontracted work. This approach allows the developer to retain control over bid packages, subcontractor solicitation, and select material procurement.

Figure 11 – Main Contractor with Nominated Subcontractors Organization Chart



Main Contractor with Nominated Subcontractors Procurement Method Risk Profile

Team Size

Advantages:

- The at-risk main contractor acts as a single point of contact for all construction cost, schedule and quality thereby significantly reducing the developer management burden.

Disadvantages:

- Preparing bid packages and managing the nominated subcontractor relationship does not eliminate the developer's management burden.
- Likely results in the highest hard cost of the Indian delivery methods observed in this study. The main contractor charges between 6% and 10% of hard costs for taking on the management responsibility of nominated subcontractor performance. Agency project management consultants typically charge between 2% and 4% for similar service however offer no performance guarantees. The use of the main contractor does not necessarily eliminate the need for a project management consultant, therefore adding two layers of fees.

Risk Profile:

- The developer allocates the risk for communication to, and management of, the subcontractors to the main contractor.

Preconstruction Approach

Advantages:

- The developer is able to freely select design professionals.
- Independent design professionals act as the owner's fiduciary during design and construction.
- A design-bid-build process allows for competitive on bidding each scope of work. This remains possible due to the developer's role in the selecting the nominated subcontractors.
- The developer benefits directly from project savings.
- By maintaining control over the nominated subcontractor bidding process, the project costs retain a high level of transparency.

Disadvantages:

- The developer and design team do not have input from an obligated contracting entity on pricing and constructability issues during design.
- Due to fast track schedule common in India, the total guaranteed construction price for bid documents is typically not known prior to breaking ground.

Risk Profile:

- The developer cannot guarantee maximum project cost prior to completion of design adding additional risk to the financial underwriting of the project.
- The developer accepts the risk that the project will be over-budget and will need to be redesigned or require an additional capital.

- Value engineering during construction as a means to resolve budget issues lacks transparency and makes it difficult for the developer to recover the total value of the incomplete scope diminishing the utility of this approach.

Schedule

Advantages:

- The main contractor takes on the responsibility of performing the entire construction scope within the contracted duration.
- Reduces the developer's involvement in the construction schedule and eliminates delay claims resulting from poor scheduling and sequencing.

Disadvantages:

- The nomination process can lead to disputes over a nominated subcontractor's performance because the developer makes the ultimate decision on subcontractor selection. The developer's selection of the subcontractors can erode the main contractor's sense of ownership of the nominated subcontractors.
- The developer that maintains control over material and equipment procurement retains some responsibility over the construction schedule.

Risk Profile:

- The contractor accepts the responsibility to deliver the project within the time allowed in the contract. This protects the developer from individual subcontractor claims and potential future overtime charges associated with other subcontracted work. The larger, more financially capable main contractor offers the developer more meaningful remedies in response to a failure to perform.

Long Lead Items

Advantages:

- The developer can carve out certain materials, equipment or scope from any package in order to negotiate prices directly with the vendor. This provides the developer confidence that it is paying the lowest price possible and eliminates subcontractor and main contractor mark up.
- Procurement by the developer allows control over long lead items via purchasing directly from the vendors. This allows the developer time to negotiate price and secure delivery commitments for long lead items prior to main contractor and subcontractor selections.
- The developer possesses the flexibility to remove the main contractor or a subcontractor for non-performance with fewer concerns over materials and equipment lead times.

Disadvantages

- The developer may need to arrange for the warehousing of long lead items if just-in-time delivery is unavailable. This responsibility carries with it the additional cost of management staff and potential off-site storage costs.
- Failure to deliver long lead items on time and in sequence exposes the developer to subcontractor delay claims, overtime claims, and claims for re-sequence construction activity.

Risk profile

- The developer accepts the schedule and cost implications associated with directly sourcing materials from suppliers. The benefits are fixed at the amount saved by sourcing directly while the potential costs associated with delayed material deliveries are unknown.

Unit Rate Contract Method

Advantages:

- The procurement approach allows the developer to carefully plan the execution strategy and prepare the bid packages at the subcontractor entity level to ensure that construction activity meets the developer's requirements regarding phasing, sequencing and quality.
- Ensures that all main contractors and nominated subcontractors are bidding the same scope of work.
- Likely to provide the lowest construction cost at the time of bid.
- The developer can make subcontractor selections on the best combination of price and performance on a unit price basis before the design is complete.

Disadvantages

- Creates the opportunity for the developer to overpay for a scope of work. This could stem from mistakes in the bill of quantity or from subcontractor disputes over quantity in place.
- May fostes a false sense of security with the developer regarding scope and price. The developer may feel that design changes are more fluid and easily resolved if payment is made on a unit rate, however this attitude can lead to escalating project costs due to poor project planning.
- The final price is not guaranteed.
- Billing approval processes are labor and time intensive.

Risk profile

- The developer carries the risk for the accuracy of the bill of quantities, which is the basis for anticipated total project cost.
- This procurement method is most susceptible to disputes regarding project costs. It carries with it the risk of work stoppage and additional cost stemming from settling such disputes.

Coordination

Advantages:

- Outsourcing this responsibility to the at-risk main contractor diminishes the management burden for construction coordination.

Disadvantages:

- Increases counter-party risk by consolidating the coordination responsibility to a single entity.

Risk Profile:

- While outsourcing the responsibility for construction coordination to a single entity this increases counter party risk, selecting a main contractor with the experience and financial resources to underwrite a meaningful remedy provides the lowest risk option of the delivery methods observed in India.

Safety

Advantages:

- The at-risk main contractor accepts responsibility for the entire safety program.

Disadvantages:

- The main contractor liability insurance premium is likely a significant premium in comparison to the multiple prime contract method.

Risk Profile:

- Through proper contracting language and insurance, the main contractor protects the developer from safety risk.

Quality

Advantages:

- The main contractor becomes the single contact responsible for the quality of all construction.
- The main contractor is responsible for the execution of the punchlist upon substantial completion.

Disadvantages:

- Increases the developer's counter party risk because the main contractor is solely responsible for project quality.

Risk Profile:

- The developer reduces its management burden and provides a single contact for warranty and latent defect claims.

Summary

Developers are exploring the general contractor concept with this delivery method without relinquishing control over select material purchases and subcontractor selection. This approach provides the developer with a single point of contact for the management of construction activity but lack

continuity with preconstruction decision-making. Most developers still use a project management consultant for preconstruction services and project oversight and reporting. This approach adds another layer of fees increasing total project cost without bridging the gap between preconstruction services and construction management. This approach may be appropriate for simple construction projects, however the gap between preconstruction services and construction management becomes increasingly important as the size, complexity, and number of real estate uses increases.

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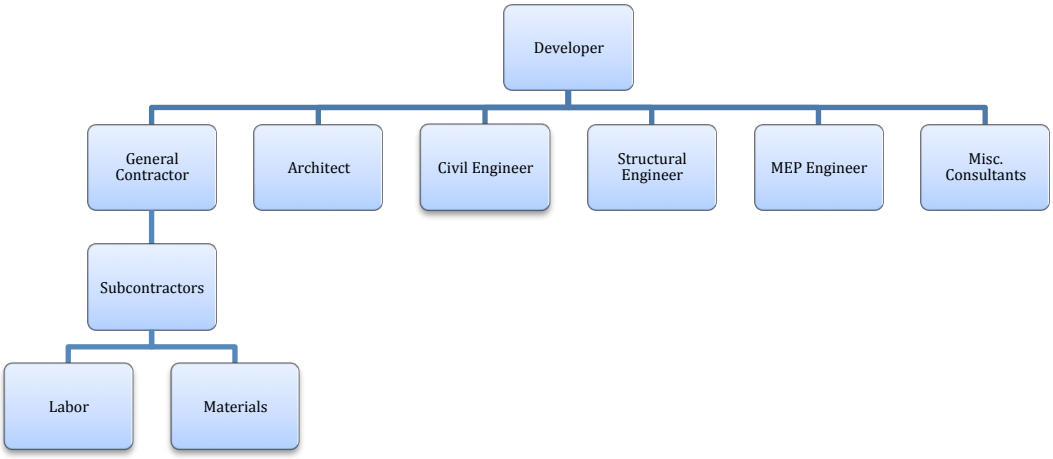
Chapter 4: Common Real Estate Delivery Methods in the United States

This chapter details several of the most common delivery methods used in private development projects in the United States. This analysis will be used as the benchmark for analyzing the execution risk allocation of the various delivery methods observed in India. It is important to note that resources available in the United States are not easily replicated in emerging markets. However, the United States is often regarded as one of the world's leaders in technology, contracting methods and risk management best practices, and therefore provides an established lens for reviewing execution risk in emerging markets.

