

CONSTRUCTION IN THE TWENTY-FIRST CENTURY TRENDS AND OUTLOOK

Talal Abi-Karam

Senior Principal Engineer, Hazen and Sawyer, P.C., Hollywood, Florida, USA

ABSTRACT

As we enter the new millennium, we move into an open global market economy. Innovative project delivery methods such as Privatization, Design/Build, and At-Risk Construction Management, are becoming common in the construction industry. The United States construction market is reacting to trends of the 1990's by reinventing itself, and emerging on the cutting edge of alternative project delivery. An outlook into the new millennium indicates megatrends such as: (a) Paradigm shift in the project delivery methods, (b) Specialization and niche marketing, (c) Increased global and local competition, (d) Emphasis on "Value" in construction goods and services, and (e) focus on project long term Life Cycle Costs and related services.

This paper will survey megatrends and sub-trends such as, mergers and acquisitions, claims and litigation, and safety in the construction industry.

KEYWORDS

Merger, Paradigm, Competition, Niche, Design/build

1. INTRODUCTION

Trends in the 1990's showed a sharp increase in the volume of litigation, stiffer competition, cost overruns, and lower profit margins. Some believe that these trends are the result of the competitive bidding system used in the private and public works sectors. Competitive bidding may yield the lowest price, and may protect public owners from exuberance. However, it promotes finger pointing, frequently generates costly changes, systematically reduces the quality of the product in the name of lowest price, and may lead to the selection of incompetent contractors.

The increase in volume of litigation was primarily due to an increase in the volume of construction put in place in a competitive marketplace, while using the competitive bidding method. Stiff competition caused contractors to cut their margins to get jobs. This resulted in less money in the contractors' pockets, and tight project cash flows, thus forcing them to seek claims to make up profits. The increase in claims led all parties to seek alternative disputes resolution (ADR) methods such as, Arbitration Mediation, Negotiation, and Conciliation to avoid costly and prolonged litigation. This also has led all parties to adopt and implement high-concept, managerial programs such as Partnering, and Total Quality Management (TQM) to facilitate communication and cooperation between all parties. Unfortunately, because some of these programs were not legally and contractually enforceable, they had limited success in stopping the "avalanche" of construction claims.

The construction industry was also affected by outside factors that changed the composition, relationships, and the legal framework of the market. The following is a list of factors that influenced the construction industry during the 1990's:

- Complexity of construction techniques,
- Advancement in construction materials,
- Labor and unions agreements,
- Strict regulations on the environment and safety,
- Minority participation legislation and requirements (MBE, WBE, DBE),
- Procurement methods in the Federal and Public Works Sectors,
- Risk Management/Risk Allocation.

2. EMERGING MEGATRENDS FOR THE NEW MILLENNIUM

The increase in claims and litigation, along with drawback of competitive bidding, has pushed contractors and owners alike to search for alternative project delivery methods to alleviate these problems. The Design/Build method, “At-Risk Construction Management”, and the Build-Operate-Transfer (BOT) methods, have emerged as innovative alternatives to the competitive bidding method to deliver projects on time and on budget. This has resulted in a major shift in project delivery, challenging the conventional thinking, revolutionizing procurement of projects, and redefining the construction process. Emerging trends for the Twenty-First Century are: (FMI 1999).

- Paradigm shift in the project delivery system,
- Refocus on the front end and back ends of project cycle,
- The construction market is becoming a “Service” marketplace, rather than a “commodity” marketplace,
- Emphasis on life cycle costs (LCC), and total costs of a project,
- Emphasis on “value” of construction goods and services,
- Niche marketing (micro-marketing),
- Global competitions (open global economy).

3. PARADIGM SHIFT IN THE PROJECT DELIVERY SYSTEM

The construction of a project (monument) is a complex undertaking. Every project is unique, and utilizes different materials. The players are numerous, and the market is constantly evolving. As a result, the construction of a project is, at best, a “fragmented” process in a “fragmented” environment. Typically, a project is conceived by an owner, designed by architects and engineers, impacted by building officials (fire marshal, plan examiners, inspectors, etc), approved by regulatory agencies (environmental, and zoning), constructed by general contractors and subcontractors, and Maintained and operated by end users. Every step of this process is laden with risks. As parties perform their contractual duties in this process, they try to reallocate (pass-down) risks to the next party. This fragmented process, combined with the rigidly structured competitive bidding delivery method, created adversarial relationships between the owners, engineers and contractors concerned with finger pointing. This adversarial, highly charged, litigious environment has also degraded the “quality” of the product, and has contributed to the loss of its “value” to an owner (see Figure 1).

