RICE UNIVERSITY

The Structure of Things to Come: New Movements in the Architectural Profession

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ABSTRACT

If [the architect] will build up a closely co-operating team together with the engineer, the scientist and the builder, then design, construction and economy may again become an entity—a fusion of art, science and business.

Walter Gropius, Scope of Total Architecture

Regrettably, the building-design industry Gropius imagined never came about. Buildings, specialization, professionalism, project delivery and contracts, as they developed over the century, all seemed to conspire against such a reality; but the industry has not come to the point the team and entity Gropius wrote about are impossible.

This thesis is an analysis of the building-design industry today, its development and by applying certain business theories on merges and acquisitions projecting a building-design industry where Gropius’ team and entity exist in mega building services firms.
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Introduction

The building-design industry is an evolving one where services and processes—ways of delivering projects—are constantly changing. Evolution in the industry in America over the past century and a half has brought increased education, specialization and professionalization of nearly everyone in the industry. This has come at the expense of the understanding—reality or not—of the architect as the most educated, professional and qualified participant in the building process. The last three decades have additionally brought, with the rise in the cost and complexity of buildings, management as an important, and independent, service in the industry.

These evolutionary trends are irreversible. The education-specialization-professionalization trend will continue as more people seek more education go on higher degrees, and then, to safeguard their positions, form groups, professionalize and establish certain qualifications for entry into the professions.

The management trend will also continue, as our civilization increasingly demands more from our buildings and the processes to build them, thus making them more complex. Currently higher demands on buildings include increased energy efficiency, integrated information technology systems, and sources of productivity—income and profit.
Another characteristic of the evolving building-design industry is the breakdown of the “traditional” building delivery method. The industry is always searching for new ways of delivering projects in an effort to develop better buildings, cheaper and faster.

In addition to all of this the building-design industry is trending larger. A century and a half of development of the American building-design industry has brought larger architecture firms, larger engineering firms, and larger construction firms. This is not inconsequential to architectural practice as buildings and their delivery become more complex it is the larger firms that have the capacity to deliver what is important in an industry that must produce increasingly more complex buildings on time and on budget.

All of these developments mean the building-design practice of the future is larger and multidisciplinary. Architects as Renaissance men, individuals of many talents have been transformed into building-services firms of many talents and capacity.

Significant amongst American and today global business, are mergers and acquisitions. In the introduction to his book on the subject, *Big Deal*, Bruce Wasserstein wrote “growth by merger has been a part of American economic history since the coming of the Industrial Revolution,” and “over the years the rational, style and intensity of successive merger waves [has] varied.” Just right now the building-design industry is experiencing a period of increased merger and acquisitions, or so *Engineering News Record* reported in
their 2005 annual survey of the “Top 500 Design Firms.” For the report’s lead article, the title read “Acquisitions Surge in Growing Market.”

Where and with what scale this surge will end is unknown but why happens and what it will bring about can be predicted given what is known from business theory on merger and acquisitions. This thesis concludes with an application of these theories to the current building-design industry and calls for changes in understandings about the industry, given the current state of affairs.
...the architect’s profound isolation from capitalist development. Passive respondents to the vagaries of development, architects are extremely reluctant to join forces ideologically with the undeniable power and productivity of the system in which we are all immersed. The division of labor between architects and developers, designers and builders, thinkers and doers seems ironclad. Furthermore and less agreed upon, architects have been trained to serve the very few, as reflected in the total belief in customization (at a high price) and the uniqueness of each project. The realization, or better the acknowledgement, that all architectural projects are too complex for any one person is not yet accepted by the heroes and their clients. Only a not-so-quiet revolution... will change this situation.

