Elitism, IT and the *Modern* Architect Opportunity or Dilemma

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Abstract

Information Technology (IT) is impacting architecture dramatically in process and form. Often the current transformation of architecture is difficult to analyze and frequently we see confusion and anxiety regarding uncertainties for the future of the architect as designer and project leader. The current potentiality for new exotic form (i.e. product) is mesmerizing; however, in the current context, less obvious issues and pertinent questions are emerging for the profession. What is the mission of the profession? What will keep us relevant in the mist of the new global society?

In this paper, we will take an evolutionary perspective of technology in architecture and draw parallels between the Renaissance, which is the genesis of the modern architect, and the contemporary state of architecture. The modern architect was birthed during the Renaissance where we see the retraction of the architect from the building site and separation from direct involvement in the building process. Communications technology (i.e. representation in the form of free-hand drawings, mechanical 2D orthographic drawings and 3D perspectives) enabled the decomposition of the master builder into three components (i.e. artist-designer, practicing architect, and builder). Thus, we see technology enable the denigration and ultimate dissolution of the centuries old craftsman guilds and the master builder. The technology evolution of “drawings” enabled monumental change in the process of architecture over the past five hundred years. The fission of the master builder, enabled by “drawings”, resulted in disparate factions which are the forerunners of the modern day litigious design-bid-build project delivery. We now increasingly see a return to the fusion of design and building where often the architect is not the project manager or leader. Thus, the question looms, will the 21st century architect lead or be led, and what are the ramifications for the profession?

The historical *Master Builder* is re-emerging as a dynamically networked team of design and construction knowledge specialists. Bi-lateral knowledge exchange, enhanced with emerging IT, is occurring between owners, managers, architects, design specialists, engineers, builders and machines. Technology is disrupting architecture, resulting in increasing specialization and compressed time frames, and may require reevaluation of the role of the architect as project-leader "integrative-generalist" or "design-specialist".

Conclusively, the concept of ‘cybernetic architecture’ is proposed as an IT reference framework. Failure to appropriately respond to societal evolution, driven by technology, could result in the loss of professional status for the modern architect. Herein lies our dilemma, or opportunity, depending on the role choice of the *modern* architect.

1 Introduction

Formal architecture has traditionally been an *elite* activity isolated to the rich and ruling; today's *modern* architect is a product of this evolutionary heritage. *Vernacular* architecture has traditionally been an activity of the *masses*, the poor and powerless. Here the designer and builder are typically synonymous with the owner/user. Simplicity in form, efficiency of materials, and limited material pallets have at times resulted, by formal analysis of "modern architecture”, in a thing of simple, functional, efficient beauty. This is to say that design and artistic expression are not isolated to the formally trained architect or the elite.

2 Political Order

Political and social order are fundamental dictates for all sectors of society. All hierarchical centralized social ordered cultures have evolved to physically manifest their accomplishments in city centers and symbolic works of architecture. Ruling class kings, queens, and priests have dictated formal architecture to reflect the aspirations of the dominant society. Within this context, the business elite have been major clients for commercial architecture as required for commerce and business activities of the society. This is to say the role of the architect, and the expression of formal architecture, has been dictated from a *centralized* hierarchy of *elite* power.

3 Technology

Technology is power. Typically, rulers and warriors have been synonymous with knowledge, power, and technology. Often technological advancement is the result of military tactical research spin-off. Hence, knowledge and technology are integral to power and, thus, is integral to the reflection of a society at a given point and time in history.

The greatest technical invention of the pre-20th-century period was the print press, which allowed the mass production of books. The mass production of information, knowledge - thus power, took centuries to trickle down to the masses. The dissemination of information to the masses, via books, has resulted in a shift in knowledge and power to a larger segment of society. This is the predecessor to 21st century social and political context. How much more so should we anticipate the de-centralization of knowledge and power in the emerging technological context. The computer and Internet have already resulted in profound transformations for the world. Are we at the apex of change? Should we anticipate accelerated impact on the process of architecture?

Early architectural computing theoreticians envisioned the *rationalization* of the design and manufacturing process (Alexander 1964, Rudofsky 1964). However, limited data processing capability, and the inability to quantify complex *intuitive* attributes of the designer and design process participants, has deterred the migration of the computer into the early phases of conceptual design (Huang 1998).

Andy Groove, former Intel CEO, predicted that Intel would ship a processor with one billion transistors in 2011, which is in line with Moore's Law. Other industry experts see silicon technology reaching its physical limits around 2017. The implications of the continued viability of Moore's Law are profound. In addition to the fact that our increasingly computerized economy will become even more productive, other technologies such as voice recognition, virtual reality, and artificial intelligence begin to appear possible and applicable in critical mass. Should Moore's Law somehow survive on into 2030, the processor would then surpass the computational power of the human brain (see Figure 1).

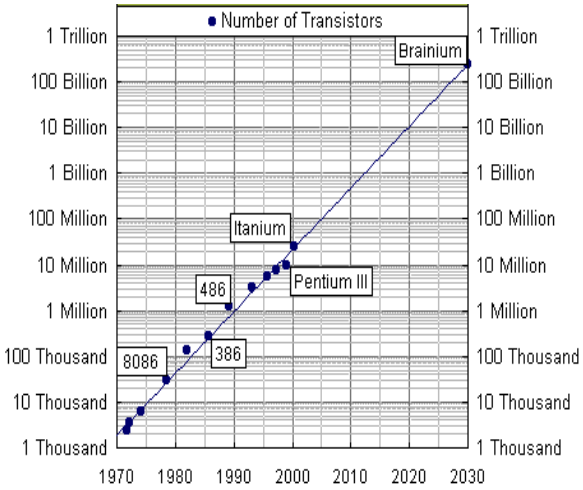


Figure 1 Source: chartofthe day.com and Intel, 2000

4 Political Order

The world has never known the current level of communications connectivity. Physical and metaphorical walls are coming down. Communication technology is driving immediacy, transparency and inclusiveness. In America, and increasingly around the world, we have a major middle class society, which historically the profession had not encountered. It is this unfamiliar turf which has been most perplexing to the *profession*. This is to say the role of the architect, and the expression of formal architecture, is being pushed and pulled by two major forces - the traditional sector of the *elite,* which demands monumentality, originality, and often gestural opulence; and the unfamiliar lower and middle class vernacular *masses* which need functional performance and efficiency (see Figure 2).