4.1 General Contractor for a Fixed Price

The fixed price contract is a very common practice in the United States. This procurement method, also commonly referred to as Design-Bid-Build, provides the project owner a fixed price from a single contracting entity to manage the subcontractors, vendors and equipment required to build the project. In order to obtain this pricing, the project owner must provide a complete set of bid documents from which the general contractors will provide a fixed price for the defined scope of work.

Figure 12 – General Contractor for a Fixed Price – Organization Chart



Many project owners believe that this method provides the greatest value because it takes advantage of the competitiveness in the general contracting and subcontracting markets simultaneously in a single bid process. However, there are disadvantages to this method of design and construction. The following analysis examines of the elements of execution risk defined in section 2.2.

Fixed Price Contract Risk Profile

Team Size

Advantages:

- The at-risk general contractor acts as a single point of contact for all construction cost, schedule and quality thereby reducing the developer's management burden.

Disadvantages:

- Increases the developer's counter party risk by outsourcing document control and project management responsibilities to the general contractor.

Risk Profile:

- The at-risk general contractor acts as a single point of contact for all construction costs, schedule deadlines, and quality measures thereby reducing the developer's management burden. While this approach increases the developer's counter party risk, properly selecting a qualified general contractor is an accepted mitigation plan.

Preconstruction Approach

Advantages:

- Owner is able to freely select design professionals.
- Independent design professionals act as the developer's fiduciary during construction.
- A design-bid-build process allows for competitive bidding on a complete scope of work providing the information for the most accurate pricing.
- The total construction cost for the bid documents is known and guaranteed prior to breaking ground.

Disadvantages:

- The developer and design team do not have input from obligated contracting entities on pricing and constructability issues during design.

Risk Profile:

- The contractor takes on the risk for the final construction cost, including commodity risks upon award. There are a few exceptions to the general contractor accepting commodity risk, but those are typically exceptions and not the rule.
- The developer accepts the risk that the project will be over-budget and will need to be redesigned or require an additional capital call.

Schedule

Advantages:

- Schedule can be dictated in the bid documents or can be a part of the selection criteria from general contractor's responses.

- The general contractor accepts the responsibility for schedule performance and typically accepts either consequential damages or liquidated damages provisions in practice. Accepting liquidated damages provisions tends to be the market standard.

Disadvantages:

- The fixed price contract method does not allow for fast-track schedules since the entire project need to be designed to competitively bid the entire scope of work.
- This model increases counterparty risk for schedule performance.

Risk Profile:

- The contractor takes on the risk for the schedule and typically provides the developer performance bonds, accepting either consequential or liquidated damages as a remedy for failure to perform within the contract schedule.

Long Lead Items

Advantages:

- The developer typically allows the general contractor to purchase all long lead items. This contract method allows for suppliers, subcontractors and general contractors to compete for the scope of work simultaneous. In theory, the competition in the market in should yield the lowest markup margin possible for this service.
- The developer possesses the flexibility to purchase long lead items. Typically this only occurs in very volatile markets or when dictated by the project schedule.

Disadvantages

- Shifting the responsibility for material procurement increases counterparty risk.

Risk profile

- Though shifting the risk for long lead material items increases counterparty risk, close monitoring of the submittal process can mitigate delays resulting from long lead items.

Contract Method

Advantages:

- Provides a single price from a single entity for a well-defined scope of work.

Disadvantages:

- A fixed price contract can create an adversarial relationship between the developer, architect and contractor. The fixed price contract creates a zero-sum game, in which what is gained by one party is lost by the other.[29]

Risk profile:

- The contractor accepts the risk for construction cost, schedule and quality while providing the developer with performance guarantees, bonds and remedies for the failure to perform.

Coordination

Advantages:

- Coordination of all construction activities is the responsibility of the general contractor.
- General contractor bears the responsibility for the costs of inevitable field coordination issues.

Disadvantages:

- Penalties for the failure to meet the project schedule can incentivize the contractor to employ improper sequencing resulting in poor quality or performance.

Risk Profile:

- The contractor takes on the schedule and financial risk for coordination of construction activities.

Safety

Advantages:

- The general contractor assumes the liability for job site safety. All contractors are required by law to meet the Occupational Health and Safety Administration's (OSHA) standards for jobsite safety, though most contractors implement safety plans that exceed the required minimums.

Disadvantages:

- Increases counter party risk for outsourcing all safety responsibility.

Risk Profile:

- Through proper contracting language and insurance, the main contractor isolates the developer from safety risk. Typically the contractor will indemnify the developer from any claim resulting from jobsite safety.

Quality

Advantages:

- The general contractor takes on the responsibility of delivering the project within the specified tolerances and quality metrics
- Single contact to manage punchlist and systems performance.
- Formalized process for warranty claims and latent defects.

Disadvantages:

- The typical warranty period, the developers remedy for construction quality and performance is typically 1 year for all items though certain systems carry an additional warranty which covers an extended period.
- Increases counterparty risk by outsourcing to a single entity.

Risk Profile:

- The developer reduces its management burden and provides a single contact for warranty and latent defect claims.

Summary

This method requires a developer with a high level of sophistication because it does not allow the general contractor to provide input on cost, schedule and constructability issues during the preconstruction phase of development. Therefore, the developer carries the risk for the total project cost prior to the general contract award. This risk can materialize if the general contractors' bids exceed the proforma construction budget. This presents the opportunity for either costly design and procurement delays or requires additional capital to fund the higher than expected project cost.

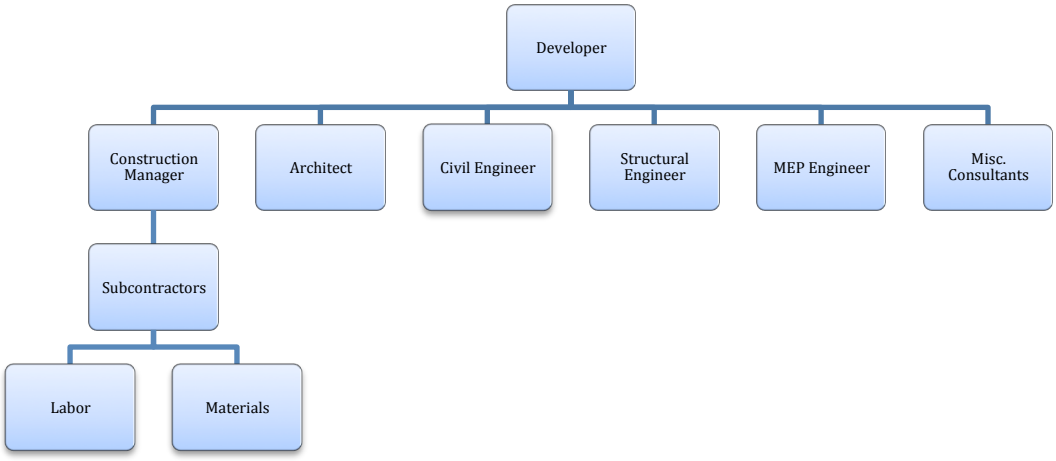
However, the developer secures a single contractual relationship responsible for all construction activities and allocates risks associated with construction cost, schedule and quality to one entity. This approach is not without its disadvantages. This contractual relationship may create an adversarial relationship between the developer, architect, and contractor. Some developers believe that some level of conflict is healthy while others prefer to opt for construction management services where construction manager has a fiduciary relationship with the developer.