Lars Lerup,
*After the City*

*Among the business peculiarities of architecture is its failure to obsess about size. Large projects don’t generate as much interest as unique design solutions. But architecture can’t ignore the growing scale and complexity of building-design practice. Even large firms aren’t growth-obsessed like the rest of the business world...*

James S. Russell, AIA
*Architectural Record, June 2005*

*Architecture is at a crossroads because it is certainly broken at this point.*

Juror number 2,
*my first thesis review, October, 2005*
Architectural Practice: A Production Related Service

The practice of architecture falls within the larger building-design industry that includes both manufacturing and service arms. More precisely, though, the practice of architecture is a part of the service industry as it is not a part of the other half of the economy, the manufacturing industry, although, the practice of architecture is highly integrated with production. The definition of the manufacturing industry holds manufacturing is the transformation of raw materials, by hand or machinery, into finished goods for sale. Analyzing the entire process of design and construction delivery, it is the laborers who take the building supplies and by hand or machinery assemble the building, landscape, interior etc. The architect is rarely the laborer who does this transformation. In those rare cases where the architect does the labor then he/she is within the manufacturing industry but only in such instances.

It can also be stated that, within the building-design industry, the manufacturing of buildings and the practice of architecture are dependant upon one another. To understand the practice of architecture it is important to define architects’ deliverables and then note these deliverables are characteristic of service industry deliverables: they are not tangible; they provide added value and they are labor intensive. Architects’ products are their designs, which are not material goods. In the instances where architects deliver designs or construction documents (CDs) they are delivering documents that are suggestions as to
how to assemble widgets. Architects design widgets; they do not assemble them. The practice of architecture it is a production related service industry.

Architectural services are not limited to design; there are many other services that architects provide. Such as, activities related to the mobilization of resources were the architects act as building contractor or coordinate with contractors, when architects become involved with conceiving and innovating products and perhaps work closely with a fabricator to design a building material/component, or when architects manage other aspects of the building delivery process and when they are owners representatives or project managers. There are also instances where architects are involved with quality assurance on project—although insurers and attorneys do not recommend architects do so, there are many instances in smaller practices where architects often will make judgments on site visits. A further service architects provide is marketing projects. These are all services. They are integrated with, add value to and improve productivity in the process of production but are not manufacturing.

The promise for the architect in the service industry is in providing information and expertise that are not available elsewhere and to become inseparable from manufacturing. It is progressively becoming more difficult for architects to offer these services, as there are too many variations on architectural practice and alternatives to architectural services within the building-services industry.
The Anatomy of Buildings, Explained

Over the centuries, and even more so over the past few decades, to build has become very complex. Buildings today, whether one-of-a-kind or repeated, are highly sophisticated blends of mass-produced and custom designed products. Well-educated designers who work for architects, engineers, manufacturers, vendors design these products or others involved in the building construction process. The products they design are assembled and integrated with one another on factory floors and the construction site.

Significant shares of building budgets go to the mechanical systems that include heating and ventilation systems, information technologies, furniture and equipment systems, and services that supply processed liquid and gasses and treat and expel polluted air. Increasingly larger portions of a building’s budget are going to these systems. Depending on the building type these systems can cost from 30%-90% of the building budget (Gutman, 33).

Building projects involve a variety of consultants from a wide range of new disciplines and professions meaning, architects are increasingly less qualified to design increasingly more of the total project. Most of knowledge of construction costs and technology resides with manufacturers, suppliers, and sub contractors; who may be consultants themselves.
or others are gaining their knowledge and as consultants are one more piece of the building-design process.

Over the years the pieces and players in the building-design process multiplied, but only because so many looked at it and saw opportunities to improve the cost, quality and schedule of building.

**Evolutions in Professions and Processes**

What there is to know about building technology and functional requirements has expanded greatly over the last century and a half. With the continuing expansion of the range of building types and complexity, there was an increase in the number of professional services required to construct them. No one person, not even one company, is master of all the technology for a single project. Building projects in America today involve, user and client management structures and their consultants, owners representatives, numerous architects and engineers and their consultants, scores of subcontractors, hundreds of manufacturers and suppliers, and numerous contracts. All of this makes the industry fractured and inefficient.

