

Early Contractor Involvement (ECI): Indian Scenario Of Construction Project Delivery

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Abstract— In recent years, for various complicated projects, early contractor involvement (ECI) is rising as a new project delivery methodology. Different project delivery strategies are like Design-Build (DB), Construction Management in danger (CMR), Alliance and Swiss challenge method and the selection of most appropriate project delivery method is dependent on number factors and project requirements for a particular project. Cases of Bandra-Worli Sea link project and Dharavi Redevelopment proposed project are reviewed to understand various risks and need of ECI. Questionnaire surveys with industry experts are conducted to obtain opinions regarding the various circumstances for early contractor involvement. Various problems identified from questionnaire responses are grouped into risk distribution issues, cost issues, time issues and quality issues. The study is focussed mainly on different government and semi-government authorities in Mumbai and Thane region from Maharashtra, India. The study identified some circumstances wherein Early Contractor Involvement can be beneficial and if well planned for ensure innovation and strong professional relationships, early contractor involvement could be a procurement approach which will and lead to economical designing and construction processes.

Keywords— Alliance, Construction Management at Risk, Design-Build, Early Contractor Involvement, Project delivery, Risk management, Swiss Challenge Method

1 INTRODUCTION

A Project delivery method is illustrated as a way for procurement by that the owner's assignment of "delivery" risk and performance for design and construction, to the extent of scope outlined beneath procurement, transferred to a distinct parties. These parties typically are a design entity who takes liability of the design and a contractor who takes liability for the exhibition of the construction [7]. There are numerous variables that will be accustomed outline project delivery options. The a lot of factors accustomed outline a delivery option, the more distinctive combinations and so, more delivery options which will finish up on the list. Whereas no project delivery option is ideal, one choice is also higher suited than another supported the distinctive necessities of a selected project. The necessities for every project must be assessed to see that of the varied options are possibly to serve best objectives of the project proponent. Early Contractor Involvement (ECI) strategy is one amongst the new project delivery strategies. The name Early Contractor Involvement (ECI) comes from the principle of taking the contractor on board early during a construction project. Historically in India, the contractor is concerned once the development of a design is completed. The thought of Early Contractor Involvement (ECI) was initially employed in the United Kingdom in 1998 and later adopted in several countries like Australia after 2005. ECI endeavours to involve the contractor, immediately after the concept stage and before the statutory procedures / approvals are in situ. The rising project delivery methods increasingly rely on collaboration between the client, designer and contractor.

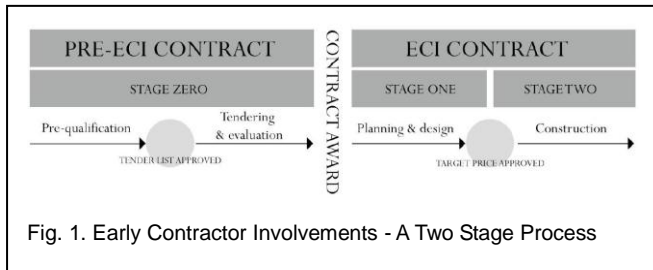
2 CONCEPT OF EARLY CONTRACTOR INVOLVEMENT

Early Contractor Involvement (ECI) is effectively a first cousin to the Design-Build (DB) contract model and exploits a Contractor's specialist knowledge relating to construction methods keeping in mind the benefit of design process. The method of ECI starts with a 'Pre-ECI contract' stage that involving pre-qualification of contractors and afterwards the procurement of a main contractor. Love et al. (2014) [5] describes that the procurement of a main contractor relies on price as well as qualitative criteria for operating in cooperative projects. Therefore, ECI permits contractors to differentiate themselves from competitors based on experience, capability and knowledge. Project yield into Stage one as a main contractor has been appointed. This stage involves the most design and planning work, which is performed by an integrated project team. Stage one is typically ruled by a professional consultancy agreement wherever the contractor is reimbursed on an hourly basis and probably an additional percentage fee [6]. The general goal of Stage one is to develop and agree on a target price for the development works [1]. Once the design process has resulted during a target price and a construction offer is submitted, progression to Stage two are often created. It's fascinating that identical contractor performs each Stage one and Stage two to totally have the benefit of the established relationships and competence [9]. However, looking on the performance and collaboration throughout Stage one, the construction works is obtainable to a unique party if the client is not glad or if the parties cannot agree on a target price [2].

