Architecture – Little "D" and Big "D" Design

Larry R. Barrow, AIA, D.Des.
Mississippi State University
College of Architecture, Art and Design
Barr Avenue, Giles Hall - Office 247
Mississippi State, MS 39762
USA
E: lbarrow@coa.msstate.edu

ABSTRACT

This purpose of this paper is to assess the current state of technology impact in architecture and gain insight into possible emerging practice and educational opportunities.

The intent of the literature review was to gain a sense of the evolution of the architect, both as designer and process manager through history. Initial reviewed sources focused on the architect in history (Smith, Harvey, Kostof, Gothwaite and Burns). Thereafter, additional readings included architects in the modern era (i.e. 20th century – Gropius and LeCorbusier). Further investigation looked at technology infusion in the related fields of the marine, aerospace, and automotive industries. A spin out of this research lead to further reading in the areas of management theory and principles of organizational strategy with a focus on process and change management for the purposes of leveraging technology. The literature review revealed limited technology and management research relative to technology in architecture and construction; however, a plethora of sources were found relative to technology impact and management strategies in related manufacturing fields.

Additional primary source data was compiled via two (2) architectural project case studies that are technology centric. Other underpinning primary evidence was provided via interviews and conversations with relevant organization and institutions representatives pertinent to the profession of architecture.

The research findings indicate the profession of architecture is slowly mutating through process and product change of significant impact on a scale arguably similar to that of the Renaissance. During the Renaissance the master builder and the guild workshop system were denigrated; this ultimately resulted in the process of architecture splitting (fission) into the two primary fields of design and construction. In the contemporary context, the research indicates the act of architecture is increasingly considered as a holistic issue of design-construct-operate. The research findings indicate that technology evolution and congruent management organizational models are increasingly integrating (fussing) collaborative design-construct-operate specialists in the process of making architecture. This evolutionary trend requires a management "hub" firm; will this void be filled by architects, engineers, builders or managers? How BIG will architects define 'design' in the future?

1. THE ARCHITECT'S ROLE

1.1 The Master Builder Revisited

I claim the *Master Builder* is re-emerging as a dynamically networked specialized team of design and construction specialists. Bi-lateral knowledge exchange, enhanced with emerging information technology strategies, is occurring between owners, architects, builders, engineers, and a plethora of design consultants as well as machines. This emerging 21st century *Master Builder* is not a literal individual, as seen in the historical craftsman guild of antiquity; but rather, the emerging 21st century *Master Builder* is a group of knowledgeable design-construct-maintain specialists who are networked via the global internet and an information management "hub" firm.

1.2 Little "d" and Big "D" Design

The emerging professional practice environment may require reevaluation of the role of the architect as a "design-specialist" or project-leader "integrative-generalist. Technology continues to disrupt architecture, resulting in increased design-build specialists, project delivery compressed time frames, as well as higher client demands and user expectations for performance and quality. Hence, I have coined the phrase "little d" for the former concept of design as an 'aesthetic' exclusive driven process and "big D" for the latter concept of design as a 'holistic' inclusive driven process.

2. THE RESEARCH FINDINGS

2.1 Overview

I offer as evidence substantiating findings from the research of the architect in history as well as contemporary findings extrapolated from research of contemporary manufacturing industries. Additional research findings include data analysis of nationally recognized organizations and governmental agencies. and supplemental observations and interviews of specific key individuals in design-build-manufacture industries. Additional research, specific to architecture, were two (2) architectural project Case Studies in which Frank O'Ghery and Associates (FOGA) were the design architects.

3. BACKGROUND

3.1 Project Delivery Evolution

Over the last two decades, numerous alternative project delivery models and competitive players have emerged in the architectural industry. Additionally, new forms of architectural practice and service areas are expanding (Baker, 2000). Often architectural firm's partner with the owner's external Construction Management firm, under various project delivery models, where the architect's role and project control is diminished (Barrow, 2000).