Over the last century and a half the increase in the number of professional services required in the building-design industry coincided with significant developments in
professionalism in America. The last century and a half saw the supply and demand for specialized education rise, professional organizations develop and licensing laws to define and protect various professions passed. Architects were at the forefront of these developments. The American Institute of Architects (AIA) was established in 1857, the first school of architecture was opened at MIT in 1868 and the first licensing laws for architects were passed by the State of Illinois in 1897.

Once were architects the most educated professionals within the building-design industry. As the twentieth century wore on, they did not remain as such. With other well-educated professionals in the industry there would come substitutes for architects.

Throughout the twentieth century many involved in the building-design process engineers, sociologists, psychologists, construction managers and businessmen and women, just as architects, became independently trained and educated and so inclined to be independent and demand for themselves that full share of decision-making which their professional training has earned for them.

There once were few contractors with post secondary education and limited financial resources there are now undergraduate and graduate degrees in the field of construction. Management and construction firms command increasingly larger and relatively constant sources of capital.
The development of financing for building construction—the bonding and insurance issues—have also conspired against architects leading significant parts of the process. To acquire bonding and insurance parties need capital assets as collateral. On building projects with significantly large bonding and insurance needs it was that only contractors had the capital assets—their heavy machinery—that were worth enough to achieve the required significant amounts of bonding and insurance. Contractors leveraged their capital and talent and were increasingly more capable to compete with architects to manage the total construction process. Eventually contractors leveraged all of this and began to oversee design (Evey).

As the middle of the twentieth century came about with increasingly complex buildings, numerous people, contracts, supplies, consultants—so much information to manage—it was management itself that emerged as one of the most important issues for building construction. Then in the late 1960s and 70s, as inflation and rising interest rates drove the cost of buildings higher, new services and delivery methods developed in an effort to keep costs under control as best possible. Construction Management (CM), various “owners representatives” schemes and Project and Program Management (PM) developed to manage various aspects if not the entire building delivery process. Integrated architect-engineer-contractor (AEC) services and in the 1980s the design-build process developed in an effort to bundle contracts and the fractured delivery process and reduce the number of claims for a building project.
In the later half of the twentieth century, in a further effort to ensure clients of the building-design industry got the sophisticated, specialized buildings they required, clients themselves began providing their own building-design services where they once had not done. Today, world over, some clients employ vast numbers of people—some trained and licensed architects—to manage their buildings in in-house departments. The departments have names such as real estate and facilities management, building and corporate services, facilities construction, worldwide plant engineering and construction, and real estate and construction. These departments vary in size, depending on the annual construction volume and degree of central planning for the organization. They are often headed by executives who in turn have direct access to the chief officers of the corporation/institution.

Robert Gutman, in his book *Architectural Practice: A Critical View*, has an entire chapter dedicated to these ‘client organizations’, as he calls them. His is one of the best discussions of the subject. He explains, clients are more intelligent as a result of the greater rationality, sophistication and professionalism of their in-house organizations. The most significant characteristic of the ‘client-organization’ is that they view architectural production from a purely rational and instrumental perspective. They regard buildings as capital assets, which should be managed like every other potential source of productivity, income and profit. This means plans for new buildings and for the renovation of old buildings are judged in terms of their initial and maintenance cost, resale value, their implications for income, usability as working environments and their
possible effects on organizational efficiency and morale. All features of buildings come to be judged by these criteria, including the esthetic dimension, which was once considered as outside this system of calculation.

The instrumental view of buildings can be found everywhere today, with business clients, including industrial and service corporations, developers, federal, state and municipal governments—which are subject to increasingly more careful budget reviews—and the non-profit institutions. The change in thinking is especially noticeable among university and cultural organizations that formerly took a more casual view of their physical plant and regarded buildings primarily as prestigious works of architectural art. With the expansion in the number of universities, museums, symphony halls and theaters competition for funding is becoming more intense. Curators, presidents and other managers of these institutions are under increasing pressure to justify their building needs in terms similar to those that apply to the private sector.

