

Global Collaboration During Front End Planning of Capital Projects

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Abstract: *Front end planning is arguably the most impactful process in the successful delivery of capital projects. Organizations expend substantial effort in this planning process, intending to minimize risk and promote project success. This process has been well documented, including critical technical components, as well as the importance of team collaborative components. As organizations continue to pursue large projects with multi-national participation from sponsors, designers, contractors and suppliers, the importance of collaboration on a global scale during front end planning becomes more important, not less. This paper will outline research performed over the past two decades giving the basic components of the process and the value of global collaboration. It will provide guidance to project participants in pursuing successful planning.*

Keywords: *Front End Planning, Collaboration, Alignment, Risk Management*

I. INTRODUCTION

Collaboration is widely defined as working together with another person or group of people to complete a task. Teamwork is a common synonym for collaboration. Effective collaboration is a critical success factor of project management. Research conducted over the past two decades has repeatedly shown that collaboration is a vital component of successful front end planning (FEP) of capital projects. This paper will outline that research and provide key lessons that have been learned concerning collaboration on global projects.

Why the concern about global collaboration? More and more projects are “global” in terms of their participants, funding, and content, particularly those involving large infrastructure and energy ventures. They require extensive effort to ensure the proper level of collaboration. International megaprojects (those greater than \$1 billion U.S. Dollars (USD) in expenditure) are accelerating in number. [1] Global collaboration poses significant potential problems as will be outlined.

II. FEP PROCESS

FEP is the process of “developing strategic information to identify risks and determine the resources needed to mitigate those risks.” [2] The purpose of the FEP process is to create an environment early in the life cycle of a capital project in which teams can effectively analyze and address potential project risks. With effective FEP, risks can be mitigated through the development of detailed scope definition and the subsequent efficient use of project resources. The desired result is to be able to successfully manage a project through detailed design and construction. [2]

The FEP research thread pursued by the Construction Industry Institute (CII) over the past two decades has extensively documented the efficacy of the process while

at the same time developed a number of decision support tools to assist project teams in successful application. Specifically, this research has gathered an extensive database to assess the processes and tools used within the CII community and the broader industry, including the industrial, buildings, and infrastructure sectors. The CII FEP research effort can be summarized as follows [2]:

- Since 1991, ten CII teams have addressed front end planning issues and developed effective management tools focused on the process. The author of this paper has been involved as the principal investigator on eight of these studies.
- CII front end planning research projects have engaged over 900 industry professionals from over 280 organizations and studied 1225 projects worth over \$100 billion USD, using a variety of research methods.
- CII research has shown conclusively that effective front end planning leads to added project value. Assessments of projects with more effective front end planning have shown cost differences of six to 25 percent, and schedule differences of six to 39 percent.

Figure 1 illustrates the three sub-phases of front end planning in the context of the typical life cycle of a project. The diamonds represent key decision points, or “phase gates,” that must be addressed prior to moving on to following phases.

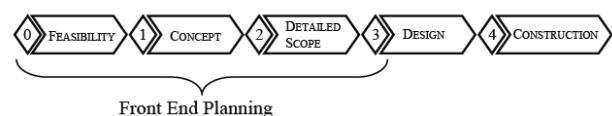


FIGURE I. Front End Planning and Project Life Cycle Diagram [2]

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Others have also reported similar benefits of the front end planning process. In particular it is a critical process on megaprojects as they are so fragmented and complicated. As pointed out in his book, *Industrial Megaprojects*, Merrow describes the gated process as most important from a business perspective, as it integrates early understanding of business requirements with the technical understanding as the project progress, assuring that planning activities are proceeding in the proper manner. [1] The process itself is essentially a “people” process, and disciplined pursuit of good and effective front end planning pays dividends.

III. ALIGNMENT AND COLLABORATION

Alignment is defined as “the condition where appropriate project participants are working within acceptable tolerances to develop and meet a uniformly defined and understood set of project objectives.” [3] Collaboration is the act of working together, while alignment is a state of being, indicating how well the team is working toward project objectives.

Figure II illustrates the dimensional issues within alignment. This definition of alignment entails three dimensions. The first is horizontally among project team members, and the second is alignment with decision makers vertically in the organization. The last dimension is longitudinally along the life of the project. In the case of the diagram given in Figure I, alignment must be maintained throughout each phase.

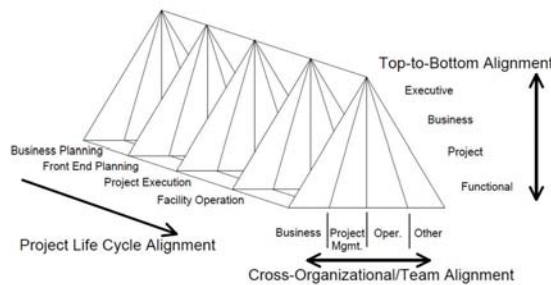


FIGURE II. Dimensions of Alignment [3]

A typical front end planning team is comprised of individuals representing a wide variety of functional groups, such as business, project management, operations and other technical perspectives, with diverse priorities and requirements. As each team member enters the planning process, they bring different priorities and expectations. As complexity is introduced, for instance diverse cultural or demographic differences within the team or among key stakeholders, gaining team alignment and being collaborative becomes more difficult. Alignment is achieved by incorporating all of those distinct priorities and requirements focused on a uniform set of project objectives that meet the business needs for the proposed facility.