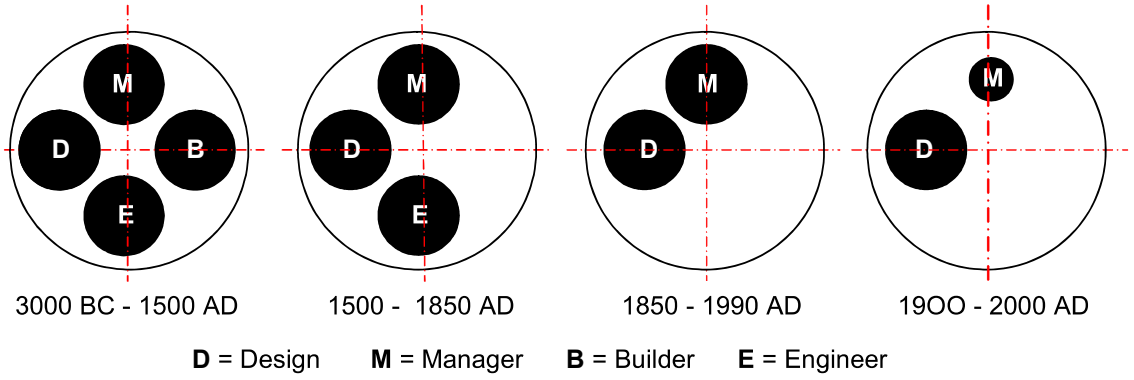

Fig. 1 Evolution of the Architect in History (Barrow, 2000)

4. THE ARCHITECT IN HISTORY

4.1 Early Antiquity

Ancient Egyptians were highly organized and engaged in meticulous *planning and design* (Smith, 1996). Imhotep, the immortalized Egyptian architect, is credited with inventing the means of cutting and placing large stones, which enabled the new architectural expression in the pyramid form. The title of architect was equated with *Master Builder* and "overseer of works"(Kostof, 1977). The research indicates the Egyptian architect was typically designer and builder; we find this similar project delivery principle of integrative design-build as well in Greek and Roman culture (Harvey, 1971, Kostof, 1977).

4.2 Emergence of the Renaissance Designer- Artist Architect

During the Renaissance Alberti argued “architecture had nothing to do with construction (Kostof, 1977).” Alberti, an upper class humanist architect, sought to separate the architect's identity from the lower class craftsman master-builder. Consequently, the master-builder function was slowly decomposed into 1) theoretical-artist architect, 2) practicing architect, and 3) mason-builder. As a final result, the implicit knowledge of the estranged craftsman was cut-off from the initial design process. Thus, due to the shifting roles of the architect, we find an increase in the design architects originality and creativity; however, the role of the architect diminished as process integrator. This was the birthplace of the modern architect.

4.3 The Modern Architect

Walter Gropius foresaw specialization as an inherent consequence of evolving technology. Gropius’s theory focused on two fundamental principles, *unification of diverse skills and collaboration of diverse individuals*. Gropius essential theme was *unity of purpose*, thus, promoting design for the needs of society.

Thus, for Gropius, the role of the architect was to be a **"coordinator"** who would "unify the many social, technical, economic and artistic problems," and in this way the modern architect was reconnected to the integrative role of the past master builder architect, in the words of Gropius,

> The historical mission of the architect has always been to achieve the complete coordination of all efforts in building up man's physical surroundings" (Kostoff-p.76);

> and "in all great creative periods, architecture, in its highest embodiment has been the dominating mother of all the arts, has been a social art" (Kostoff, 1978).

Diminution of the role of the individual designer is an inherent consequence of collaboration, Gropius felt that it was *subjective individualism* that lay at the root of the problems of modern design education, for "only the collaboration of many can succeed in finding solutions which transcend the individual aspect"; thus, immortal works of art would be the product of the *group*, not of the individual."

5. ARCHITECTURE AND DESIGN

5.1 Architecture

Modern dictionaries define architecture as "the art and science of designing and erecting [constructing] buildings." Therefore, mainstream society includes construction as an integral component of architecture.

5.2 Design

Modern dictionaries define design as "the act of making a plan." For the sake of our discussion and argument, the question is, how **BIG** is the plan?

5.3 Construction Design

Pollalis and Banos (1988), in their assessment of technology impact and process management in architecture, argued design decisions occur in all phases of the act of ideation and making. Accordingly, Pollalis and Banos coined the terms "Conceptual Design," "Design Development," and **"Construction Design."** Further, Pollalis and Banos argued design and construction cannot, and are not separate acts or processes.

6.0 MACRO FINDINGS

6.1 The General Services Administration

Many felt collaborative design-build project delivery models would remain in the private sector and not transfer to the public sector; however, governmental agencies are increasingly pursuing design-build-operate project delivery models. Numerous publications, to include the AIARCHITECT, have documented this migration of attitude and goals of the largest real estate owner in the US, the Federal government's General Services Administration (GSA). The GSA is now researching and implementing pilot projects regarding collaborative design-build with the intent of finding a project delivery method which improves design quality while establishing cost, scheduling, performance and long-term operational expenses. Thus, even in the public sector, architecture is experiencing shifts in fundamental process.