Today, the planning for a building does not begin with the appointment of an architect. In-house staffs and expertise mean it is possible for clients to take projects further before they hire outside firms to take charge of developing projects. The sophistication of clients has been an important factor leading to the increasing fragmentation and division within the profession. The ability of clients to distinguish between the purposes and budgets for buildings and the services required to produce them is increasingly matched by their knowledge of the array of practices that can be hired. Some clients are now in a position
to understand their own needs before they approach an architect or anybody else in the building-design industry.

'Client organizations', Gutman explained, have a reasonably accurate view of available services. Because of this the market has a discernable pattern that is known to both clients and architectural firms. The pattern consists of sets of identifiable niches or market segments. So the fragmentation of the market is something clients have helped to create, in that services can be discernibly purchased separately.

Architecture and other building service firms also find it to their advantage to preserve the pattern, once they have succeeded in understanding it and mastering its implications and are able to offer a variety of services separately or bundled.

Clients are in a stronger position than they have ever been before in the history of modern practice to dictate to the architect and others the services a firm is expected to perform and also allowed to perform. Owners feel more confidant projects will be completed on time and on budget if the total project is managed by someone more qualified than the architect or does not have the architect's conflict of interest. Because of the availability of a wide range of qualified specialists modern buildings owners delegate specialists,

1 In response to industry developments many architecture firms have developed CM and PM services. According to the AIA 1994 firm survey 43% of firms provide some sort of construction services beyond contract administration and 25% of firms now provide CM services. In these firms what is the relationship between architects and construction managers?
construction managers, project managers and program managers to oversee projects. In this way clients are driving the industry and driving many building services firms to become experts on a range of issues.

Coinciding with the development of all these other groups competing with architects to provide building services, architects themselves have reduced their responsibilities within the industry in order to reduce their moral and legal liability for performance failures.

Loosing roles is controversial for architects because many of them believe the roles they are loosing are important to guaranty the building will be completed as designed. For architects, being further isolated within the building-design process is troublesome as there are frequent needs and inclinations for clients and contractors to modify designs during the construction stage of projects. As some architects see it, loosing so much control over the final outcome means architects are loosing their ability to have a social and aesthetic impact.

Others have bitten off various specialized services architects once offered, such as master planning, strategic planning, contract management, construction management and program management. These services have moved to massive engineering-led, contractor-led and other firms, even accounting firms capitalizing, on their management capacity, are doing building project management (Solomon, 169).
In conclusion, the modern American building-design industry is constantly developing new roles and delivery processes in an effort to manage its increasingly complex and fractured nature.

For the past one hundred and fifty years the building-design industry in this country has constantly developed specialized tasks to be preformed by people with specialized educations and qualifications. These people are members of professional groups that help define and protect their positions in the industry. Specialists and professionals can be found in a variety of different places within the industry, working to a variety of different ends. They are substitutes and competition for one another, causing firms and clients to develop new products, services and technologies to differentiate themselves, add value to projects and survive in the industry. Many firms offer different combinations of services. The competition coming from so many directions within the industry is wasteful, with efforts duplicated many times on a single project, in many cases raising costs.

The industry is also such that no company has mastered all the technology, services and markets. Unfortunately for the industry today, the integrative function is difficult given the fractured building-design industry and project delivery climate.
Nonresidential design and construction in the United States

Leadership in design-build ventures

- Joint ventures: 5%
- Developers: 4%
- Designers*: 11%
- Contractor: 55%
- Integrated firms: 26%

*The majority of design staffs surveyed here were dominated by engineers

Source: 2005 Design-Build Survey of Design and Construction Firms

Errors and omissions claims

Growth in architecture billings

- US GDP: 5.9%
- Nonresidential contract awards: 17.9%
- Billings at Architecture firms: 18.9%

Source: 3DI/International

Source: 2003 AIA Firm Survey

Firms in design-build
All firms

Source: 3DI/International

1996-1999
1999-2002

Figure 1
Figure 2
Figure 3
Figure 4
New Movements

Above are the significant developments of the building-design industry in the United States from the middle of the nineteenth century up to the last two decades of the twentieth century. Those one hundred and thirty years of developments positioned the architectural profession within the industry and had a great effect on the roles architects played as the past twenty years brought two further significant developments. These developments are still on going; they will profoundly shape the industry's next ten years and subsequently whatever follows. These developments are single-source delivery and large, expanding, multidisciplinary building service firms.