Some would argue the vernacular sector of society is not part of the equation for the formal expression of architecture, thus rendering the needs of mass society as irrelevant to the discussion of architecture. This argument is invalid as long as one speaks of the *profession* of architecture. Society has not asked us to be a profession; rather, it was architects who pursued formal recognition as a profession. After centuries of identity crisis, late 19th and early 20th century architects argued that we should be the protectors of the environment and the "general welfare" of the public. After 4900 years of recorded history, the architect was finally, first in England and then in America, recognized as a professional. So the proponent of an elitist perspective of architecture is inherently, either consciously or sub-consciously, a proponent of the pre-20th century role of the non-professional architect who served the elite. The elitist proponent remains aloof to the fundamental ethics by which we became *professionals;* and thus, by deduction, do not wish to be *professional* architects.

Can we as a profession, in the emerging, technology driven political climate of transparency and accountability, maintain a stance for "professional" protection by formal political legislation? How many in the *profession* really care about formal recognition as a *profession*? Is this really a pertinent issue?

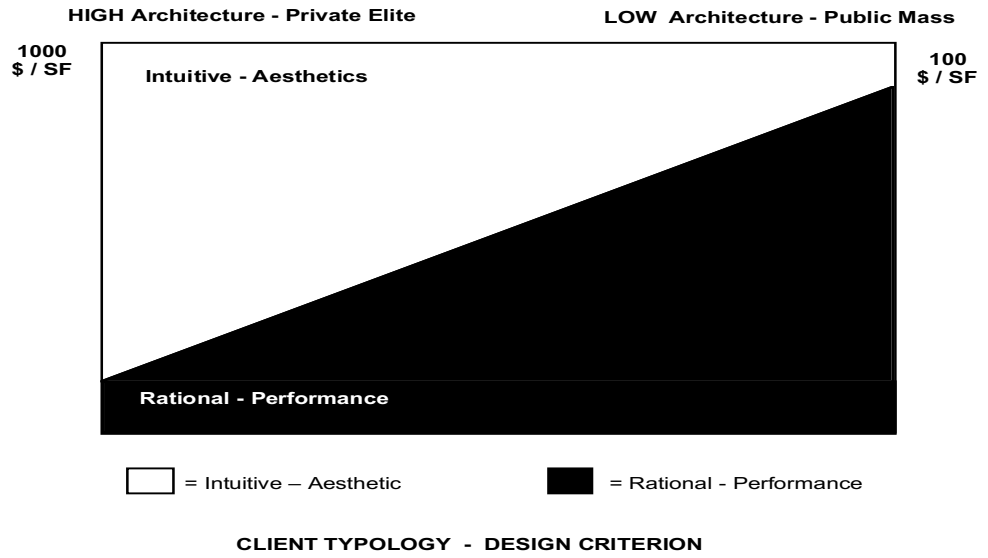


Figure 2

Rules of society and business have changed. The current international political, business and professional scene are directly related to the ability of the world masses to observe, communicate and require respective performance. IT, not nuclear technology, is shaping the face of the social, political and business environment of the globe. The architectural *profession* may have to address broader societal needs to remain relevant in a world society that is rewriting the rules of the marketplace.

5 Current Context

Many nineteenth century architects were skeptical of technology, often viewing technology as a threat to traditional classical forms of architecture. Thus, two of the most famous structures of the 19th century, the Eiffel Tower and Crystal Palace were designed and built by engineers (Mostafavi and Leatherbarrow 1993). Accordingly, early twentieth century architectural theoreticians adopted industrial *manufacturing technology* as the under-pinning for the Modern Movement. Walter Gropius envisioned the architect as the generalist integrative design leader in an increasingly technological society of evolving complexity and specializations (Kostof 1977). Industrial era technology resulted in the fusion of *process and product* design, resulting in *man and machine* manufacturing affordable new products for the masses of industrialized societies (Ford 1990).

IT is forcing new project delivery systems requiring obliteration of traditional practice and project delivery[6]. We now see diminution of the architect as *fiduciary-agent* for the owner, and certain unknown risks are inherent in the emerging impact of technology in architecture. In the current context of technology disruption and increasing specialization, the architectural profession may need to clarify practice values and professional ethics as a prerequisite to evaluating contemporary vision and mission.

IT is enabling new architectural *form*, which is visually obvious in the *physical* model and built artifact, much less obvious is the generation of new project delivery models and long-term practice implications for the profession of architecture. Thus, IT may result in a greater impact on the *profession* of architecture in the area of information management, communications, project delivery, role definitions, identity, and inter-organizational structure (i.e. *process*) than in the physical artifacts (i.e. *products*) of architecture.