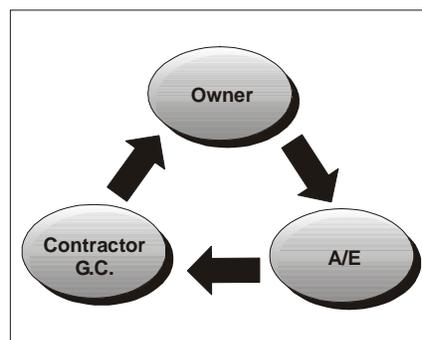


Figure 1: Competitive Bidding

In order to restore “value” and “quality” of the product, a major shift in the project delivery methods must occur. This shift encompasses the adoption of a “one-stop-shopping” concept, with a single source of responsibility, for delivering projects (whether design/build, BOT, or at-risk construction management). This concept also calls for incorporating the contractor as a “shareholder” in the entire project cycle (design and construction), rather than limiting him to the construction phase. This arrangement helps the team to focus on project success, and to benefit from the contractor’s vast experience in the design and installation of specialty systems such as, mechanical, electrical, lighting, and ventilation. As alternative project delivery methods become accepted, the distinction between architects, engineers, and contractors is fading. Alternative methods utilize an integrated process that allows contractors to participate in the design process. This participation has elevated their status to the rank of “professional service providers”, and set the stage for professional services competition, (Abi-Karam, 1999, a):

3.1 Paradigm Shift-Owners

Owners (private and public) are the driving force behind the shift to alternative project delivery methods. Public owners are increasingly under pressure to cut costs, and to deliver public services in a timely matter in order to generate tax revenues, and uphold their bond rating. In order to do that, they need to reduce their operating expenses, and most importantly, they must be able to tell their Commissions and Boards that project X will cost Y dollars and will be open by date Z. Similarly, private owners and developers also are under pressure to turnover their facilities for quick occupancy in order to ensure a decent rate of return on the investment (ROI).

The problems that characterize the competitive bidding era persist while owners are looking for more “value” in the construction goods and services they acquire. It is no longer important for an Owner only to acquire the project at the lowest price, but rather at the lowest total costs (life cycle cost) over the life span of the project. The construction of a project is no longer viewed as a single event limited to the construction phase, but rather as an evolving dynamic process that includes the front end, the construction phase, and back end of the project (See figure 2). The emphasis in construction delivery is changing from the “physical” construction of a project, toward creating long term “value” for

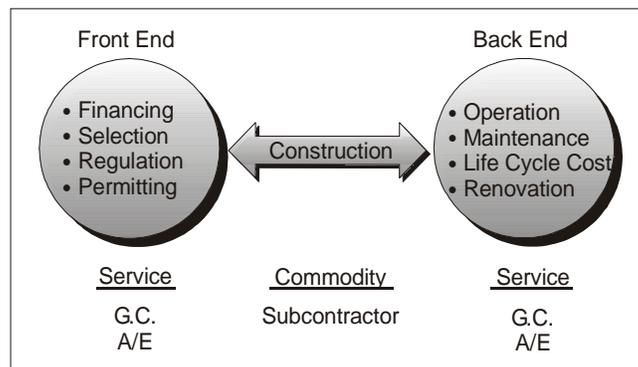


Figure 2: Paradigm Shift-Project Delivery

owners. Value creation is shifting toward both the front end (finance, selection, and regulation), and the back end (renovation, operation and maintenance) (FMI 1999). The physical construction of a project remains a commodity that can be subcontracted out, and acquired at the lowest costs. As results, owners are looking toward seeking alternative project delivery methods that encompass the entire project cycle, and for providers that can provide comprehensive services that fit their needs over a long time. This has led to “relationship contracting” and creating long term “strategic alliances” between owners and contractors.

3.2 Paradigm Shift - Contractors

General contractors recently realized that the competitive bidding method, widely used in the Public Works and private sectors, is a risky proposition with a small return on the investment. It is simply not economically viable anymore for contractors to wait for bids, and hope to be the lowest bidder. Contractors are taking the initiative, and performing market research to identify niche markets and key owners, and to provide these owners with specialized professional and construction management services that fit their needs. As a result, Contractors are looking to form long term alliances with key owners to provide them with services over a longer period of time, not just one project (strategic partnering, relationship contracting). Some of these services may encompass non-traditional services such as assisting an owner in relocating to a new market, site selection, real estate evaluation, project financing, lobbying, and permitting (See Figure 3).