Single-Source Delivery

The design-build method of building procurement, briefly mentioned above, is on the rise. It has gained in popularity steadily since its inception in the 1980s, currently about 40 percent of all nonresidential construction projects use this method of delivery (figure 1). Some in the AIA predict that by 2010 it will be the leading method of project delivery in the North America (Solomon, 167).

Clients hold only one contract in design-build. Its quick and steady rise in popularity is proof the building-design market is ready and eager to support single-source project
delivery. Single-source delivery was rejected for decades in this country because it was seen as a conflict of interest to have designers, who were supposed to be protecting owners, profiting from the construction labor and materials. The 1909 AIA Code of Ethics forbade members from participating in the process.

The conflict of interest assumption disappeared over the past two decades as the AIA ethics code changed in 1986 to allow design-build and the federal government—the largest single buyer of buildings and building services in the US—embraced design-build.

There are many contract permutations in design-build; for example, the owners contract can be held with an architectural firm, contracting company, a single company with both designers and builders on staff, or an individual developer (figure 2). However, according to a recent survey by the Design-Build Institute of America and the 2003 AIA firm survey architects are not leading many design-build ventures (figure 2, Solomon, 109 and AIA 2003, 28).

The great benefits of design-build are putting construction input—such as techniques, and materials and installation costs—into the design from the start of a project. This knowledge has shown to save time and money on projects. There is also the benefit of having all the parties in the design and building processes beholden to one contract holder; when there are problems in the process they are fixed immediately rather than later, following a round of blaming another contract holder in the process. Thus, a lot of
litigation involved in a building process is eliminated (figure 3). Litigation drives up the cost of building.

Additionally of note is the profit on the construction fees can be six to ten times greater per dollar volume than that on architectural fees (Solomon, 172). Usually this profit is used to manage risk in construction and correct any defective work that may occur. In architecture practices, insurance is used to cover these errs and omissions. With integrated teams the number and severity of errs, omissions and defective work is lessened and so profits are higher. Profits and capital available within a company are important to growth of a business and, as noted above, in the financing of construction and leveraging for leadership and control of projects.

**Multidisciplinary Firms**

According to the 2003 AIA firm survey architecture firms are diversifying the design services they offer and the larger the firm the more likely they are to offer diversified services (AIA 2003, 11). They are doing this, the AIA survey explains, in response to competition from other firms that serve the same client base. Multidisciplinary practices are good for firms’ billings, as multidisciplinary practices create increased billings. In fact, according to AIA firm surveys, for the same period that architecture firms have become increasingly more multidisciplinary the growth in architecture firm billings has
greatly out preformed the growth in non-residential construction (figure 4). All of this is proof architects are coming to realize, as mentioned above, there are many substitutes for their services within the building-design industry and starting to diversify and compete.

So it is that architecture firms are finding value in the market place for their alternate services, but there is no data on what these services are exactly or architecture-led firms market share for these services as opposed to their competitor firms led by non-architects. The lack of such data makes the future for the architecture-led ‘multi-disciplinary’ firm—as the AIA refers to it—illusive.

Large Firms

According to US Census data, over the last thirty years the size of architecture firms has grown. The numbers of people employed in large architecture firms has grown steadily larger for this period (figures 5-8). The AIA has data that illustrates the same developments over the past thirty years, however it does not have as detailed breakdowns as the US Census. The AIA stops with of over 100 employees.