Contractors in ECI are usually elite through a non-price selection technique throughout that the foremost stress is placed on the potential of the planned team. The kind of contract is set before being awarded; it's either a standalone "preconstruction" agreement or one contract with two distinct stages. In Stage one of an ECI contract model, the contractor commences design development up to stipulate design phase or maybe preliminary design. This design development is

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undertaken on cost compensation basis that conjures up innovative design alternatives. Throughout this section, value engineering and constructability issues is addressed and risks properly proverbial, quenched and distributed. Stage one includes the detailed design submission and evaluation for Stage two from the contractor and Stage two in ECI contracts tends to be a fairly traditional Design-Build contract. ECI contracts tend to possess differing degrees of discretion for the client with connection the transition from Stage one and Stage two.



1. Early contractor involvement. Innovative arrangements are caught forthright where most savings are made, and additional worth is given through project planning, design, and construction by securing in risk management strategies.
2. Selection of a contractor utilizing non-price based criteria. Based on capacity of his assets, resources, methodology, technology, and productivity benchmarks, contractor enters competitive bids.
3. Agreed risk management. In entire life cycle of the project, risks are proactively recognized and managed as early as possible.
4. Risk-adjusted price. To determine a negotiated target construction cost, the feasibility study price is risk adjusted by using negotiated risk allocation.
5. Termination from owner's end. If the owner isn't content with the contractor once coming into the construction stage, the contract is likewise retendered with no additional opportunity for the prevailing contractor.

3 TYPICAL PROJECT DELIVERY METHODS

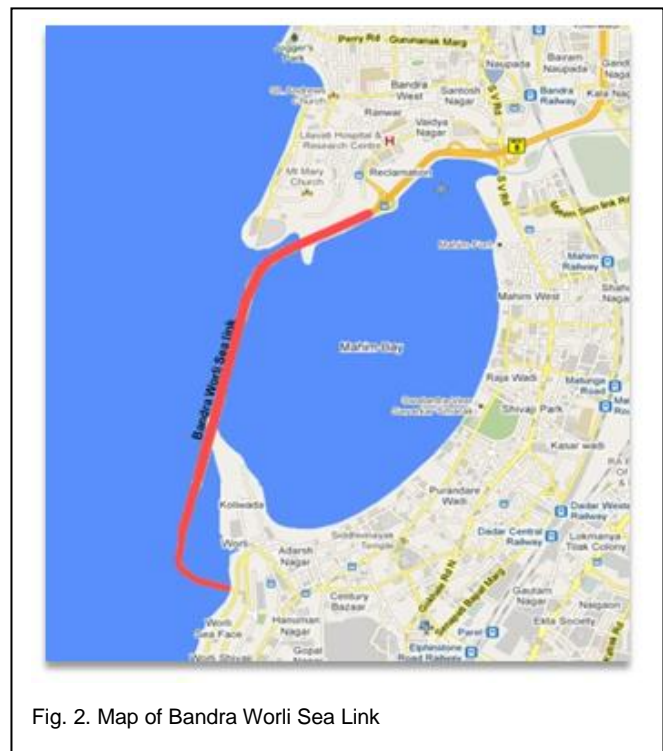
The selection of most appropriate project delivery method is dependent on number factors and project requirements for a particular project. Some of the forms of ECI are a) **Design-Build (DB)** wherein Contractor/Developer has all the liability of design and construction. Only final output is specified by the employer [9]. b) **Construction Management at Risk (CMR)** is a delivery method during which a designer (Architect/Engineer) is appointed for project's design and a construction manager at risk is chosen separately to act as a general construction contractor and additionally design advisor. The risk for construction and consultation in design phase for price & schedule evaluations, characteristic implications of different designs, materials and systems are assumed by the Construction Manager at risk (CMR) at a secured price. The construction manager (CM) holds the risk of completion of construction work (with work assign to subcontractors) of the project following completion of the

design for either a fixed or negotiated price [7]. c) **Alliance** is a delivery method whereby owner work collaboratively with one or more service suppliers in one integrated team so as to accomplish a particular project [12]. d) **Swiss Challenge** is a delivery method, wherein interested one contractor/developer incurs cost of preparation of DPR and based on his DPR quotation is called, wherein such contractor developer may get first right of refusal for tender based on such DPR. However, Swiss Challenge does not qualify for real advantages meant from ECI, except for assurance of success of the completion of the project [3].

4 NEED OF ECI FOR PUBLIC CONSTRUCTION PROJECTS IN INDIA

Recently asset owners are investigates various delivery models for construction projects that give upgrades in project delivery schedule and value for money. Public agencies charged with delivering infrastructure, moreover as designers and construction contractors, got the opportunity to adjust to project delivery strategies that significantly take issue from traditional strategies in structure. Rising project delivery techniques depends increasingly more on collaboration between the varied parties and are pointed toward growing long run positive relationships.