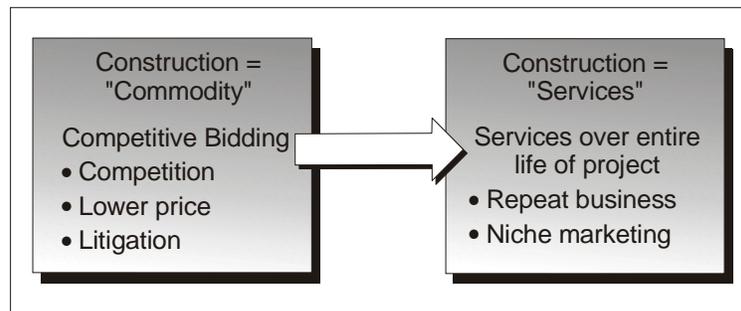


Figure 3: Paradigm Shift - Contractors

Marketing campaign's of sophisticated contractors today emphasize the "quality" of the product, the "value" of the services, "repeat business", and the invitation "what can we do for you today Mr., owner?" The construction industry is therefore modifying its image from a "commodity" market to a "service" providing industry.

3.3 Paradigm Shift-A/E Consultants

The renewed interest in the entire project cycle will present unique opportunities for A/E's and contractors to offer new services. General contractors now, are marketing professional services such as design/build, construction management, financing assistance, total program management, operation and maintenance (O&M), and renovation services. Some of the services offered by contractors are professional services that have been traditionally offered by A/E consultants for a long time. A/E consultants, faced with contractors taking away a large slice of the professional service pie, must defend their market shares, and expand their service base (See Figure 4). This expansion will require A/E consultants to add new non-traditional services specifically tailored to the front end and back ends of the project cycles. Services in these segments include financing assistance, permitting, regulatory assistance, life cycle cost analysis, operation and maintenance (O&M) and renovation services.

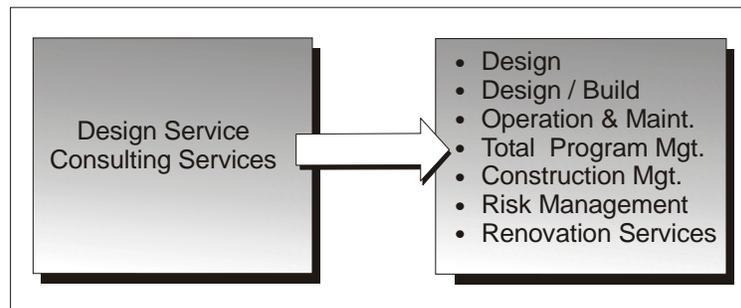


Figure 4: Paradigm Shift – A/E

4. NICHE MARKETING (MICRO-MARKETING)

Marketing professional and construction services in the new millennium is not a simple task anymore. Architects in the past have relied heavily on their reputation and name recognition to get jobs. Consulting engineers relied on the 80/20 Rule (80 percent of business comes from 20 percent of clients), to drum-up business, and general contractors fell back on low bids in competitive bidding. These techniques have worked in the past. However, recent shift in the project delivery system, and advancement in communication technology, necessitate that corporations look closely at their marketing efforts in the Twenty-First Century. As general contractors move into the professional service arena, they seize market shares from A/E consultants. A/E consultants must react in any of three ways, (Abi-Karam, 1999, b):

1. They must reinforce existing market niche (services and clients),
2. Develop marketing plans focused on client's retention (holding to market shares),
3. Restructure their organizations to offer flexibility in the people and services. (New services)

Reinforcing market niche, and devising strategies for clients' retention, will require micro-marketing to spread the message to existing clients, and existing markets about the customized service offering. To make-up lost market shares, A/E consultants must look for new areas where they may offer non-traditional professional services. These areas will encompass both the front end and the back end of the project cycle. Services in these areas include permitting, regulatory assistance, risk management, utility management, construction and program management, operation and maintenance, and renovation services. Most of these services are specialized services offered for the first time by A/E and contractors alike. As a result, these services will require customized marketing efforts tailored for that particular market segment (micro marketing).