The nature of large architecture firms was recently discussed in an article, “Big Firms Growing Bigger” in Architectural Record. The article explains the advantages and market forces driving firms to be big.
Amongst the advantages are speed and agility; clients always want things done faster. While smaller firms are capable of these two through the aid of technology and adroit firm collaborations, they loose out when it comes to capacity. Large firms have the capacity to serve a growing range of client needs. They can do so because they are multidisciplinary; they are able to employ the specialists and other professionals needed for large, complex, or specialized building projects. Bigness helps when clients need a depth of expertise in multiple specialties. Large firms dominate the complex building types markets that require specialized expertise: health care, laboratories, airports, and sports facilities.

**Firm Growth**

Large firms pursue markets and clients not projects. Repeat clients can represent 70 percent or more of their billings (Russell, 77). It is a very expensive and long-term process to land a big project and so as is explained in the *Architectural Record* article, going from client to client is a form of suicide. Large firms emphasize their relationships with clients.

Economic necessity drives growth for many firms in the building-design industry. As the range and sheer quantity of clients needs grow many firms grow to meet those needs.
BSW, International and Gensler are two examples of this. These two are number 435 and 32, respectively, on Engineering News Record’s Top 500 Design Firms list. Gensler is the second largest architecture-led firm in the US.

BSW, International is a full-service architecture and engineering company. From the beginning, BSW has focused on programs instead of projects and so it works with clients that require repetitive design. Wal-Mart is their biggest client, consistently retaining them for about 50 percent of their entire building program. BSW has designed around 5000 Wal-Marts over the past 20 years, growing internally to match the needs of Wal-Mart and their other clients. Today, using pre-defined CAD blocks and CAD macros BSW can produce a Wal-Mart store to 95 percent complete construction documents in a matter of hours.

Wal-Mart stores may not appear very different from one another but for Wal-Mart’s purposes they are fairly sophisticated buildings. There has been continuous improvement to the model over the years. Wal-Mart feeds around 170 changes a month to BSW for inclusion in the prototype documents. Examples of these changes are daylighting strategies, prismatic lenses and interior paint changes when Wal-mart noticed higher sales on merchandise in portions of their stores that were naturally lit.

Arthur Gensler in a 1998 interview with Architecture magazine explained how his firm grew in size and services to meet expressed client demands.
Every office has been opened and staffed by Gensler people. Then we've hired locally. We don't believe in merging... Most of the work comes from repeat clients... We're providing consistent service to many large companies... Those are the niches we play in. People in those industries move around and we follow them. But we hope to stay with the original client too... We started by doing tenant work [for our clients], and then we were asked to analyze the buildings of well-known architects in the profession. We earned a wonderful reputation for building-design consultation. After a while, people [clients] started saying, "You can do the whole thing." Then we got into strategic planning, and facilities—what you do with a space after you move in and how you integrate technology. We put a whole program together, Gensler Information Solutions (GIS)—graphic databases for companies that help manage their real estate. Then we started doing graphics and branding. Then we got into product design and other things. So we're a design firm, not just an architectural firm. We use design as a tool to create all sorts of things (Secret, 67-68).

Both BSW and Gensler grew internally in response to increasing client demands. BSW began as a firm that specialized in retail and commercial architecture and expanded its services to include engineering. It expanded its services and technology and process capacity in response to clients' demands for speed. Gensler began as a firm that specialized in interiors and diversified its services at the behest of its clients. As Gensler grew, it too had diversified both within and outside of traditional architectural services.

While both firms have grown with their clients they have also grown with an interest to capture more of their respective markets and, as is particularly the case with Gensler, expand their markets.
Another growth option that is growing in popularity these days is mergers and acquisitions. While it is not quite a full merger or acquisition, in the spring of 2003 the architecture-led firm The Stubbins Associates made a merger of sorts with the engineering-led firm Kling (number 118 on the ENR list). The two firms did so not in response to client demands but in an effort to become more services and resources diverse and gain the critical mass and agility they felt they needed to compete effectively in an uncertain building-design industry.

Kling is a sixty year old, Philadelphia based firm with a presence in the Raleigh/Durham (NC) area, Washington DC and San Francisco. Stubbins is a fifty-seven year old, Cambridge, MA based firm with a presence in Las Vegas. Kling and Stubbins now have a presence in each all of these markets and enhanced marketing capacity.