Some progressive traditional general contracting firms have migrated into pure management, verses construction, and have been early adopters of technology. Further, they view technology as a competitive differentiator as consultants to the owner, additionally; they now envision themselves as *professionals* who add value to the early design phases to protect the interest of the owner. They aggressively use extranets, and other technologies for empowerment (Castle 1999, Barrow - Huibrejts 2000).

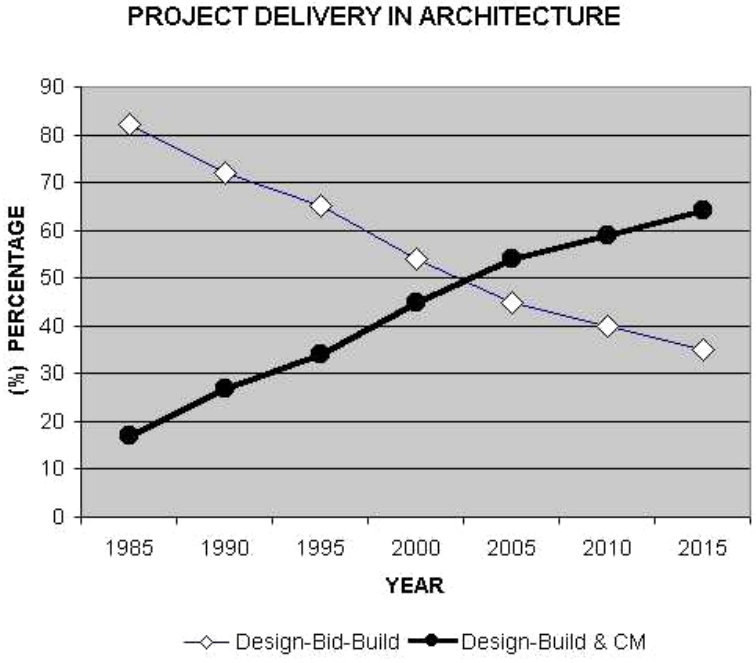


Figure 3 (Source: Design Build Institute of America – Susan Williams - September 2000).

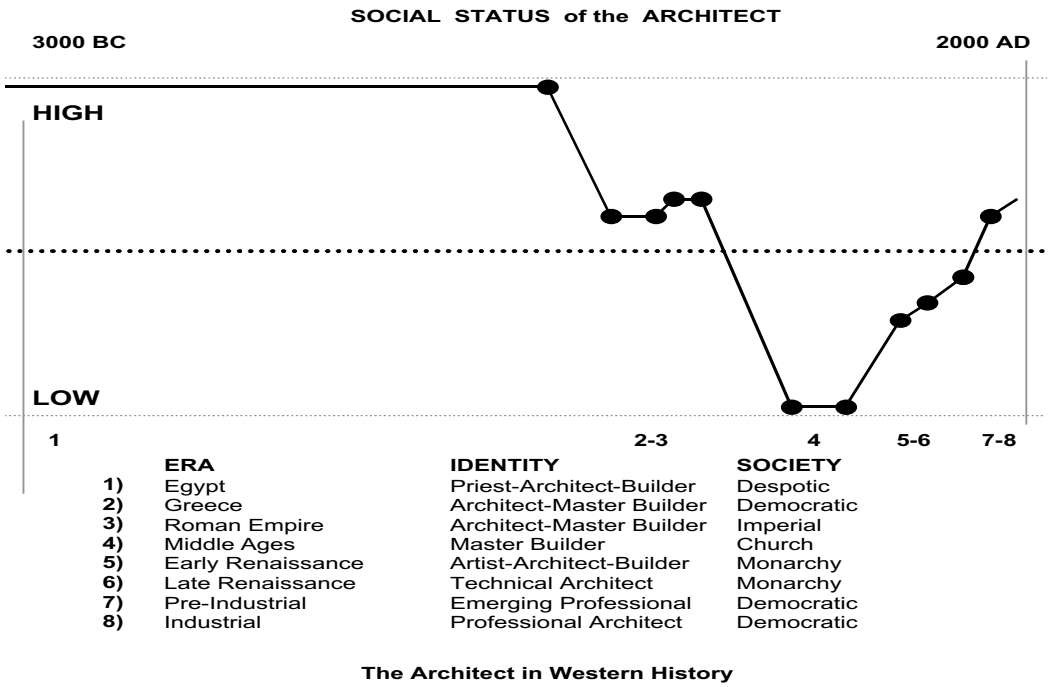


Figure 4

Data obtained from the Design Build Institute of America indicates that in 1985, traditional design-bid-build project delivery accounted for 87% of all non-residential construction, in 2000 it accounted for 54% of the market, with other collaborative-integrative project delivery methods being responsible for 46% of the market, thus, we see a dramatic shift in project delivery methodology (Barrow, 2000). Further, design and construction (architecture) experts project a continued increase in integrative design-build project delivery methodology (see Figure 3).

What does this mean? Is this a new phenomena? What is the heritage of the *modern* architect? The following section will provide a backdrop to the issue of identity and roles as a prelude to further discussion of the mission and vision of the contemporary *modern* architect.

6 Background

This section we will review the evolution of the western architect and technology in history. The focus on the western architect is attributed to the limited education of the writer and framing of the research scope. Secondly, broad generalizations have been made to extract key-points relevant to our discussion; certainly, exceptions exist to the general typologies proposed. The diagrams are provided as a summation of the *essence* of each depicted time period.

6.1 The Architect and Technology in History

The historical master builder-architect was designer, manager, builder, and engineer and was often of the working lower class (Kostof 1977). Figure 4 depicts the architect's social status in history.