6.2 Construction Cost and the American Institute of Architects

In 1997, the AIA conceded to decades of public and legal pressure to assume responsibility for the owner's budget. Consequently, we now find many firms abandon the role of "fiduciary agent" for the client to lower risk.

6.3 The Design-Build Institute of America

Further evidence for the claim is offered; data obtained from the Design Build Institute of America (DBIA) indicates that in 1985, traditional design-bid-build project delivery accounted for 87% of all non-residential construction, in 2000 design-bid-build project delivery accounted for 54% of the market, with other collaborative-integrative project delivery methods being responsible for 46% of the market. The research indicates a slow shift continues in project delivery methodology from traditional design-bid-build linear process to collaborative design-build project delivery models (see Figure 2).

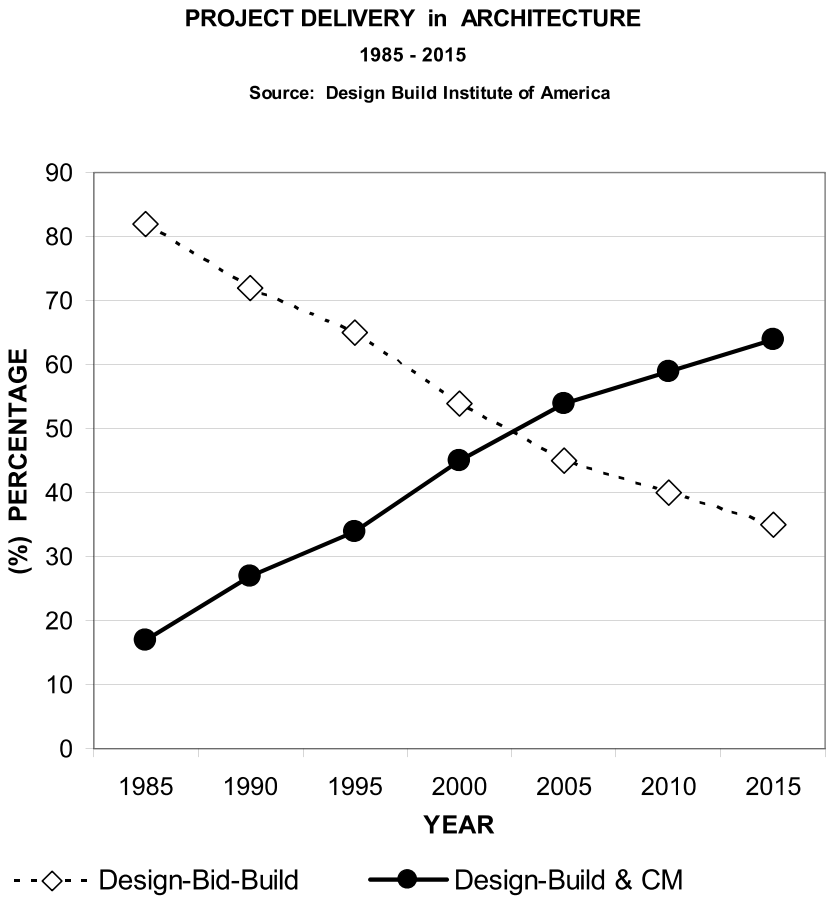

Fig. 2 Shift in Project Delivery Methodology (DBIA / Barrow, 2000)

The Design-Build Institute of America (DBIA) was founded in 1993; the following is a summation of DBIA goals:

1) The integration of services, in the process of architecture, via the promotion of a "single-contract" entity.

2) The promotion of innovative design and management techniques using empowering "information-age management techniques" to control the process of architecture.

3) "Remaking the image" of America's construction industry.

Additionally, the research indicates some progressive general contracting firms have migrated into pure management[83], verses construction, and have been early adopters of technology. Further, they view technology as a competitive differentiator as consultants to the owner; and they now envision themselves as *professionals*.

6.4 Manufacturing Industries and Technology

Experts in the related automotive and aerospace industries, that are much more mature relative to technology implementation than architecture, argue that *mission and organizational issues* are much more important in the implementation of technology strategy than *technical* issues (i.e. hardware & software) (Tushman, Nori, Monger, 1988). Furthermore, experts in the management field maintain that in the current context of decomposed large organizations into smaller micro firms that allow fast-track Just-In-Time (JIT) processes, the need for a "Hub" management firm is absolutely essential to maintain equilibrium of the system.