This delivery method is likely to result in the lowest project cost because the information is available for general contractors to prepare accurate proposals. However, the bid process does not incentivize general contractors to recognize design coordination flaws or constructability issues that present additional project costs because it will put it at a disadvantage against its competition. This fact presents the risk that design and coordination issues will result in large volume of change orders to perfect the design. This change order process is not competitively bid and presents the opportunity for the general contractor and subcontractors to increase profit. In fact it is common that a general contractor will reduce its fee in its bid to increase the probability of award and use subcontractor negotiations and change orders to bolster the fee after award. These tactics heighten an already tenuous relationship between the general contractor, developer and architect participating in a zero-sum game.

4.2 Construction Management for a Guaranteed Maximum Price

This guaranteed maximum price contract method has gained popularity during in the last few decades. This procurement method shares the same project organization chart as the fixed price contract, but the selection method, timing of engagement of the construction manager and design processes differ from that of the fixed price contract procurement method.

Figure 13 – Construction Management for a Guaranteed Maximum Price Organization Chart



In this delivery method, the construction manager is selected prior to the completion of the construction drawings. The developer may select the construction manger at any point prior to the completion of the construction drawings.

Guaranteed Maximum Price - CM at Risk Contract Evaluation

Team Size

Advantages:

- The at-risk construction manager at risk acts as a single point of contact for all construction cost, schedule and quality thereby reducing the developer's management burden.

Disadvantages:

- Increases the developer's counter party risk by outsourcing document control and project management responsibilities to the at-risk construction manager.

Risk Profile:

- The at-risk construction manager acts as a single point of contact for all construction cost, schedule and quality thereby reducing the developer's management burden. While this approach increases the developer's counter party risk, properly selecting a qualified general contractor along with performance guarantees, bonds and damages clauses is an accepted mitigation plan.

Preconstruction Approach

Advantages:

- Owner is able to freely select design professionals
- Independent design professionals act as the developer's fiduciary during construction
- The developer and design team benefit from the construction manger's input on cost, schedule, value engineering and constructability during design. In theory this most quickly guides the design of the project within the budget.
- The total construction cost for the bid documents is known and guaranteed prior to breaking ground.

Disadvantages:

- The involvement of the construction manager skews the design toward the capabilities it unique skill sets.

Risk Profile:

- The construction manager takes on the risk for the final construction cost, including commodity risks upon award. There are a few exceptions to the construction manager accepting commodity risk, but those are typically exceptions and not the rule.
- The involvement of the construction manager during the design process reduces the risk that the project will be over-budget and the project will need to be redesigned or additional capital will be needed.

Schedule

Advantages:

- Schedule can be dictated in the bid documents or can be a part of the selection criteria from the construction manager responses.
- The construction manager accepts the responsibility for schedule performance and typically agrees to either consequential damages or liquidated damages provisions, though liquidated damages tends to be the market standard.
- The CM at-risk procurement method allows for fast track scheduling.

Disadvantages:

- This model increases counterparty risk for schedule performance.

Risk Profile:

- The construction manager takes on the risk for the schedule and typically provides the developer performance bonds and accepts either consequential of liquidated damages as a remedy for failure to perform within contract schedule.

Long Lead Items

Advantages:

- The developer typically allows the construction manager to purchase all long lead items for the project. This contract method allows for suppliers and subcontractors to compete for the scope of work simultaneous with the construction manager adding its negotiated fee. The competition in the market in theory should yield the lowest markup margin possible for this service.
- The developer posses the flexibility to purchase long lead items. Typically this only occurs in very volatile commodity markets or in case where schedule constraints require.

Disadvantages

- Shifting the responsibility for material procurement increases counterparty risk by relying on a single entity to manage the procurement process.

Risk profile

- Though shifting the risk to the construction manager for long lead material items increase counterparty risk, close monitoring of the submittal process can mitigate delays resulting from long lead items.

Contract Method

Advantages:

- Provides a maximum price from a single entity for an incomplete scope of work. This allows the developer to conservatively underwrite the development project with a guaranteed maximum price.
- The construction manager may be selected prior to the completion of the design with general conditions and management fee as the selection criteria.
- The construction manager develops a fiduciary relationship, which eases the potential for adversarial relationships between the developer and architect.

Disadvantages:

- If the schedule is fast tracked, the total cost and schedule is not guaranteed.
- The guaranteed maximum price approach to procurement results in the highest initial construction price though the contractor is structured so that the developer only pays for reimbursable costs which are capped that the guaranteed maximum price.
- Savings are typically shared with the construction manager as an incentive for controlling project cost.

Risk profile:

- The construction manager shifts a significant amount of cost, schedule and execution risk to the construction manager very early in the process resulting in a higher guaranteed maximum price.

However, the contract is structured to incentivize the construction manager to delivery the project under the GMP.

Coordination

Advantages:

- Coordination of all construction activities is the responsibility of the construction manager.
- The construction manager bears the responsibility for the costs of inevitable field coordination issues.

Disadvantages:

- Penalties for the failure to meet the project schedule can incentivize the construction manager to employ improper sequencing resulting in poor quality or performance.

Risk Profile:

- The construction manager takes on the schedule and financial risk for coordination of construction activities.

Safety

Advantages:

- The construction manager assumes the liability for job site safety. All construction managers are required by law to meet the Occupational Health and Safety Administration's (OSHA) standards for jobsite safety, though most contractors implement safety plans that exceed the required minimums.

Disadvantages:

- Increases counter party risk for outsourcing all safety responsibility.

Risk Profile:

- Through proper contract language and insurance coverage, the construction manager isolates the developer from safety risk. Typically the construction manager will indemnify the developer from any claim resulting from jobsite safety.

Quality

Advantages:

- The general contractor takes on the responsibility of delivering the project within the specified tolerances and quality metrics
- Single contact to manage punchlist and systems performance.
- Formalized process for warranty claims and latent defects.

Disadvantages:

- The 1-year general warranty is the developer's remedy for construction quality and performance though certain systems carry an additional warranty that cover an extended period.

- Increases counterparty risk by outsourcing to a single entity.

Risk Profile:

- The developer reduces its management burden and provides a single contact for warranty and latent defect claims.

Summary

This method is popular with private real estate developers because of the continuity of preconstruction services, the fiduciary relationship between the developer and construction manager, the ability to guarantee a maximum price for the project prior to construction, and a single contractual relationship responsible for the cost, schedule, quality and safety.

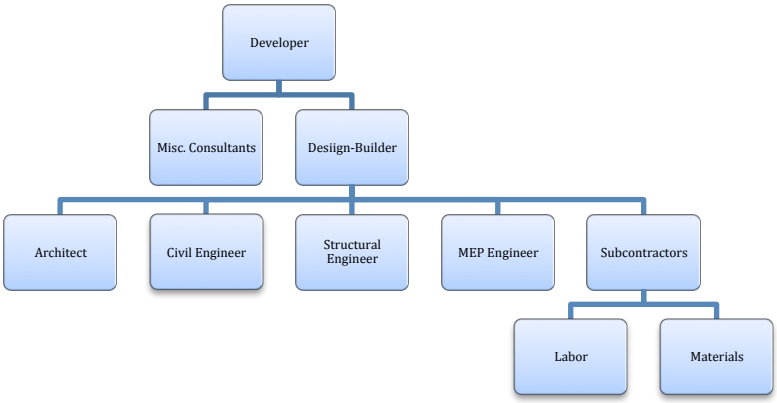
This approach is likely to produce a higher price for construction at the time of the construction management contract award due to the incomplete design, however many developer feel that this procurement best dovetails with the development process. The guaranteed maximum price is not necessarily the final price for construction but rather a maximum price. The GMP contract includes shared savings provisions to incentivize the construction manager to save money. Since the construction manager contracts with subcontractors for nearly all hard costs, the construction manager's procurement of subcontracts allows for the developer to access competitive bidding in the subcontracting markets for a pre-negotiated construction management fee. This process is a transparent process, which allows the developer to monitor project costs closely.