The integrative knowledge required for the *process* of architecture was included in the individual "generalist" architect-master builder who had evolved through and trained in the traditional guild system. The architect-master builder collaborated with fellow artisan/craftsman guild cohorts for the realization of architecture (Gothwaite 1980). The Pre-Renaissance architect used limited 2D and 3D representation; thus, the primary means of accomplishing architecture was on-site verbal communication and full scale

layout in the field with craftsman cohorts (i.e. stonemasons and carpenters). This required the architect to be onsite and produce one project at time. Further, the process of work (i.e. design, craftsmanship and building) depended on tacit knowledge of "in-formal" networks within the mason-craftsman guilds. Thus, the historical architect (master builder) was a builder and relied heavily on direct physical contact and on-site verbal communication with fellow craftsmen (see Figure 5).

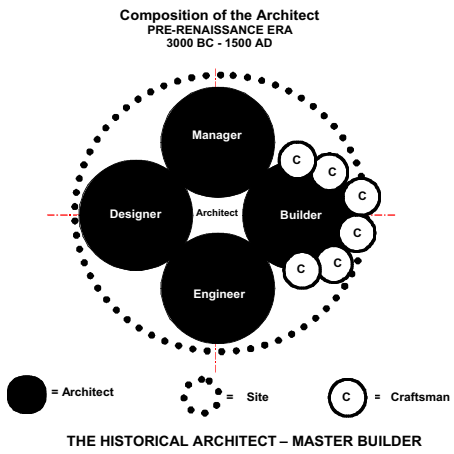


Figure 5

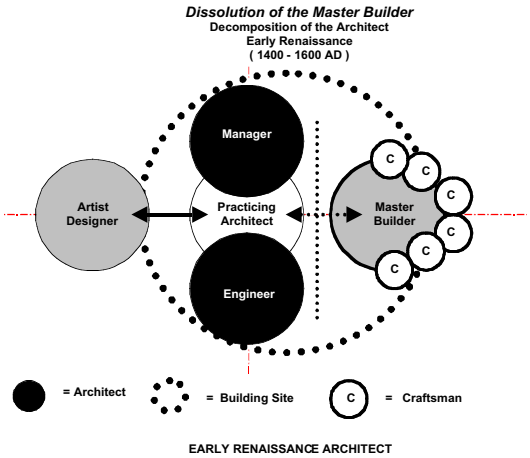


Figure 6

During the Renaissance, Alberti's treatise claimed, in an effort to elevate the status of the architect from the low class master builder, "architecture had nothing to do with building" (Kostof 1977, Gothwaite 1980). The master builder-architect was slowly decomposed into artist-designer, practicing architect, and mason-builder. Predictably, conflicts existed between the mason's guild and the emerging architect. The decomposed master builder collaborative team of designer-architect-master mason was responsible for many of the great buildings of the Renaissance (see Figure 6).

During the Renaissance, humanist owners were seeking *originality* and felt the traditional master builder was trained for repetition of past forms. Therefore, the cultural context dictated focus on "design" as a separate "artistic" concern from the process of building, thus resulting in "creative innovation" and an "identity-crisis" for both builder and architect. Most "designer-artists" had no construction and technical knowledge; thus, they provided conceptual and schematic design drawings for implementation by the practicing architect and mason-builders. With the slow disintegration of the traditional guild system anyone could, and did, call themselves 'architect'. During the Late Renaissance architect's refocused on "technical" issues in order to obtain differentiation from the "artist-designer" in an effort to regain some claim to *"professional"* autonomy during the Pre-Industrial and Early Industrial Era (see Figure 7).

Following the Renaissance, formal *drawings* slowly became the primary means of communication between the owner, architect and the builder/craftsman. Thus, the evolution of the technology communication tool contributed to the growing barrier between the architect and builder. Some of the in-formal knowledge network remained from the traditional master builder and craftsman guild system. Mid-nineteenth century demand for mass "commodity" housing in industrialized England created the "lump-sum-low-bid" single-source General Contracting methodology. The architect was cut off from informal and formal contact with the craftsman, thus consummating a formal barrier between the architect and builder. Concurrently, the Professional Engineer (PE) emerged in industrialized England, thus, formalizing a technical profession separate from the architect and builder (circa 1850 AD) (see Figure 8).

During the Late Renaissance, after 200 years of disarray, where the Master Builder tradition was displaced, the architect began to gain minimal recognition as a *professional*, even though it took another 200 years before formal legislation, training and testing requirements would be established to consummate architecture as a profession (circa 1900).