7.0 FOGA CASE STUDYS

The case studies are comprised of two Frank O'Gehry Associates (FOGA) projects; the Disney Concert Hall (circa 1988) and the Bilbao Guggenheim Museum (circa 1992). A summation of comparative findings follows.

7.1 The Disney Concert Music Hall

In the case of the Disney project, the County of Los Angeles administered the project through the Walt Disney Concert Hall Committee (WDCHC) which was comprised of appointed members. The WDCHC utilized multiple layers of Project Managers and General Contractors teamed with FOGA, the design architect, and Dworsky Associates, the Executive Architect. Ultimately, no one took responsibility for Cost and Schedule and the project went out of control resulting in extensive delays and disappointment to the Disney family. Mrs. Disney, the primary benefactor who donated fifty million dollars in 1988, passed away without seeing or hearing her dream. Additionally, multiple lawsuits ensued among the professional team and bad publicity abounded for most of the duration of the project. The project was ultimately completed in 2003; however, simply stated, the pursuit of aesthetics drove the project. There was no management Hub firm or Executive Architect who took responsibility for the comprehensive needs of the client relative to Cost and Schedule.

The writer interviewed the Executive Architect, Dan Dworsky, his final summation of the Disney project was that following his Disney experience, "he preferred to act as both designer and Executive Architect and he would not recommend a 'limited' responsibility role to other architects where they had no authority relative to budget and schedule control.

7.2 The Bilbao Guggenheim Museum

In contrast to the Disney Concert Hall, the Bilbao Guggenheim Museum was completed on time and budget. A very tight streamlined organizational management model was formed by the owner as the Basque government hired Juan Vidarte, an MIT Sloan School of Management Ph.D. graduate, *who had never built a building*, as the Director of the Consorcio Guggenheim Museum (CMG). The CMG administered the project and managed the entire design-build (architecture) process. IDOM, a local architect/engineering firm, with extensive industrial project experience, was hired as the Executive Architect. IDOM accepted contractual responsibility for the project cost and schedule as well as interfacing between FOGA - the design architect, and seven (7) prime contractors. Most notably, **NO** General

[83] Examples - John Tocci , Tocci Builders (interview) and William Berry of W. A. Berry & Sons, Harvard Design School course visiting lecturers.

Contractor was involved. IDOM negotiated directly with the persons who would build the building. FOGA provided 80% working drawings and IDOM completed the final details using input via collaboration with the seven (7) prime contractors.

The writer interviewed the CMG Director, Juan Vidarte; he indicated he told Frank Gehry he wanted his “best building, as long as it met IDOM’s [the Executive Architect] cost and schedule requirements.”

7.3 Disney and Bilbao – A Comparative Study

Comparatively, the Disney Concert Hall cost 110% per Square Foot (SF) more than the Bilbao Guggenheim Museum and took 150% longer to complete, even though Bilbao was 10% larger and utilized a more expensive titanium skin. The primary difference between these two projects was the owner’s organizational and management model and the role played by the Executive Architects relative to process management.

In the case of the Disney Concert Hall the Executive Architect, Dworsky Associates, was hired with no authority and were to just “draw the plans for FOGA.” In the case of the Bilbao Guggenheim Museum the Executive Architect, IDOM, was hired by the owner (CMG) with complete responsibility, and associated authority, for Budget and Schedule control; thus, IDOM acted professionally as the owner’s fiduciary agent. Additionally, In the Bilbao project, the CMG, directed by a non-architect and non-builder PhD Manager, Juan Vidarte, acted as the key player in managing ALL aspects of the project process.

8 SUMMARY OF FINDINGS

The research indicates that through most of history, the architect has been responsible for the design and construction process. Only in modern times do we find the decomposition of the master builder into specialized roles. In the modern era, Gropius foresaw the evolution of specializations driven by technology, and he felt the architect should be a generalist who collaborated and managed a diverse team of experts as a means of accomplishing architecture.

The research indicates owners increasingly want quality design, on time and budget with long term operating efficiency. The balancing of the complex "system" of the *process* of architecture requires extraordinary management skills. The research indicates there are no clear paradigms at this time; moreover, the research indicates that during the recent period of owners increased management demands, many architectural firms have chosen to defer “risks” to other emerging “professional” entities (i.e. project managers and contractors).