In summary, the construction manager at-risk method is very popular in private development because of preconstruction input from an at-risk construction manager, the continuity between the preconstruction and construction phases, the fiduciary relationship between the developer and contractor, the single contact responsible for project performance, and the access to competitively bid subcontracts.

4.3 Design-Build for a Guaranteed Maximum Price

The design-build procurement method is a reemergence of the master builder concept in private development in which the developer contracts with a single entity for the design and construction of a project.

Figure 14 – Design-Build Contract Organization Chart



Design-Build Contract Risk Evaluation

Team Size

Advantages:

- This contract method reduces the size of the project management team significantly. The design-builder holds contracts with nearly all of the designers and consultants and acts as the liaison between the developer and the project team.

Disadvantages:

- Increases the developer's counter party risk by outsourcing design and construction to a single entity.

Risk Profile:

- The at-risk design builder acts as a single point of contact for design, construction cost, schedule and quality thereby reducing the developer's management burden. While this approach increases the developer's counter party risk; properly selecting a qualified design-builder that provides performance guarantees, bonds and agrees to damages clauses is viewed an accepted mitigation plan.

Preconstruction Approach

Advantages:

- Contractor, the party most directly responsible for the cost, schedule and quality of the project is the developer's fiduciary.

- The design-builder typically has a strong working relationship with its architects and engineers, which results in increased productivity and reduces the design period.

Disadvantages:

- The developer looses some control over the design process.
- The developer has lost the fiduciary relationship with the architect.
- This process requires a sophisticated developer who is knowledgeable of the design-build process and can clearly communicate all of the design criteria and can select the design-build proposal that meets its criteria.

Risk Profile:

- The design-builder takes on the risk for the final construction cost, including commodity risks upon award.
- The involvement of the construction manager during the design process reduces the risk that the project will be over-budget and the project will need to be redesigned or additional capital will be needed.

Schedule

Advantages:

- Schedule can be dictated in the bid documents or can be a part of the selection criteria from the construction manager responses.
- The design-builder accepts the responsibility for schedule performance and typically agrees to either consequential damages or liquidated damages provisions, though liquidated damages tends to be the market standard.
- The CM at-risk procurement method allows for fast track scheduling.

Disadvantages:

- This model increases counterparty risk for schedule performance.

Risk Profile:

- The design-builder takes on the risk for the schedule and typically provides the developer performance bonds and accepts either consequential of liquidated damages as a remedy for failure to perform within contract schedule.

Long Lead Items

Advantages:

- The developer allows the design-builder to purchase all long lead items for the project.

Disadvantages

- Shifting the responsibility for material procurement increases counterparty risk by relying on a single entity to manage the procurement process.

Risk profile

- Though shifting the risk to the design-builder for long lead material items increase counterparty risk, close monitoring of the submittal process can mitigate delays resulting from long lead items.

Contract Method

Advantages:

- Provides a single price from a single entity for the design and construction of an entire project. This allows the developer to conservatively underwrite the development based upon a price.

Disadvantages:

- Making design changes is difficult and expensive.
- The developer does not typically participate in savings.

Risk profile:

- The contractor shifts all of cost, schedule and execution risk to the design-builder. However, the contract is typically structured to incentivize the construction manager to delivery the project under the GMP.

Coordination

Advantages:

- Coordination of all construction activities is the responsibility of the construction manager.
- General contractor bears the responsibility for the costs of inevitable field coordination issues.

Disadvantages:

- Penalties for the failure to meet the project schedule can incentivize the construction manager to employ improper sequencing resulting in poor quality or performance.

Risk Profile:

- The construction manager takes on the schedule and financial risk for coordination of construction activities.

Safety

Advantages:

- The general contractor assumes the liability for job site safety. All contractors are required by law to meet the Occupational Health and Safety Administration's (OSHA) standards for jobsite safety, though most contractors implement safety plans that exceed the required minimums.

Disadvantages:

- Increases counter party risk for outsourcing all safety responsibility.

Risk Profile:

- Through proper contract language and insurance coverage, the design-builder isolates the developer from safety risk. Typically the design builder will indemnify the developer from any claim resulting from jobsite safety.

Quality

Advantages:

- The design builder takes on the responsibility of delivering the project within the specified tolerances and quality metrics provided in the proposal
- Single contact to manage punchlist and systems performance.
- Formalized process for warranty claims and latent defects.

Disadvantages:

- The 1-year general warranty is the developer's remedy for construction quality and performance though certain systems carry an additional warranty, which covers an extended period.
- Increases counterparty risk by outsourcing to a single entity.

Risk Profile:

- The developer reduces its management burden and provides a single contact for warranty and latent defect claims.

Summary

The design-build method marks the reemergence of the master builder concept. The design-builder is the single point of contact that manages the entire design and construction. One perceived benefit of this delivery method is the design-builder takes the risk of design and eliminates claims for design errors.[30] The design-builder's greatest benefit, which is the ability to manage the entire process, is also it greatest risk. The developer has lost control over the design process and has increased its counterparty risk.

The design-build method also requires the most sophisticated developer. The developer must be able effectively communicate the design criteria and must be able to ensure that this criteria is understood by the design-builder. This process may lock the design-builder into a contract for a scope that is a vaguely defined concept. Disputes over the construction systems, produce selection, and performance criteria are common. Some developers hire independent designers to prepare a preliminary design to mitigate this risk. Ideally this adds clarity to the scope of work before awarding the project to a design-builder.

In summary, the design-build method outsources all design and construction responsibility to a single entity. Through this process can be advantageous from a management perspective, many developers prefer to manage the preconstruction process directly.

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Chapter 5: Comparison of Indian and U.S. Delivery Methods

The review of the development processes in India begs the question whether development teams are properly structured to take advantage of the resources available to improve execution performance and reduce the developer's execution risk. Comparing the delivery methods in India to those of the United States is difficult due to the unique conditions that limit Indian developers' capability to directly apply the best practices from the United States.

However, there is a meaningful evolution occurring in Indian construction and development as evidenced by the movement from the multiple prime contractors procurement method to the main contractor with nominated subcontractor procurement method. This trend signals a change in the contractors' capacity to execute larger scopes of work and the developers' willingness to outsource a larger percentage of the management burden. Furthermore, the emergence of fee-for-service project management consulting firms confirms the acknowledged importance of project team structure, preconstruction planning, procurement methods and holistic project management.

Though there is a significant amount of attention to project structure and execution management, the question remains whether current Indian development planning and execution plans minimize the impact of execution risk and incentivize performance.

5.1 Indian Market Constraints

The following inputs are constraining factors an Indian developer faces when structuring a development team and selecting building systems:

5.1.1 – Construction Methods

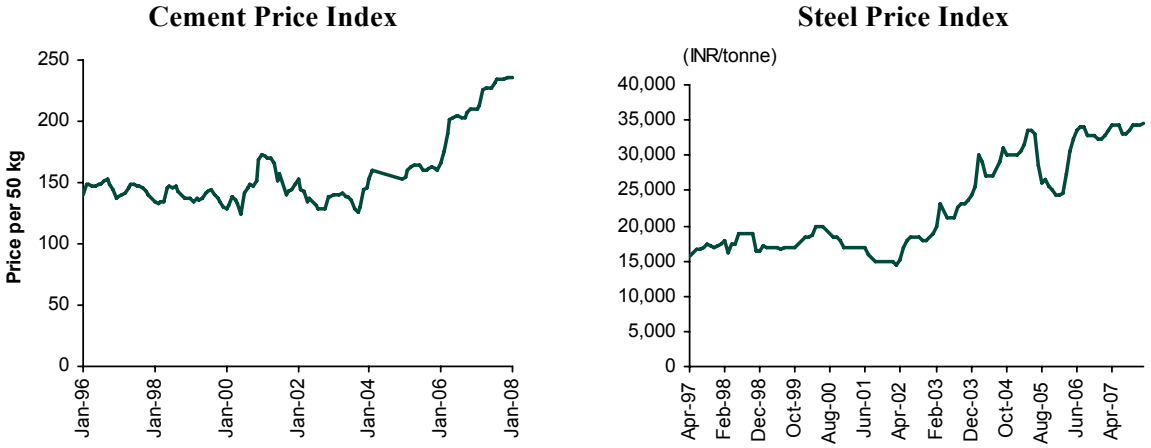
Currently, inexpensive labor in India is one of the key inputs that drive construction systems decisions and means and methods. For example, a carpenter in New Delhi earns between 200 and 300 rupees, or between $4.50 and $6.50, per day.[31] Because labor is so affordable, construction operations in India are not highly mechanized and most assembly takes place on site.