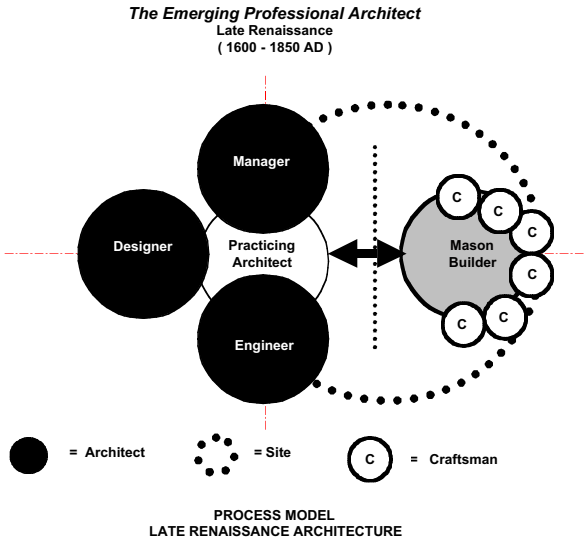


Figure 7

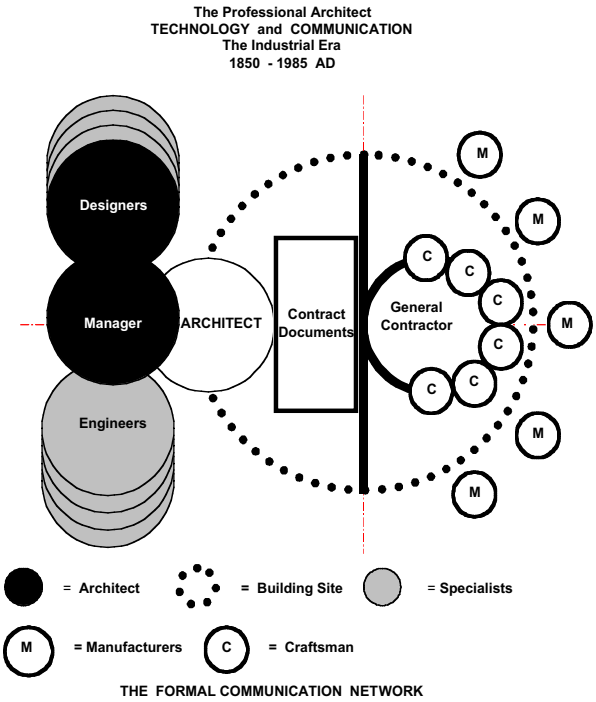


Figure 8

We have mapped and reviewed the architect in history to the modern period where we see the divisive linear design-bid-build litigious project delivery methodology (circa 1985). The architect has shed the role of builder and engineer and remains the designer and professional “fiduciary agent” for the owner. However, as noted in Figure 3, we now see a dramatic change taking place in project delivery, where often the architect is not the “fiduciary agent” for the owner. Why is this occurring and is this process transformation unique to architecture? In the following section we will review industry related manufacturing process models and draw parallels with the process of architecture.

7 Current Context

Research of the automotive industry indicates a fundamental change in design process has occurred. The industry standard has evolved from a linear "single-event" process, which used a physical clay car model, to a dynamic "multi-event" in-series design process. The locus of the process is a central digital 4D car model whereby visual representation and performance simulation testing is performed, thus resulting in the saving of time and expense, and resulting in a higher quality product. Further, *all* process stakeholders are now integrated in the early design phases of the product design (Tushman 1988). The American automotive industry shifted processes after learning from the Japanese about “team” building and collective problem solving with inclusive collaborative team design in the early phases of design (see Figure 9).

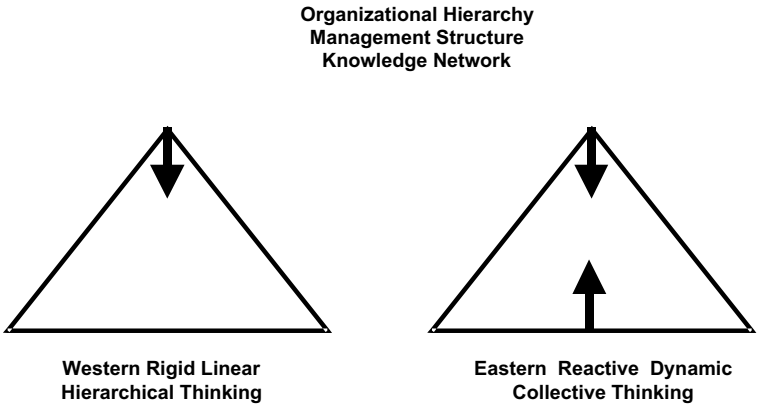


Figure 9

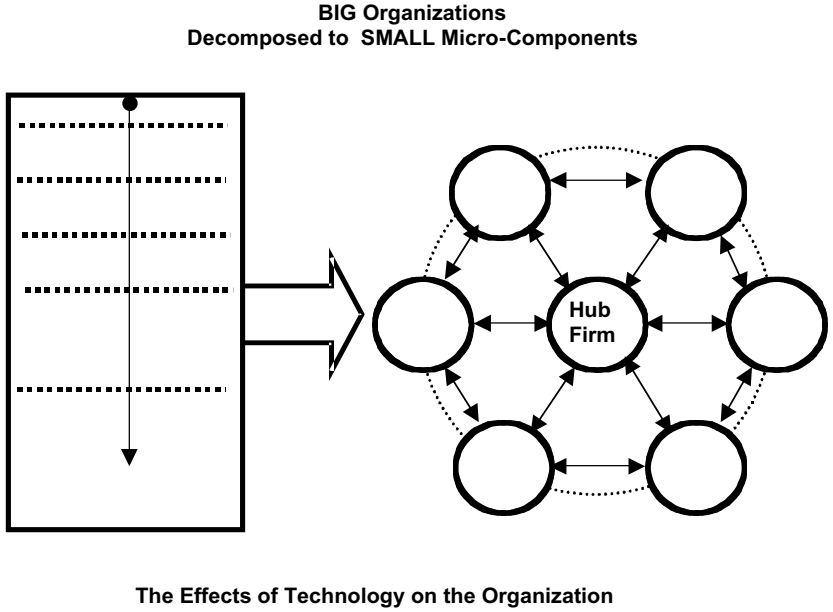


Figure 10

Research of the business and management field indicates IT tends to decompose large organizations into smaller micro-components thereby facilitating creativity, specialization, efficiency, flexibility, and fast-track scheduling. The "Hub Firm" addresses *process* and *product* interactively; leads team-building, and places personal "individualistic" agendas aside in order to accomplish the organization's goal (Monger 1988) (see Figure 10).