5. EMERGING ATERNATIVE PROJECT DELIVERY METHODS

5.1 The Design/Build Method

The design/build method is an integrated, project delivery technique whereby an owner contracts with a single entity (design/builder) to deliver the project (See Figure 5). The perceived advantages of this method are (Friedman, 1984):

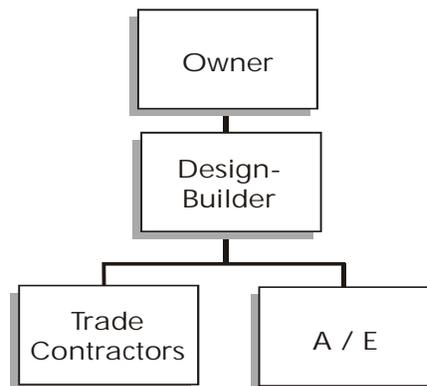


Figure 5: Design-Builder

- Selection is based on qualification, definitive performance criteria,
- Contractor is involved early in the design phase,
- Reduction in the design, and construction phases,
- Allow for a single source of responsibility,
- Elimination of adversarial relationship between contractors and A/E's.

Design/build is not a new project delivery method. The design/build method (i.e. turnkey, performance contracts, etc.) has been used for delivering domestic (pulp and paper, industrial, hydroelectric,) and international projects around the world for the last fifty years. The rapid rise in the use of design/build methods is fueled by the signing of the Federal

Acquisition Reform Act in 1996, giving federal agencies the legal authority to engage in design/build (Charles 1996). This federal reform act is further reinforced by the recent passage of local legislation in several states allowing qualification-based selection (QBS) for selecting design/build teams, as well as, architects and engineers (Florida Statutes, FS 1997). These actions have opened the door for the formal and legal acceptance of the design/build method in the public works sector. The Federal Acquisition Reform Act, and QBS legislation, changed past practices, giving municipalities legal authority to award jobs based on qualification criteria rather than low price.

5.2 The At-Risk Construction Management Method

In the At - Risk Construction Management method, the Construction Manger serves as the general contractor providing a single point of responsibility. This reinforces the “one stop shopping with a single point of responsibility” concept. Unlike the traditional role of a construction manager, and the extension-of-staff construction manager; the At-Risk Construction Manager guarantees the price of a project to the owner. As a result, he/she assumes all risks for completing the project, and thus the expression “at-risk construction management”. The perceived advantages of this method are:

- It Provides a guaranteed price for the project,
- There is no additional layer of management,
- Allows for maximum local business participation,
- This is a single source for responsibility and accountability.

6. THE COMPETITION (GLOBAL AND LOCAL)

Competition will continue to thrive in the construction industry. Major events in the world, such as, the recent collapse of the Soviet Union, the ongoing integration of European economies, the implementation of the General Agreement on Tariff and Trade (GATT), and the North American Free Trade Agreement (NAFTA), have created new opportunities for international firms to enter the U.S.A. market, and compete with local firms, (Abi-Karam, 1999, c).

The USA construction market is a sizable lucrative market, and presents unique opportunities for foreign firms to set up local subsidiaries to actively pursue work. There are indications that foreign firms have successfully penetrated the heavy civil and highways Public Works markets in California, Massachusetts, and Florida (Kajima construction, Obayashi, Oderbreck, etc.). There are also indications that European firms are targeting the residential construction markets of Florida and California. As far east market economies slow down due to currency devaluation and political unrest, large Korean and Japanese firms have branched abroad, and have carved sizeable market shares in the petrochemical, water and wastewater, heavy civil and highway segments in the middle east market. The competition for construction abroad in the international market is also intensifying. USA companies now face competition not only from large international firms, but also from local small and midsize firms, that have matured and developed, and can provide similar expertise and services. These local firms will always have the competitive edge in securing local jobs due to friendly domestic regulations and legislation.

7. MERGERS AND ACQUISITIONS

The shift in the project delivery system forces contractors, architects, engineers, subcontractors to cooperate in a joint venture arrangement offering “one-stop-shopping” with a single point of responsibility of construction services. As more projects are delivered utilizing alternative methods, it will become apparent to contractors, A/E, architects, and suppliers that it is financially beneficial if they merge into a single legal entity. These mergers will mitigate a range of insurance, liability, bonding, contractual, organizational, and legislative issues that are prevalent today. On the local scene, the merger and acquisition craze of the 1990's will continue in the A/E community. The consolidation of A/E firms allows the newly created firm to compete with international firms, reduce costs, and spread the risks among various divisions and business units. The benefits of these mergers include improvement of technical skills and competency, as well as diversification of personnel and services. Internally, a merger will allow for the development of integrated teams between various disciplines in an organization. These teams will enable large A/E firms to stay in niche markets, and to provide specialized services that bring in a much higher value of service offering to customers (higher multipliers, increase clients satisfaction, and generate repeat business).