In a study published in 2001, data collection that included workshops with experienced project participants, surveys and interviews involving actual projects, and best practice interviews was conducted. More than 100 individuals with extensive project experience in a wide variety of positions and industries were consulted. The three-phased research approach provided a deep information pool related to alignment during the FEP process, identifying ten key alignment issues that must be addressed to ensure good alignment: [4] [5]

1. Stakeholders are appropriately represented on the project team
2. Project leadership is defined, effective, and accountable.
3. The priority between cost, schedule, and required project features is clear.
4. Communication within the team and with stakeholders is open and effective.
5. Team meetings are timely and productive.
6. The team culture fosters trust, honesty, and shared values.
7. The pre-project planning process includes sufficient funding, schedule, and scope to meet objectives
8. The reward and recognition system promotes meeting project objectives.
9. Teamwork and team building programs are effective.
10. Planning tools (i.e., checklists, simulations, and work flow diagrams) are effectively used.

These ten alignment issues were used to develop an alignment index and tested on a data sample of 70 projects in 2003. Project data were submitted by 11 owner organizations and four contractor organizations and had a total installed cost of \$6 billion USD. Actual construction cost of the projects ranged from \$1.1 million to over \$2.1 billion with an average project cost of \$90.9 million. Sample projects with alignment scores above the median (indicating better alignment) showed better average performance than those with scores below the median (approximately 7.8) as given in Table I. The findings for cost performance are statistically significant. [4]

TABLE I. Summary of Cost, Schedule, and Change Order Performance for Projects in the Sample

Performance	Alignment Index Score	
	Less than Median	Greater than Median
Cost*	3.3% over budget	6.5% below budget
Schedule**	24.5% behind schedule	8.4% behind schedule

* denotes performance was statistically significant, $p < 0.05$

** denotes performance was statistically significant, $p < 0.10$

In related research, integrated project delivery (IPD) is a project delivery system that collaboratively involves key project stakeholders early in the project timeline,

often during FEP. It typically involves a multiparty contractual agreement allowing risks and rewards to be shared among signatories. In effect, it forces collaboration and alignment of key project participants by ensuring that the reward and recognition systems of the disparate parties are shared. In a study of IPD published in 2013, the main conclusion is that this systems delivers higher quality projects faster and at no significant cost premium, achieving better results on 14 metrics as compared to non-IPD projects. [8]

IV. DIFFICULTIES IN ACHIEVING COLLABORATION AND ALIGNMENT ON GLOBAL PROJECTS

In simple terms the ten issues outlined in the previous section can be of use in beginning to address effective alignment and collaboration on capital projects, including global ventures. However, the world is not simple. For instance, although getting the appropriate stakeholders involved to the right degree in a project may sound easy, it is in many ways not easy. Geographic location, language, culture, competing values or obtuse objectives, among many factors, can all work to derail this very relevant step. [7]

Alignment and collaboration barriers during FEP are extensively covered in the literature and include: lack of team continuity; geographic dispersion of the team members; lack of appropriate involvement by the owner team; failure to integrate teams initially and later as the project team expands; dis-functionality of joint venture teams; lack of resources; and probably the most insidious barrier of all, lack of effective leadership. [1] [2] [4] [6]

In 2003, CII published a study looking at the risk issues that are generally relevant on “international” projects. It is important to note that the work has since been recognized to apply to complex projects and those pursued in locations that are unfamiliar to at least one of the key stakeholders; global projects apply to this meaning. The study identified 82 potential elements that may bring risk to the project, segregated into four overarching areas, Commercial, Location, Facilities, and Production/Operations. An excerpt of some of these issues is given below, with particular emphasis placed on those that can trigger alignment problems. [7]

Collaborative focus must be exerted on the following commercial-specific issues that shape the business venture, otherwise alignment problems could occur due to misunderstanding:

1. Economic incentives/barriers
2. Business standards and practices
3. Sources and form of funding
4. Currency
5. Insurance requirements
6. Tariffs and duties
7. Value added tax (VAT)
8. Legal entity establishment
9. Expropriation/nationalism
10. Political stability of the region
11. Government participation and control

12. Intellectual property

In addition, collaborative focus must be asserted on the following location-specific issues that shape the team response to local conditions:

1. Public opinion
2. Religious differences
3. Governing law
4. Legal standing and basis
5. Environmental permitting
6. Corrupt business practices

Other facilities and production/operations issues such as those below also can lead to alignment concerns unless addressed and mitigated:

1. Project scope, particularly governing regulations, permitting, property ownership and safety
2. Sourcing and supply, including local sources and importing and customs requirements
3. Design/engineering, including use of local services
4. Construction, including workforce availability, safety practices, insurance, quality
5. Startup requirements, including worker training and turnover
6. People, including governing language, required operational work force, security
7. Legal, including use of expatriates, governing law, environmental compliance
8. Technical, including infrastructure support for operations, facilities management and maintenance, technical support

All of the issues outlined above, and many more, must be addressed collaboratively in front end planning through the project life cycle to define, measure, and mitigate their effects on the project. [7]

V. CONCLUSIONS

It is clear from past research that team alignment (and collaboration) during FEP is a critical success factor; this is particularly true for highly complex projects, and those that are global in nature. Alignment during FEP positively impacts performance and helps the team address adversity as the project moves forward. The ten alignment issues related in Section III give some insight into important issues that must be addressed to gain and maintain alignment during FEP. To be successful, project teams must support an aligned team environment while at the same time discovering and addressing the unique risk issues outlined in Section IV; this in turn will help the team keep away from conflict that can derail progress as the project proceeds through its life cycle.

Well-aligned and collaborative teams: ensure that the team takes into consideration geographic dispersion of stakeholders; get the right owner input at the right time; work hard to integrate the team through each project phase; work hard to integrate joint venture partner personnel so that they are effective; are provided sufficient time and resources to get the job done; and

ensure that effective leadership is present and employed during the effort.

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