In this seemingly dilemmatic posture for the architect, where we see change and chaos, is there opportunity for reinvention of the profession and practice of architecture? It maybe that it is now time for the “architect” to once again be split into another “specialist.” Many terms are emerging that hint at the future, some experts see the emergence of a Building Information Management (BIM) “hub” firm which may act as a central management firm that will manage the entire process of design-build-operate (big “D” design – comprehensive). Yet others claim this is not the appropriate role of the architect and we should remain focused on “design” (i.e. little “d” – aesthetic driven). It maybe that our educational model needs to address specializations and offer “advanced” focus areas; in this manner, the truly gifted “designer” would be all the more empowered to be a “creative artist” and pursue intuitive “beauty.” Other students, of a contrasting gift, could be educated to fill the need for “rationalization” of architecture and fill the need for central process “hub” management. Based on the research, we should expect various types of design and practice models to emerge at an increasing rate, and one can not say what is right or wrong for the individual architect or firm. Rather, the talent and aptitude of the individual architect should drive the career choice of the architect. The large question remains with the jurisdictional organizations as to the breadth of choices available in the professional architects educational, licensing and

practice alternatives. Additionally, we may anticipate new educational and practice models to emerge in the mist of chaos and change in architecture.

The Bilbao Guggenheim Museum project provides a "real world" prototype. FOGA acted as the conceptual "design" firm, IDOM acted as the Executive Architect "DESIGN" firm under the auspices of the owner's non-builder MIT Ph.D. Director/Manager Juan Vidarte. This project posse as many questions as it does answers; can the profession of architecture learn from and leverage this organizational model in the future?

The emerging 21st century *Master Builder* is not a literal individual, as seen in the historical craftsman guild of antiquity; but rather, the emerging 21st century *Master Builder* is a group of knowledgeable design-construct-operate specialist who are networked via the global internet and an information management "hub" firm. Who will fill the role of the "BIG D" **design** management "hub" firm?

References

American Institute of Architects. (2000-2002). AIA Firm Survey - Economics and Market Research. Washington, D.C.

Baker, Kermit. AIA Chief Economist. (November, 1997). Architecture Firms Continue to Redefine Themselves. Washington , D.C. AIArchitect.

Baker, Kermit. AIA Chief Economist. (June, 2000). How the Business of Architecture is Changing. AEC/IS Roundtable. Washington, D.C.

Barrow, Larry R. (2000). Cybernetic Architecture – Process and Form – The Impact of Information Technology. Dissertation. Harvard Design School. Cambridge, MA.

Burns, Howard. (1993). Building and Construction in Palladio's Vicenza. GSD News - Harvard University, Graduate School of Design 1993 Winter-Spring. P. 12-13. Part of a chapter published in Les Chantiers de la Renaissance.

Goldthwaite, Richard A. (1980). The Building of Renaissance Florence - An Economic and Social History. The John Hopkins University Press - Baltimore and London.

Harvey, John. (1971). The Master Builders - Architecture in the Middle Ages. McGraw-Hill Book Company - New York.

Kostof, Spiro. (1977). The Architect - Chapters in the History of the Profession. New York, Oxford University Press.

Monger, Rod F. (1988). Mastering Technology - A Management Framework for Getting Results," The Free Press - A division of Macmillan, Inc. 866 Third Ave. - New York, N.Y. 10022.

Noori, Hamid (1988). Managing the Dynamics of New Technology - Issues in Manufacturing Management. Prentice Hall - Englewood Cliffs, New Jersey.

Pollalis, Spiro N. & Bakos, J. Yannis (November, 1987) A Framework For The Design Process,. No. LCT-87-2. Laboratory for Construction Technology, Graduate School of Design - Harvard University.

Pollalis, Spiro N., & Bakos, Y.J. (1994). Technology in the Design Process . Journal of Architecture and Planning Research.

Pollalis, Spiro N. (1995). Information Technology: A New Source of Empowerment for Architects Harvard Design School.

Smith, Craig B., P.E., PhD. “Program / Construction Management in 2550 BC: Building the Great Pyramid at Giza,” *1996 Program Management B.C.*, June, 1999 - Civil Engineering - pg 34-41.

Tushman, Michael L. (1988). Editor, "The Management of Organizations: Strategies, Tactics, Analyses.Graduate School of Business - Columbia University, Charles O'Rielly - Graduate School of Business - University of California, Berkley, David A. Nadler - Delta Consulting Group, Harper & Row, Publishers, New York, Ballinger Publishing Company