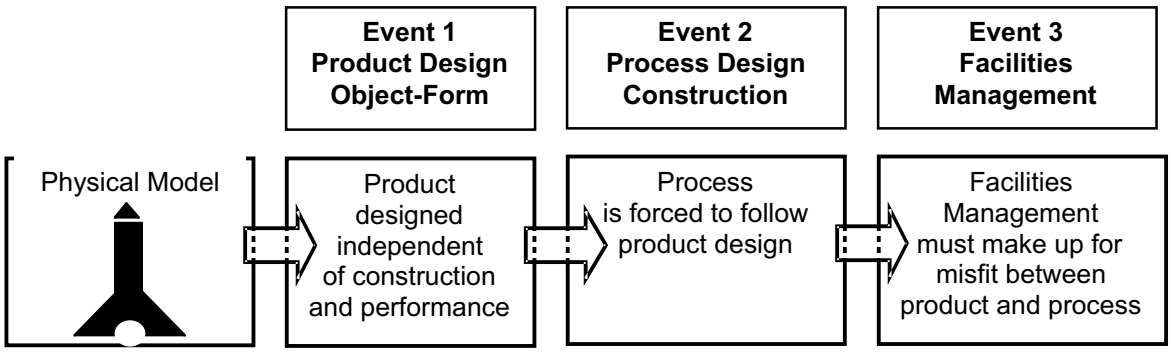
Management tactics from the automotive and aerospace industries have migrated into architecture. Many owners and public agencies now require “wholistic” life cycle analysis of their projects and broader design criterion are required by the owner in the early phases of design. Therefore we now see the diminishment of the 20th century linear process model in architecture (see Figure 11).

8 Dilemma

The focus of the profession remains the *product* (form) of architecture in lieu of the *process* of

architecture. Architects are educated and trained in a culture of individualism and subjective aestheticism which often obscures broader inclusive issues of mass society. Architects are loosing project delivery control and many firms, both large and small, now base their primary value in “design”. Is this a natural evolution of specialization? Can we expect to maintain our short lived *professional* status if we maintain the core value of the *modern* architect is aesthetic based intuitive subjective “design”.

DIMINISHING ARCHITECTURE PROCESS MODEL
Traditional "event-in-series" Approach



LINEAR PROCESS

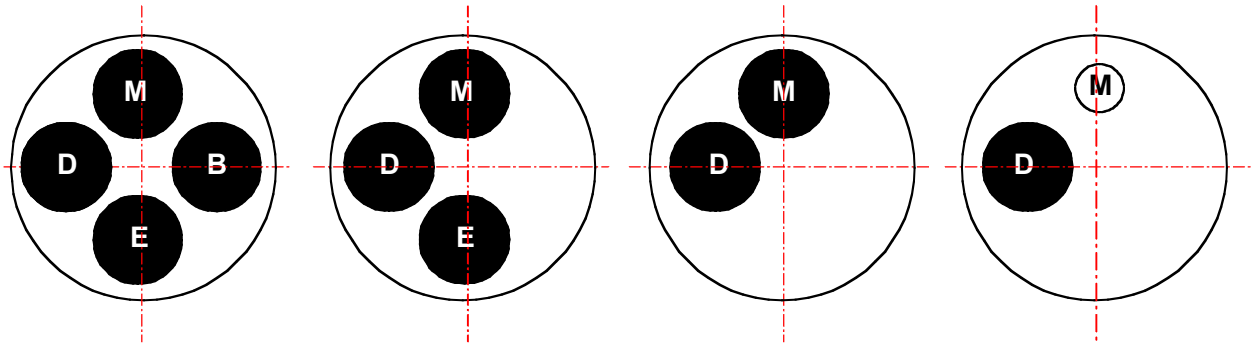
Figure 11

As we have seen, technology is driving inclusiveness and collaboration. The computer wants to rationalize, quantify, and repeat, yet we remain anticipatory of the future where the computer will allow the architect “freedom” for creativity and “self-expression” of *original* “one-offs”. Is this a misuse of the current tool? It may be that we our lack of focus on rational and management issues, and the innate capacity for the computer to deal with binary data and numeric output has enabled the surge of non-architects to flourish while the role of the architect is diminishing. To choose the “designer” role leaves the *profession* aligned with fashion, hair, and product designers. Is this really a problem? We must recall the similar dilemma which occurred during the Renaissance.

After decades of vehement resistance by the AIA, AIA Document B141: The Owner-Architect Agreement was modified in 1997; should contractor's bids exceed the owner's budget, the architect is responsible to modify the design and plans as necessary to comply with the owner's budget, at the architect's expense (Sapers 1998). Many firms now choose to avoid the hub-firm function firm for the owner and work with the owner’s project/ construction manager who take responsibility for schedule and budget.

In England, circa 1993, it was contended in Parliament that British architects are no longer preeminent in the building team and did not deserve protection of the title "architect" through statutory registration. The RIBA was ultimately successful at rescinding the legislation, however, no "architect" is required to permit and construct buildings in England (Pressman, 1995).

The late 20th century architecture integrative requirements for project leadership have exponentially increased, while the architects communication and management capabilities (i.e.- collaborative "in-formal" knowledge network) in project delivery methodology has atrophied (see Figure 12).



3000 BC - 1500 AD 1500 - 1850 AD 1850 - 1990 AD 199O - 2000 AD

D = Design **M** = Manager **B** = Builder **E** = Engineer

The EVOLUTION of the ARCHITECT

Figure 12

9 Opportunity

Management experts indicate three fundamental factors must be established sequentially to successfully engage technology:

1) The clear establishment of a mission and vision, with relevant goals.
2) Appropriate changes in organizational structure must be implemented.
3) Last, the appropriate adoption of congruent technology.