In addition to inexpensive labor, inadequate infrastructure and resistance to change are key factors that deter the growth of prefabricated building products, including structural steel, structural precast and architectural precast systems. However, the projected rapid urbanization coupled with the government's significant infrastructure investment may provide a shock to the current equilibrium, causing developers to consider alternate building methods as the spread between worker productivity and demand for new real estate product increases.

5.1.2 – Commodity Prices

Steel and cement are the primary materials that present exposure to commodities price risk. During 2003 and 2004 the industry experienced significant upward inflection in raw material costs as shown in Figure 19. A 2008 Lehman Brothers' study showed that increase in commodity prices resulted in the decline of participating contractors' average core EBITDA from 10.5% in 2001 to 6.4% in 2004.[32]

Figure 15 – Concrete and Steel Commodity Price Indices



Source: Lehman Brother, India Infrastructure and Construction 2008

Due to the high demand for construction services, the contracting companies possessed the leverage to move away from fixed-price contracts toward flexible contracts that include provisions to pass commodity risk to the developer. The Lehman Brothers' study estimates that 70%-80% of the contracts of the participating companies contained pass-through provisions.

Since the market has shifted away from fixed-price contracts to reimbursable contracts with regards to commodities, developers have responded by negotiating steel and cement prices directly with the suppliers. The negotiated raw material prices are included in the bid package and payments to the contractor reflect market prices at the time of materials purchase. This market condition makes it very difficult for a developer to use a contracting method to shift commodities risk to the contracting entities at the time of award.

5.1.3 – Labor Market

Indian construction labor is considered a commodity. The labor is typically unskilled or semi-skilled and is viewed by the industry as interchangeable.[33] Construction labor is primarily comprised of migrant rural populations that are organized by labor contractors. Similar to unions in the United States, contractors assemble workers from a variety of labor contractors to build its work force. The placement of labor from a labor contractor is typically not a contractual arrangement, leaving workers free to leave for better pay, better living arrangements, or for projects closer to home. The fluidity in the labor market

is best described by a Nash equilibrium. This theory describes the balance reached when each entity involved assumes to know the strategy of the others in the market. This results in an equilibrium, wherein no player is poised to gain anything from unilaterally changing its strategy. In this case, a contractor does not benefit from unilaterally developing a program to train a migrant labor force as no one else in the market is taking such an approach. Thus, construction labor remains largely undertrained and semi-skilled. The lack of training practices and labor mobility make it increasingly difficult to implement new building systems and cultivate innovation in construction.

5.1.4 Land Price

The land component typically makes up approximately 50% of the total development cost in India.[34] This is significantly higher than the 25-30% typical in the United States. This fact compels Indian developers to fast track construction projects in order to minimize the effect that the land investment has on equity returns. This process removes to the natural linear progression of design and requires the design team to compartmentalize design into trade packages. One risk unique to this approach is the designers' inability to visualize the impact of interfaces between packages. This lack of foresight increases the probability of design conflict once the project is underway.[35] Design conflict often results in additional costs and time to resolve the conflicts in the field.

5.2 Execution Risk Comparison

Evaluating the exposure to execution risks in India against those in the United States is a difficult task as there is no single delivery method used in either market. However, examining the common themes present in each market's delivery methods provides a means for a thorough analysis. Section 5.2 evaluates each of the execution risk components defined in Section 2.2.2.

5.2.1 Team Size

The development team size observed in India is larger than what is typical in the United States. This requires a higher level of sophistication from the developer in order to manage the larger volume of project stakeholders. An Indian developer must either have in-house project management staff or contract with a fee-for service project management consultant. This staff is necessary to perform tasks that are typically managed by the general contractor or construction manager in the United States. These tasks include: preparing bid packages; subcontractor bid solicitation; subcontract negotiations; materials procurement; document management systems; and construction coordination.

The Indian construction methods observed display an evolution that signals the developers increased willingness to outsource an increasingly large portion of project management to at-risk subcontractors and main contractors. However, this level of outsourcing does not eliminate the lack of continuity between preconstruction services and construction.

5.2.2 Approach to Preconstruction

While none of the three previously outlined Indian delivery methods make use of a general contractor or at-risk construction manager as a consultant during the design phase, two of the three procurement methods in the United States do. The reason for this is likely two-fold. First, equity investors in the United States demand more conservative execution mitigations to protect lower returns in a mature market. This is accomplished by mitigating downside risk via guaranteeing total cost prior to a complete design. Second, the limited demand for construction when compared with the ample supply of qualified contractors allows the developer to pass on significant amounts of execution risk at a very reasonable price early in the development process.

However, the conditions in India are quite different. Opportunistic investors are looking for high yields in a growth market. The demand for construction services exceeds the supply of qualified contractors, leading to high construction fees for accepting additional risk. In a very inelastic space market this fact compels developers to seek the lowest possible cost for the project. This has often resulted in the use of the multiple prime contractors, with the majority of current trends leaning toward the use of super subcontractors. Competitive bidding of small scopes likely produces the lowest initial development cost but does little to cap the downside. Such bidding also places an enormous management burden on the developer to manage construction and exposes the developer to more execution risk than the most common delivery methods in the United States.

5.2.3 Schedule

Due to the proportionally high land prices, the developer may feel compelled to fast track the construction schedule. All of the Indian delivery methods allow for the developer to begin construction prior to the completion of the design. In fact, all the projects reviewed while researching this report employed fast track schedules. This decision places a significant amount of risk on the developer as in all delivery methods observed the developer is starting construction before the design is complete and the total project cost is known. In particular, the multiple prime contracting places a large project management burden on the developer or its project management consultant and exposes the developer directly to subcontractor delay claims. The main contractor with nominated subcontractors method shifts the management burden for project schedule to the main contractor, buffering the developer from subcontractor claims.

Unlike the delivery methods employed in India, the fixed price contracting method does not allow a fast track schedule, as the complete design is required to competitively bid to a single at-risk entity. However, both the CM at-risk and design build methods allow for the developer to understand guaranteed maximum prices for construction and shift schedule responsibility to the contracting entity.

5.2.4 Long Lead Items

All three Indian delivery methods allow for the developer to procure long lead items directly. The motivation for this is two-fold. First, it prevents the subcontractor and main contractor, if applicable, from adding fees to these expensive material costs. Material cost can represent 50% of the total hard cost, presenting the developer with meaningful savings if it purchases expensive materials and equipment directly from the vendors. Second, labor shortages are common and by controlling the long lead items, the developer may replace a non-performing subcontractor with fewer risks to the overall schedule.

The three delivery methods common in the United States also allow for the developer to purchase long lead items directly from the vendors. However, this is uncommon in the United States. The reasons for this are two-fold. First, it is not typical for a developer to purchase materials directly from the vendors, meaning that the contractors or subcontractor possess the relationships with the vendors and can command a lower price than an unknown buyer. Second, the subcontractor and contractor mark-up is lower in the United States and therefore diminishes the reward for accepting the schedule and performance risk associated with the sourcing material and equipment directly from the vendor. Most building owners prefer to have a single source responsible for the performance of a scope of work and would prefer to avoid the debate over whether the source of the issues is presented by the material or the installation.