4.1 Case Study 1: Bandra - Worli Sea Link Project, Mumbai



Key features:

1. The Bandra Worli Sea Link starts from Bandra end at the junction of the Western Expressway and S.V. Road at the northern end and joins Khan Abdul Gaffar Khan Road (Worli Sea Face Road) at Worli end.
2. First sealink in India (length - 5.6 km).

3. Average daily traffic of around 37,500 vehicles.
4. Time saving of 35 to 40 minutes (23 signals).
5. Reduction in pollution in main city.

Cost & Schedule overrun:

Work of Packages 1, 2 and 3 was completed by year 2001 and commissioned for traffic. The work of Package 4 - Construction of Cable-stayed bridge, Approach Bridges and Toll Plaza was awarded to M/s Hindustan Construction Company in the month of October 2000 at a total cost of Rs. 400.23 cr. The scheduled time limit for the completion of the work was 30 months i.e. up to March 2003. Construction Company was awarded the Design and Build Item Rate Contract.

Due to various environmental Public Interest Litigations, the design of the project was required to be modified. Also, the quantity requirements of the project increased especially for foundation works. Due to various court cases and PILs, there was substantial delay in the project. The project which was planned to be completed by 2003 got completed by 2009. The total project cost increased from Rs. 766 cr envisaged in year 2000 to Rs. 1699 cr by 2009.

4.2 Case Study 2: Dharavi Redevelopment Project [13]



Fig. 3. Map of Proposed Dharavi Redevelopment Project

Key features:

1. 240 Ha Gross land area and 154 Ha FSI plot area.
2. Centre of Mumbai with highest transport connectivity through Central Railway, Western Railway, Harbour Railway, Colaba to Airport Metro and Bus connectivity.
3. After two failures Govt. has come out with SPV model of development.
4. Project declared as a Special Project and given status of Vital Public Purpose Project.
5. Bid Criteria: Bidder promising to deposit amount, over and above the minimum stipulated Rs. 3,150 cr, before signing the Development Agreement.

In this project, the government came up with the SPV model of development for this project after continuous failure of delivery of project. The government failed to attract any tenders for this project twice when using traditional PPP approaches.

This shows the need for an alternative project delivery

method for projects with such high risks project. The risks

TABLE 1

DHARAVI REDEVELOPMENT PROJECT: RISK IDENTIFICATION

Major Issues Noted		
Existing Slum Dwellers/ residents/ industrial & commercial units	Risk: Site Constraints	Risk: Financial
Risk of losing employment	Airport Height restrictions	High investment @ Rs. 20,000 crore in first 7 years before any revenue
Likely higher taxes by becoming formal economy	High density of slums	Low rates of residential/ commercial units in Dharavi compared to surrounding areas
Non-eligibility	Excluded areas	Delay in decision making
Demand of higher area of renewal tenements	Mixture of slum / renewal	---
---	Irregular land, Private land	---
---	Industrial structures	---
---	No Transit area available in DRP	---

identified and its efficient mitigation can be done by having speedy decision making mechanism for construction projects that offer improvements in value for money and project delivery time.

5 INDUSTRY'S EXPERTS PERSPECTIVE TOWARDS EARLY CONTRACTOR INVOLVEMENT

To gain industry's perception towards adopting early contractor involvement for public constructions, a survey with relevant industry experts was felt necessary. Consequently, structured questionnaire interviews surveys were conducted with industry experts (engineers and consultants) from different government and semi-government authorities coming beneath Mumbai Metropolitan Region and Thane region. The questionnaires were completed by 15 industry professionals representing a variety of government and semi-government companies who have intense experiences in numerous infrastructure projects. The aim of structured questionnaire interview surveys was to get data/opinions upon that generalisations are engineered with some extent of assurance.

While it is not possible to get statistically significant data from such small sample size, the interview responses are qualitatively analysed to spot the perceptions of the respondents towards adopting ECI and mitigations of associated risks. The sensible reasons given by respondents for such provision, in conjunction with any valuable suggestions are summarized.

6 RESULTS

6.1 Response Results on ECI Provision in Different Circumstances

According to experts responses, in following circumstances Early Contractor Involvement can be beneficial. Identified circumstances are presented based on maximum expert's

TABLE 2

RESPONSES ON ECI PROVISION IN DIFFERENT CIRCUMSTANCES

Sr. No.	Type of circumstances	No. of Respondents Consensus	No. of Respondents No consensus
1.	All stakeholders are not on same page	6	9
2.	Cost recovery framework is not well defined	6	9
3.	Information base of the project is weak	6	9
4.	Regulatory framework is expected to be defined based on project requirements	5	10
5.	Capacity of the Government entity as Employer is weak	5	10
6.	The Bidders universe does not have technical capacity but have financial capacity to execute and capable technical partner is ready to work only after award of contract.	4	11
7.	The Bidders universe does not have financial capacity but have technical capacity to execute and capable financial partner is ready to work only after award of contract.	0	15
8.	From Government end, there is likely time delay due to site requirements	9	6
9.	Operation and maintenance cost cannot be well defined at the time of tendering	5	10

consensus.