This is why we have focused on the issue of mission and values in this paper as an underpinning to the discussion of technology. We can surmise that the current emerging trends in project delivery are being implemented for accomplishment of mission and goals of the client. Hence, technology should be adopted with the pre-requisite understanding of mission and the organizational model.

> *The adaptation and implementation of IT should be directly related to the practice value of the architectural firm, and thus, is no more or less of a transforming factor than the philosophic premise upon which the genesis of IT adaptation is birthed* (Barrow 2000).

Management (i.e. collaboration and team building) is emerging as the predominate factor in the design process. Within this context, process management criterion must be established in order to establish the appropriate combination of "team" players and design process-prioritized criteria. The four examples shown are highly generalized, for example, the complex issues of performance might contain numerous sub-criteria (i.e. energy, acoustics, lighting, user productivity, etc. Hence, even at the simplified level of analysis where we use 4 major criterions, and a matrix of 4 minor sub-criterions, we have the possibility of exponential prioritization options (see Figure 13).

The general public and clients in general are forcing the profession to change, expectations of performance and integrative processes are being transposed from related design – manufacture fields into architecture. Technology is an integral component of this change in process; management tactics and career/business strategies should be analyzed in this larger context of evolution in society and architecture.

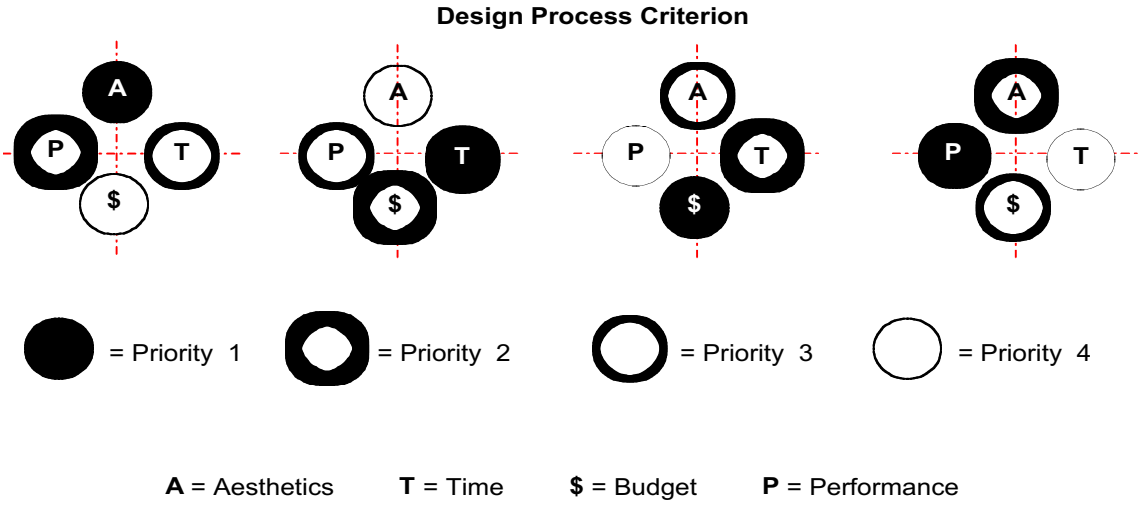


Figure 13

Project leadership will not restored to the architect due to the adaptation of technology or “quality design”, but rather, by understanding the comprehensive needs of the client. Additionally, the project leader must take on the “hub firm” activity of managing the sensitive interface of multiple forces and factors in order to achieve the client’s overall mission and design criterion.

10 Cybernetic Architecture

Architecture is being transformed via an emerging *knowledge network* that is empowered by evolving information technologies and management strategies. This *knowledge network* enables sophisticated problem solving and heretofore, unaccomplished performance and physical *Forms*.

Old model views of architecture are no longer sufficient, a re-evaluation of the role of the architect and new ways to "think" about architecture are needed in the current IT disruptive context. This is what we have tried to do with this paper; *Cybernetic Architecture* can be seen as a reference framework for inter-organizational relationships and communication networks. The *cybernetic architect* is a component of a *dynamic knowledge network* of collaborative contributors that offers the ultimate expression of technology, adaptability, craft and creativity. Organizational restructuring is a prerequisite for congruent technology adaptation; hence, emerging new inter-organizational forms of *collaborative* project delivery methodology are viewed as necessary enablers to leverage networked digital collaborative integration tools that enable project leadership.

During the Renaissance, we saw the decomposition of architecture into two factions, design and building; *Cybernetic Architecture* is a return to the pre-Renaissance comprehensive *integrative vision* of architecture as design and building. However, in great contrast to the historical architecture process via the master-builder, where the designer-manager-engineer and builder were embodied in the single individual, the emerging architecture *process* is a "collective" body of knowledge and specialty skills found in many individuals. New contract typologies are emerging, resulting in "in-formal" relationships that encourage knowledge exchange and collaboration, thus enabling fusion, in lieu of fission, of architecture factions. We have tried to gain insight to the current context by reviewing the heritage of the architect and the master builder (see Figure 14).