8. RESEARCH AND DEVELOPMENT (R&D)

In order for the construction industry to meet challenges in the millennium, it must embark on an effective research and development program (R&D) to alleviate existing problems, and to catch up with the latest technical and technological advancements. The USA construction industry today, is at the same cross road that the manufacturing industry faced at the end of World War II. During 1950-1970, Japan undertook major research and development efforts aimed at improving manufacturing operation and production. These efforts paid off in the 1980's and 1990's giving Japan competitive advantages in the international marketplace. These research efforts also resulted in many effective managerial techniques such as: Quality Circles (QC), Total Quality management (TQM), Just-in-time (JIT) inventory, now widely used in the manufacturing and high-technology sectors.

Today, Japan is conducting ambitious R&D programs for improving construction productivity, construction materials, methods, and techniques. In comparison, The USA Federal government believes that construction R&D should be spearheaded by private companies, and spends small amounts of money through the National Science Foundation (NSF). Due to stiff competition in the construction marketplace, private firms spend even less on research and development. The majority of R&D in the USA construction market is conducted by the Construction Industry Institute (CII) in conjunction with graduate institutions.

Neither the government, nor private companies, can alone lead an effective R&D program. It needs to be a collaborative national responsibility that must be shared by all parties, and coordinated with the educational system throughout the country. Colleges and Universities must provide funding for building construction programs, and must overhaul their civil engineering programs to entice new quality students. Few universities offer pure "Building Construction" programs on the undergraduate and graduate levels. This forces construction companies to hire graduate civil engineers, and train them for careers in construction.

9. CLAIMS AND LITIGATION

The new millennium has ushered in new integrated project delivery methods such as Design/Build, At-Risk Construction Management, and Built-Operate-Transfer (BOT) methods. There are two points-of-views regarding claims and litigations under these methods. Proponents believe that alternative delivery methods eliminate the adversarial relationships between the parties, and reduce claims and litigations. Advocates of litigation, led by aggressive lawyers, believe that alternative delivery methods merely rearrange the players and associated risks in the construction process. Therefore they do not see a reduction in claims or litigations. In fact, they believe that claims and disputes will increase due to larger, more complex projects undertaken, and due to the competitiveness of the marketplace and lower profit margins. Regardless of one's point of view, the use of alternative dispute resolution (ADR) methods, which is highly favored and advocated by courts and judges, along with a shift in project delivery, will theoretically reduce construction litigation. This is due primarily to the high cost of lawsuits, Pre-qualification by the owner, and the emergence of relationships contracting.

Trends in construction claims indicate that the bigger and more complex the projects are the larger the claims. Also, there are more claims in the Public works construction than there are in the private construction. Private owners of large industrial and commercial projects tend to know more precisely what they want at the onset of a project, and there are fewer changes during the construction. In contrast, Public owners have the need to exercise control over the project, and they initiate more changes.

Trends are also showing a sharp increase in the value of claims. This is primarily due to the fact that contractors, who often initiate these claims are turning to soft-dollars cost claims such as extended overhead, delays, disruption, loss of productivity, and loss of use. Most often, these soft costs are unique to the contractors, and are hard to verify by the owner due to lack of standardization in these areas. Claims based on hard-dollars costs such as variation in the quantities (extra concrete, steel, bolts, etc.), will generate limited revenues since prices are fixed in comparison with soft cost claims.

10. SAFETY

There has been some measured improvement in construction safety in the last decade. Several landmark court cases along with better training, improved safety devices, and employee demands for safety, have increased awareness of safety in construction. However, gains, and improvements in safety will be minimal and incremental in the next 10 years. This is due primarily to lack of a heavy handed enforcement by the Occupational Safety and Hazard Administration (OSHA), reluctance of owners to sponsor training and safety programs, the risky nature of the construction work, and high insurance costs.

11. CONCLUSION

Construction in the Twenty-First Century will be characterized by Innovation, Integration, and internationalization. Innovative project delivery methods continue to redefine the construction process. There will be more integration of people and services in construction and engineering. Alternative delivery methods integrate design, construction, and operation & maintenance phases of projects. In order to offer integrated services, engineering and construction firms will continue to consolidate their talents and expertise through mergers and acquisitions to offer one-stop-shopping, of services. Expansion of the open global economy will allow firms to compete and offer personnel and services anywhere at any time.

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