Exceptions to the trend against purchasing long lead times do exist. Developers in the United States will purchase materials directly in very volatile markets where price or availability present risk to the project schedule. There are also some aggressive developers that build highly replicable commodity space where repetition has refined a real estate product design to the point where it will source materials directly from the suppliers. Once again, however, this is uncommon in the delivery of unique real estate assets.

5.2.5 Contract Type

The market contract type in India is a unit price contract. This contract type is employed in a wide range of sophistication exposing the developer to a varying array of risk profiles.

In the least sophisticated form, the unit price contract provides an estimate of an incomplete project design. The bill of quantities is more programmatic than detailed and the tendering process is used more as a subcontractor selection method than a cost control mechanism. In this case, the contract is based upon a rough estimate of the quantities and the contactor is paid for the work in place. When employed in this manner, it is common that contractor billings exceed the initial estimate by 25%.[36]

However, in the most sophisticated form, the contractors are bidding on a completely designed bid package. Prior to award, the developer and the subcontractor reconcile any discrepancy in the

quantity take off provided by the developer and the subcontractor estimated quantities. This assures that the contractor will be paid a fixed price for the agreed scope of work and in effect backs into a fixed price contract. This process eliminates any discussion regarding waste as the developer has agreed to pay a fixed price for the specified unit of in-place product.

The U.S. delivery methods evaluated in this thesis provide two distinct contract types of payment. One is a fixed price for a completely designed scope of work, the second is a maximum price for an incomplete design.

The fixed price contract is forward, wherein the contractor provides a lump sum price for the entire scope of work as well as held responsible to provide all of the items in the contract drawings. The developer may extract some level of detail for the project cost, but typically project costs lack transparency and the developer does not participate in any savings.

In the CM at-risk delivery method, the developer selects the construction manager based upon competitively bid fixed general conditions and a construction management fee applied to the total value of the subcontracted work. Once awarded, the contractor joins the developer, architect and engineers to provide preconstruction pricing and consultation on schedule and constructability issues. Prior to the completion of the design, the construction manager will provide the developer with a guaranteed maximum price. Upon completion of the design, in whole or in part, the construction manager will bid the project to the subcontractor market. The contractor shares the subcontracting cost with the owner and makes a recommendation for an award. This method provides a high level of visibility on project cost. Additionally, the contract typically includes a shared savings clause with the developer in order to incentive the contractor to control project cost.

The design build for a guaranteed maximum price method is structured similarly to the construction manager for a guaranteed maximum price method except that the contractor also controls design. This contract method requires a very sophisticated developer as the design-build contractor is selected without the aid of the architect and consulting engineer. The developer must be certain that it understands what is required of it and that those responsibilities are reflected in the design-build proposals.

In all methods, the developer specifically avoids providing quantities in the bid packages because it wants to avoid the responsibility for the accuracy of the figures. It is not uncommon for the developer to ask the subcontractors and/or general contractors to provide quantities in its bid so that it may compare subcontractors to each other as well as to its in house estimate to ensure that the complete scope of work is included in the bids.

Furthermore, all of the contract methods allow the developer to know the construction cost before breaking ground. In the case of CM at-risk and design-build, the exact project cost is not known, however the maximum price is guaranteed by the counterparty, allowing the developer to control

downside risk. The one exception to this occurs when the developer decides to fast track the schedule. In this case developers commonly begin with excavation and foundations prior to the agreement on the guaranteed maximum price. Typically the developer carries the risk of subsurface conditions and therefore carries a significant amount of exposure regardless. Fast track scheduling allows the developer to take advantage of a shortened duration without increasing greatly its subsurface exposure if the developer and contractor reach agreement on the guaranteed maximum price before vertical construction.

5.2.6 Coordination

Two of the three Indian delivery methods place a significant burden on the developer for subcontractor coordination. The third method, the main contractor with nominated subcontractors, begins to allocate this responsibility to the main contractor without relinquishing control over bid packaging and subcontractor selection.

The three US delivery methods place construction coordination solely on the contractor, construction manager or design builder. The means and methods of project execution are the responsibility of the contractor, and if the project is assembled in accordance with the plans and specifications, the developer derives little value from getting involved in the management of the day-to-day operations. Entitling, leasing and selling real estate is the developer's primary business, and it does not typically have the in-house capabilities to measure a construction project of scale. Furthermore, the developer is not typically interested in accepting the risk associated with coordination.

5.2.7 Safety

The multiple prime contract methods in India make the developer directly responsible for overall project safety. The developer places provisions in each subcontractor, making the subcontractors responsible for certain aspects of safety. However, the responsibility for overall site safety remains with the developer. The emergence of the main contract allows for the developer to shift this responsibility to the main contractor.

All US delivery methods place the responsibility for site safety on the contractor, construction manager or design builder. It is very common that the contract with these entities would include language stating that the contractor will indemnify and hold harmless the developer from any claims arising from jobsite safety.

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Chapter 6: The Ideal Indian Project Delivery Method

In review of the Indian delivery methods and constraining conditions in India, there are several common themes in the development methods observed that must be considered when structuring a project delivery method. These are:

1. Disproportionately high land prices compel the developer to deliver the building in a short period of time. This has typically been accomplished by employing a fast-track schedule.
2. Inexpensive labor currently makes off-site prefabrication prohibitively costly.
3. Poor infrastructure makes large deliveries difficult during working hours, which presents procurement limitations.
4. Commodity risk cannot be mitigated through contractual relationships with main contractors or subcontractors.

The proper delivery methods will take into account the above-market constraints and allocate both controllable and uncontrollable risks to the party most capable to bare these risks while providing the developer the flexibility to navigate the overall development process.

6.1 Assignment of Risk

Uncontrollable Risk Allocation

The developer should bear commodities risk, uncertain subsurface conditions and extreme weather delays. The contract should prepare a base case for each of these risks and detail the structure by which these items are adjusted when an event occurs. Since the developer bears these risks, it should also reap any reward. Below is a suggested uncontrollable risk allocation for real estate development projects in India:

Commodities Risk: If responsible for volatile commodities market, developer should benefit from lower-than-expected steel and concrete prices. The developer can choose from a myriad of hedging strategies, but it is unlikely that in a frothy real estate market this is a risk that can be inexpensively mitigated by passing it to a contracted entity.

Weather: The contract should include provisions detailing the number of weather days contemplated in the contract and weather conditions required to qualify a weather event. In the event that the weather events exceed the number of days allotted in the schedule, the contractor should be compensated for the extended schedule. An aggressive developer could review the number of weather days consumed at certain milestones and recover weather days from the overall schedule if the project has advanced to a point where the critical path is not dependent on activities that can be impacted by weather.

Subsurface Conditions: The developer should obtain unit prices from the contractor for the variety of possible adverse subsurface conditions and the contract should include provisions for notification guidelines and reimbursement. Advanced planning allows for adverse subsurface conditions to be handled quickly minimizing its impact on the project schedule. However, the schedule and cost associated with subsurface conditions ultimately should be borne by the developer.

Controllable Risks Allocation:

Currently the Indian developer carries an unusually high volume of controllable risks when compared with developers in the United States. The Indian developer is concerned that, by assigning responsibility for controllable risks to a single entity or small group of entities, it will only increase project costs without providing guarantees and remedies in exchange. However, the guarantees and liquidated damages provision common in Indian contracts is not fundamentally different than in the United States. Dispute resolutions are risky in any environment, and collection from under-capitalized contractors and subcontractors is uncertain in either market. However, financially solvent large contracting entities responsible for the performance of its subcontractors provide increased capacity to enforce remedies.

Labor: The contractors and subcontractors possess the relationships with the labor market and are best suited to manage risks associated with finding and retaining qualified labor as well as maximizing productivity.

Schedule: The contractor possesses the resources to manage the schedule. The civil and structural contractor, which is the same class of contractor as the main contractor, is the most capable contractor in India and has demonstrated the capacity to manage the entire project.

Quality: Each subcontractor and contractor possesses the resources to manage the quality of the installation. The larger the scope under a single contract increases the incentive value for the responsible contractor.