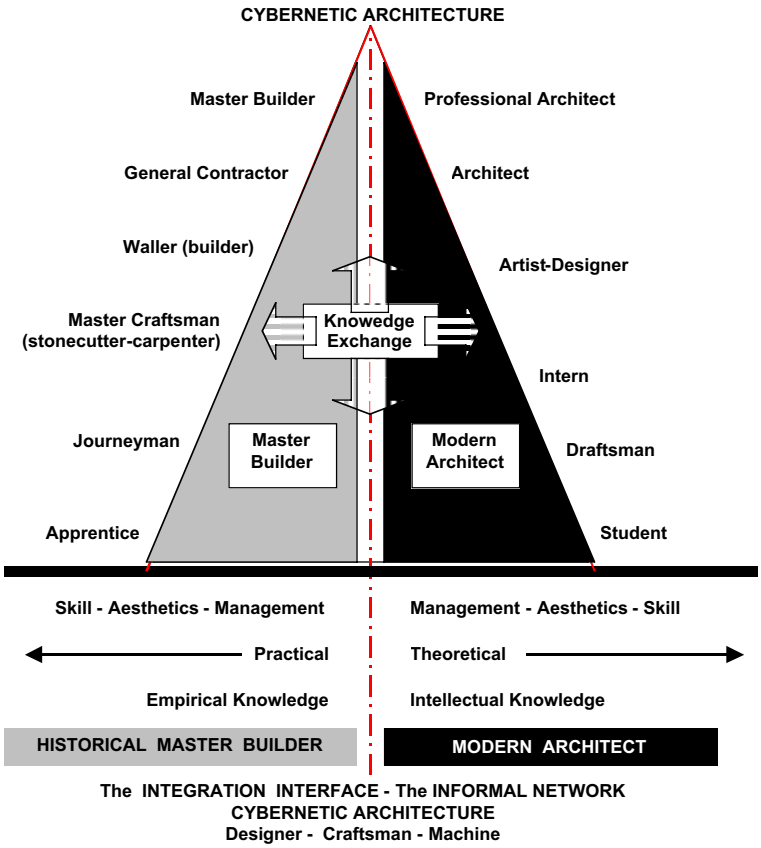


Figure 14

Walter Gropius, architect and former dean of the Harvard Graduate School of Design, pursued similar concerns, quoting Gropius regarding his design philosophy:

> *…. I tried to put the emphasis of my work on integration and coordination, inclusiveness, not exclusiveness, for I felt that the art of building is contingent upon the coordinated teamwork of a band of active collaborators whose cooperation symbolized the cooperative organism of what we call society.*[1]

Thus, the proposed *Cybernetic Architecture* model views the future architecture practice as a balance and harmony between "generalist and specialist," "formal and in-formal" communication networks, "intuition and rationalization," "designer and builder," and "man and machine." Thus, the reconnection of modern day *disparate factions,* (i.e. owner, architect, designer, engineer, builder, craftsman and machine) is enabled via informal relationships and bilateral knowledge exchange in the digital environment (see Figure 15)

[1] Spiro Kostof - Bernard Michael Boyle: *The Architect - Chapters in the History of the Profession.* Oxford University Press-New York - 1977, pg. 323.

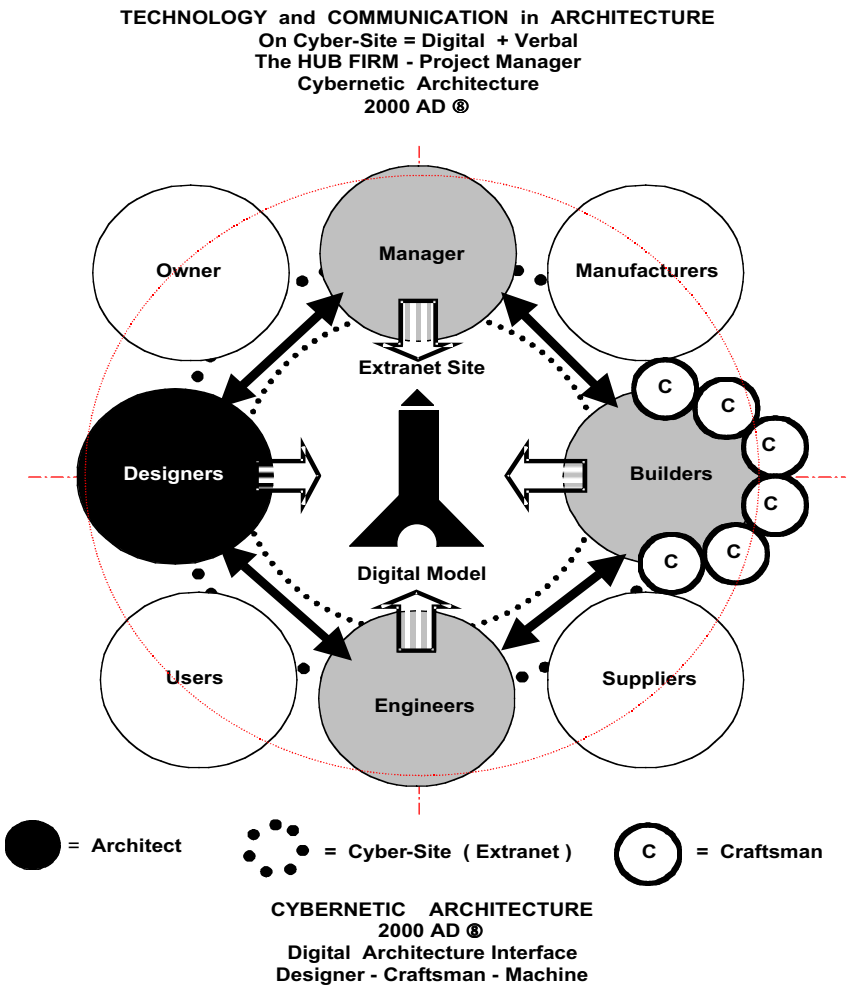


Figure 15

The architect has been adaptable in history, how well we understand our role and implement accordingly in the dynamic IT environment will answer our question of the emerging *professional* opportunity or dilemma.

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