1. From Government end, there is likely time delay due to site requirements.
2. All stakeholders are not on same page.
3. Cost recovery framework is not well defined.
4. Information base of the project is weak
5. Regulatory framework is expected to be defined based on project requirements.
6. Capacity of the Government entity as Employer is weak.
7. Operation and maintenance cost cannot be well defined at the time of tendering
8. The Bidders universe does not have technical capacity but have financial capacity to execute and capable technical partner is ready to work only after award of

contract.

6.2 Risk Distribution Issues

ECI is used by owner to make a stage whereby project risk to the owner, designer, and contractor is avoided or mitigated through a cooperative approach at the design stage. Parties held various perspectives on how the distribution of risk would alter between traditional contract delivery strategies and ECI. The owner and therefore the consulting teams cared-for the opinion that contractors would be allotted a bigger portion of risk below ECI. All parties ought to see the impacts of distributing risk for going into an ECI project. In the allocation of risk, it is fundamental that all parties have know about the risks that that every one among different teams faces, just as the results of those risks materializing. The knowledge of the risks and impacts of risks materialization is necessary on risk distribution. The risk consequences severity can contrast contingent upon which party bears that risk. A more efficient risk distribution could likewise be contrived if all members in an ECI venture pay due thought to the ways in which different parties approach avoiding or mitigating certain risks. Particular risks should be allotted to the party may be altered at the time of negotiation if all parties coming into an ECI project should have a free consent.

6.3 Cost Issues

Mixed perspectives were control by the expertise on the on the different cost issues related in adopting ECI as a procurement strategy. Questionnaire results demonstrate that in embracing ECI as a procurement strategy, there is lots of scope for the owner to avoid wasting money. All parties foresee some short monetary sacrifice for the industry. All expertise usually held the view that in using ECI on a specific project, variety of resources additional to those vital underneath traditional ways would be needed in administration and these surprising administrative responsibilities will cause further costs. There was no accord on how operational costs would contradict from those related to traditional methods. In an ECI project some parties have to be compelled to modify their internal accounting frameworks to oversee potential changes in cash flow and finance. Payment terms for the work underneath taken could dissent from that which has been utilized under traditional methods in getting into an ECI situation. This aspect ought to be checked out by individual parties to confirm that they need systems which will change them to address potential variations. This viewpoint should be looked at by individual parties to affirm that they need frameworks which will transform them to address potential varieties.

7.3 Time Issues

Contrasting views of experts were observed in overall project time savings would result when the ECI delivery strategy was utilized contrasted with the use of traditional delivery strategies. In adopting ECI, the price negotiation process and the design phase consultation expedited by including a contracting party would contradict any potential time savings. It is necessary that the owner sets out its objectives at the very start of the project and additionally makes its primary desires clear to the opposite parties to get time savings within the design part. Throughout the preliminary design stage of the project, clear directions and targets should be set, presumably together with time and design detail needs. Extension of the preliminary design stage by

delivering a progressively complete design could also minimize risk exposure in resulting stages. To figure with unfamiliar procurement ways would bring delays as a result of new documents and contract forms would need to be compelled to be used.

7.4 Quality Issues

A majority of respondents within the study were held a consensus view regarding quality improvement through the cooperative relationships built up as a part of an ECI project. ECI would urge parties to complete work to a standard that surpasses expectations due to the project ownership that is expected by being part of a cooperative team. There must not be any area for dispute as clear objectives in respect to quality are laid out by the owner toward the beginning of a project. For any venture to succeed when utilizing ECI, the parties concerned ought to urge involved staff to act as promoters and trust in the advantages of the alternative procurement strategy.

7 CONCLUSION

Various circumstances are identified wherein ECI might be essential and different risks and measures are put forth in groups as risk distribution issues, cost issues, time issues and quality issues. Results are based on questionnaire interview surveys with industry experts. From results it can be concluded that robust project management is needed to confirm that the owner's objectives don't seem to be overlooked, that successively cause the owner could become discontent with the ECI method. Number of problems may also be present once a procurement strategy is employed for the first time in an explicit market. As ECI is adopted, specific aspects of the delivery model will get to be thoroughly worked through by all parties with an understanding that current review and adjustment is also necessary. In future, one will choose similar kind of work with statistical quantitative analysis which can bring new results and proposals in this subject.

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