Developers in the United States have found that the fees paid to a single source responsible for the labor, materials, project cost and quality provide value to the project by having a single source responsible for the project. This approach decreases the burden on the developer for project management and provides incentives to the contractors for managing the risk.

6.2 Preconstruction Decision-Making

The goal of any project delivery method should be to allocate risk to a party able to absorb the risk as well as to provide the incentive to manage the risk within the parameters of the local market.[37] Structuring the project delivery method to match the developer's in-house risk management capabilities with that of the designers and contractors ability to manage risk will produce the lowest possible price.

The appropriate structure should provide the flexibility to navigate the refinement of the concept while allocating internal and external risks to the appropriate party. This holistic approach best ensures that developer's vision and financial and political capital are best translated into real property.

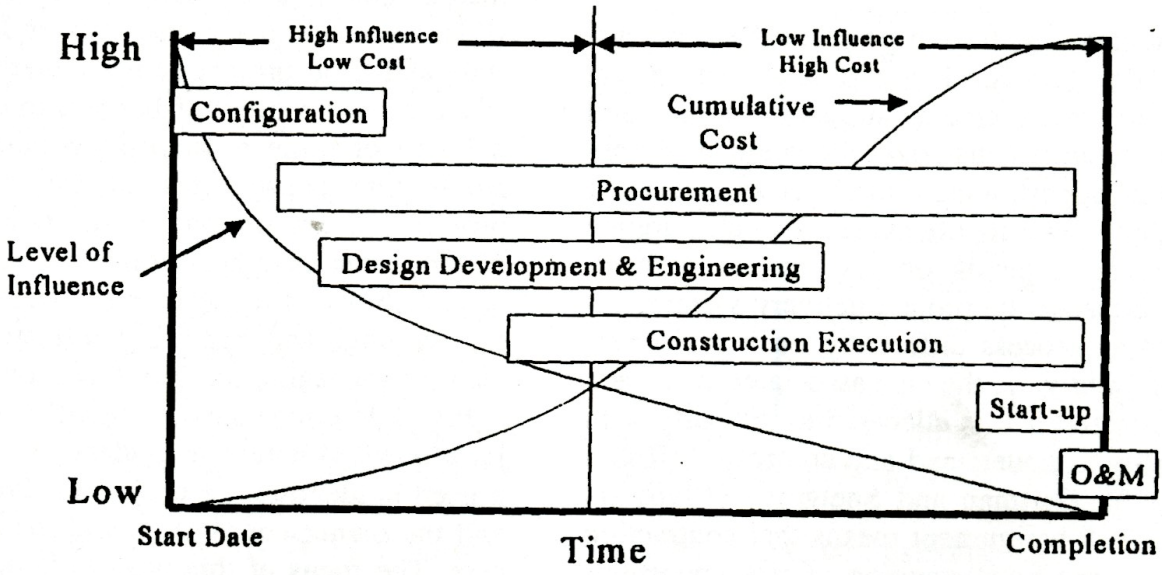
The previous chapters review the common delivery methods observed in India and the United States but the analysis to this point has not evaluated the ideal model. As discussed early in this thesis, the real estate development process is a highly iterative process where an initial idea is refined by the balancing of the economic, physical, financial and political and legal components of real estate development.

As shown in Figure 14, James Graaskamp graphically describes the idea refinement process, which through much iteration balances the inputs to produce a plan that maximizes the land value. [38] Through this process the developer forms the investment thesis for the asset. Early in this process the developer should choose the delivery method that provides it the resources to accurately guide this decision-making process. Unrealistic inputs on the physical component of the decision-making process can result in devastating cost and schedule overruns or dissatisfaction stemming from reduced scope or poorer quality than desired. The possible outcomes during the decision-making process and preconstruction phases demonstrate the importance of realistic inputs in the goal of seeking the appropriate scope and maximizing the value creation through the development process.

Figure 16 – Graaskamp Decision Making Process

The preconstruction and planning phase is the point in the process where the final project scope, total project cost, and schedule are crystallized. Figure 17 show that effective decision-making in this phase has a higher level of influence when expenditures are low and diminishes as increasing hard costs and work-in-place limits flexibility.[39]

Figure 17 – Level of Influence and Cumulative Cost throughout Project Development Cycle



Ideally the developer would use the best resources available to enhance the positive influence on the overall project. In India, this role with has typically been filled either solely by the developer or through the combination of the developer and an agency construction manager. While this is replicated in the United States, agency construction management is more common in institutional development than commercial real estate development. Typically, institutional development has a slightly different investment strategy and perspective of value than commercial real estate development, making it less sensitive to the uncertainties involving agency construction management. In the United States, a commercial developer producing highly repetitive commodity space, such as distribution facilities and suburban office buildings may choose to use its vast database of project costs to guide preconstruction decisions. However, developers of unique real estate assets usually employ an agency construction manager or an at-risk construction manager with the preference toward the construction manager at-risk due to guarantees in cost, schedule and quality.

6.3 Price of Risk vs. Remedy

Indian developers are rightfully aware of the balance between risks versus remedy. Consider that the premium to assign subcontractors to the main contractor cost between 7% and 10% of hard cost and an agency construction manager charges between 2% and 4%. In this scenario, what assurance does the developer have that this arrangement will result in improved performance rather than simply result in higher project costs?

The assignment of risk has serious implications on the total project cost. Any variable that presents uncertainty in the final cost and schedule is considered to be risk. A study at the Massachusetts Institute of Technology separates two types of risk - controllable and uncontrollable.[40] This study defines

uncontrollable risks as random variables such as material price escalations, weather and subsurface site conditions. Controllable risks are those associated with labor, performance, design errors, and material wastage. This study goes further to contemplate the allocation of controllable and uncontrollable risk and the impact this assignment has on project cost. Controllable risks may be best allocated to those directly able to manage the risks. Uncontrollable risks, if allocated to the inappropriate party is likely to carry a price tag that is higher than if the developer were to bare these risks. A developer should seek to balance risk allocation in such a manner as to maximize the incentive value of managing risk while minimizing the contingency charged to accept the risk.

Indian developers remain concerned about the total project cost and the utility of contract remedies and guarantees. The following list contains the list of risk mitigation tools currently available to an Indian developer:

- **Mobilization Guarantee**: An Indian developer pays the contractor upon award 10% of the contract value. In exchange, the developer receives a bank guarantee for this amount, which is released at 80% complete. This exchange or mobilization fees and guarantees are not common in the United States. This market expense appears to be satisfactorily mitigated.
- **Performance Bank Guarantee**: If possible, Indian developers will obtain a performance bank guarantee, which is typically 5% of the total contract. Due the limited supply of, and high demand for, qualified contractors, this is no longer marketable in India. This missing tool is important and adds risk to the developer outsourcing execution risk to the main contractor.
- **Retention**: The market for retained revenue in India is 5%. The developer, often due to the requirement of its lender, retains 5% of the monthly revenue as an incentive for performance and as a tool to complete. This is held for one year after the substantial completion of the project or receipt of a bank issued retention guaranty. Retention in the United States typically ranges between 5-10%, with 10% being more common.
- **Liquidated damages**: Liquidated damages provisions are common in Indian construction contracts. The market for liquidated damages is capped at 5% of the total contract value. Contractors in the United States typically accept some form of liquidated damages language, however it is often capped at the contractor's fee. Earlier, we established that the contractor's fee is between 7-10%. By capping liquidated damages at 5%, there is still room for the contractor to retain fees on projects far behind schedule.

These risk mitigation tools are substantially similar to those available to developers in the United States with the one exception being the performance guarantee. While this omission is significant, other meaningful risk mitigation measures are in place to consider the main contractor a viable development team member capable of providing management while providing meaningful remedy for performance

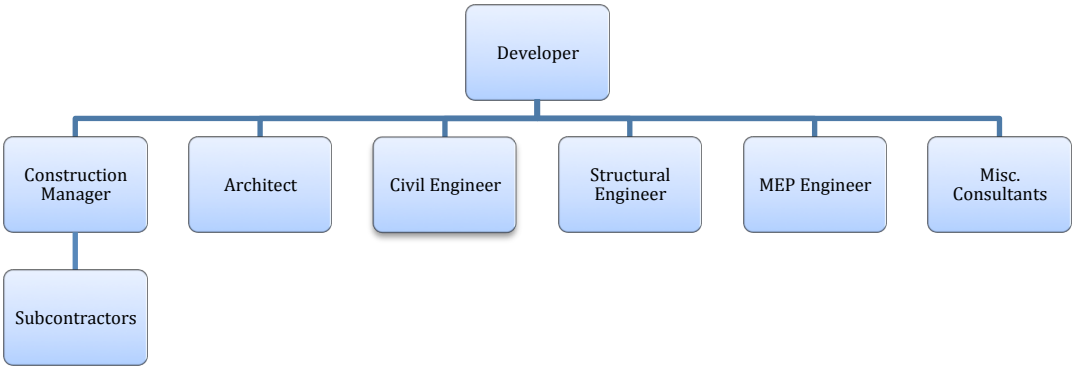
issues. The one issue that remains is a reliable and equitable court system to enforce the contract provisions. However, the legal remedy is equally risky regardless of the scope of the contract. In fact, in labor-only contracts when the developer controls the bulk of the material and equipment burdens directly, often the contract value does little to provide a meaningful remedy for improper execution or delay.

6.4 Ideal Project Delivery Method – Construction Management for a Guaranteed Maximum Price

The ideal project delivery method will provide the developer with preconstruction services, fast-track scheduling capabilities, guaranteed project costs prior to construction, and a single point of contact for construction coordination and management. It will also allow the flexibility to allocate uncontrollable and controllable risks to the appropriate party. None of the delivery methods currently seen in India provide all of these tools to the developer. The multiple primes contracting method does provide preconstruction services via the project management consultant, but looses some effectiveness due to a lack of continuity. The main contractor concept does provide a single contact responsible for construction activity, but does not offer preconstruction services from an at-risk entity. The combination of both a project management consultant and the main contractor results in two layers of fees and does not solve the issue of continuity.

Between the project management consultant and the main contractor, the project management consultant is best prepared to provide all of the needed services. The project management consultant's expertise in all scopes of work and familiarity with preconstruction services and value engineering makes it the best choice to provide these services.

Figure 18 – Ideal Indian Delivery Method – Construction Management for a Guaranteed Maximum Price



The proposed delivery method is a natural progression from agency construction management already common in the Indian market. However, this method does not currently exist in any meaningful

way in India. Thus, the challenge remains on how to best structure the contract to incentivize the project management consultants to go at risk for services that it currently offers as a fee service.

This delivery method maintains the fiduciary relationship between the developer, the architect, and the engineers as well as adds the construction manager to that list. Furthermore, the trade contractors now have a contractual relationship with the construction manager, relieving the management burden of lengthy contract negotiations.

6.2.1 Preconstruction Services

The selection criteria should be the construction manager's fee along with the general conditions cost. This will allow the developer to select the construction manager at-risk based upon fee, general condition costs, proposed project team resumes and company reputation prior to the completion of the project design. The construction manager should join the design team and consult on product selection, project cost, schedule and constructability issues. During preconstruction, the construction manager should be paid on a fee basis until the design has progressed to the point where a guaranteed maximum price is accessible. The preconstruction period allows for construction manager to understand the project and tailor the scope and systems to the strengths of the local market. In theory this process removes uncertainty from the scope and allows for the construction manager to provide the best price for the proposed scope of work.

Upon completion of the design development drawings, in whole or in part, the construction manager should prepare a guaranteed maximum price and schedule for the project. At this point the developer and contractor would enter into a guaranteed maximum price contract.

6.2.2 Construction Manager Contract

The construction manager's fee should be based upon a negotiated fee percentage of the subcontracted work. The contract should include several key provisions that detail management responsibilities, reimbursable expenses, cost transparency and schedule. There should also be cost and schedule incentives to provide the motivation for the construction manager turn over the project under budget and ahead of schedule. Below are a few common provisions often included in a construction management contract.

Management Responsibilities: The contract should include the exact responsibilities of the construction manager with regards to bid packaging, bid solicitation, subcontractor selection, project reporting, construction coordination, and safety.

Reimbursable Expenses: This provision should detail the exact list of reimbursable expenses. This is to ensure that the reimbursed costs directly benefit the project. A typical contract includes

a list of reimbursable staff, subcontracting cost, and direct costs that are considered necessary to complete the project.

Cost Incentives: Construction management contracts typically should include a shared savings provision. This provision can be structured in many ways, but ultimately allows the construction manager to participate in savings when the cost is below the guaranteed maximum price.

Liquidated Damages: This clause should set forth a graduated schedule of damages for not completing the project by the contractual completion date. In the United States, it is common that the construction manager's exposure to liquidated damages is capped at the construction management fee. This is a highly negotiated provision but is deemed equitable to limit the damages to the construction manager's interest in the project.

6.2.3 Subcontracting Methods

The unit rate construction subcontract appears to be embedded in the Indian development and construction culture. However, there is a significant amount of risk associated with providing subcontracting entities with the quantities for a scope of work. Some construction managers mitigate this risk through a thorough review of quantities with the subcontractor prior to award in effect building a fixed price contract. This process can be lengthy and can be improved.

The subcontractor bid packages should instead be based upon the subcontractor's own quantity survey. This removes any responsibility from the construction manager or developer for the accuracy of the bill of quantities as well as streamlines the billing and payment processes. The construction manager should demand the subcontracting entities report the units to be put in place for each scope on the bid form. The construction manager should use its own quantity survey to ensure that the subcontractor has included the entire scope of work by comparison. This process places the ownership of the drawings solely on the subcontractor and resolves any potential disputes over quantity in place.

6.5 Opportunities for Innovation

There are several key opportunities for innovation in Indian real estate development which, when available, will present significant opportunities to improve the overall quality of Indian real estate assets. The scale of the expected urbanization in India has only been outpaced by the urbanization of China. The current demand for construction services are already pushing the limits of the current market capabilities to produce real estate assets, and this gap is expected to increase in the short run. Thus, there is a tremendous opportunity for the developers and contractors that can cost effectively create prefabricated products to enhance the speed at which project can be constructed.

6.6 Conclusion

A developer is the quarterback of the development process. It is responsible for managing many risks, some controllable and others not. Because the opportunity cost of capital for developers is very high, they tend to operate with the lowest overhead possible while putting in place appropriate risk mitigation tools to manage controllable risks. The tools to mitigate controllable risks exist in India, but have not been organized to place the construction manager at risk. However, the volume of construction expected in India has already attracted international construction management firms such as Turner International, Flour Daniel, Samsung, and Brookfield Multiplex among others. The influx of these international construction management firms bring with them the management experience and best practices that provide the foundation for this delivery method.

The proposed delivery method provides the developer with important preconstruction services from an entity that will ultimately take the risk for the execution of the project. This method provides the continuity between preconstruction and construction, which should reduce the price at which the developer must pay for cost and schedule guarantees. Though the at-risk component to this delivery method is not currently common in India, the infrastructure is in place for the growth of this service. This project delivery method will also remove a layer of fees observed in the main contractor with nominated subcontractor method that employs both an agency project management consultant and pays a fee to the main contractor to guarantee subcontractor performance.

Furthermore, this delivery method also maintains the ability to negotiate material prices directly with vendors to hedge against the uncontrollable risk from the commodities market. The developer also maintains the option to fast track the project schedule as a mitigation strategy for proportionally high land prices. This method does this while also providing a single point of contact for preconstruction services and construction management. And while the existing project management consultants and the expanding main contractor will compete to offer this service as it gains popularity, the project management consultant is best prepared to assume this role. This is due to the similarity to the agency construction management model currently in place and the project management consultants experience in the preconstruction process. Developers will benefit from this service by reducing overhead and by obtaining guaranteed prices that are accompanied by meaningful remedies. However, the developer must be open to shared savings and early completion bonuses to compensate at-risk construction managers.

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