The two had a unique merger where they did not become one company, but remained independent. However, various members of each firm have joint ownership and there are overlapping members on both of their boards of directors, in order to align strategies (figures 9 and 10).

At the time of the merger Kling was a 400-person firm and Stubbins was a 100-person firm. Scott Simpson, president and CEO of Stubbins explains upon the merger they both went to the capacity of a 500-person, multi-disciplinary firm with the capacity to compete for mega-projects they never would have seen otherwise (www.bdcnetwork.com). They
Overlapping boards of directors

Joint ownership

figure 9

figure 10

Largest design firms' 2004 revenue

Median billings per employee

Source: Engineering News Record

figure 11

figure 12
now share capacity and expertise. To gain the sort of capacity and expertise they both now share would have taken years and lots of capital—borrowed or internal—to manage.

Beyond expanded markets and service expertise and capacity the merger also gave Stubbins and Kling cost savings as a result of economies of scale. The two share one liability insurance policy, one healthcare insurance plan, unified accounting, purchasing, IT services and various other operational and overhead expenses.

The firms mentioned above are all considered “large” firms within the building-design industry, although they fall on different extremes of that designation. The stories of their growth in size and services are typical within the industry.

Architecture-led firms* are growing larger but as it today, not large enough for the full extents of building-design industry. Architecture-led firms do not have the capacity for the largest of projects today. The building-design industry/ market manages this by assembling services from several firms for the largest of projects.

The International Terminal D at the Dallas-Fort Worth Airport is an excellent case to illustrate this point. While the project was headed by some of the largest architecture and

* Architecture-led firms consider their primary service architectural services even though they may, and many of the largest firms do offer engineering services, and licensed architects often head them. It is the same case for engineering-led firms and engineering services and most offer architecture services as well.
engineering firms in the country HKS, HNTB and Corgan Associates,** ultimately fifty-four architecture firms worked on the $1.7 billion, and 2.1 million square-foot project (Russell, 76). This is the type of project one large building services firm in the future might be able to handle. While on this type of project that day has not come but there are firms large enough to manage certain mega projects. These are engineering-led firms.

These large engineering-led firms have come about in the last two decades due to the same market forces—a desire to find new markets, services, scale and survival—that are driving the growth in architecture-led firms.*** The URS growth story is an excellent example.

Through a series of acquisitions that each doubled the size of URS in 1996, 1997 and 1999, it increased its revenues by more than fifteen fold—growing from $137 million in 1992 to $2.3 billion in 2002. URS made these acquisitions because it was looking to revive itself following an accounting scandal. The new management anticipated federal and state governments would soon embark on a program of highway, bridge and airport construction. Their assumption paid off but in 2002 infrastructure spending slowed and

** HKS is number 56 on the Engineering News Record's (ENR) top 500 Largest Design Firms in the US list, and number five of the largest architecture-led firms. HNTB is number 23 on the ENR list and Corgan Associates is 166 on the ENR list and 32 of the architecture-led firms.

*** The largest engineering-led firms have grown to the size they are today, largely due to merges and acquisitions and the fact they offer highly technical services, such as design and project and program management in markets that have high revenues such as, the transportation, defense and petrochemical markets.
so URS acquired a firm specializing in services to the Department of Defense. URS has also recently received contracts for infrastructure rebuilding in the wake of hurricane Katrina.

Some of the diverse markets in which URS and other engineering-led firms are active, are one in which architecture-led firms have a most negligible presence. However, the engineering-led firms also have a significant presence in markets—such as commercial, government and commercial—and for services—such as management and design—that architecture-led firms compete.

The largest architecture-led firms pale in comparison to the largest engineering-led firms. The top five architecture-led firms command significantly less of their markets than the top five engineering-led firms. According to the US Census data for 2002, the top five architecture-led firms command 4.6 percent of the market for architectural services while the top five engineering-led firms commanded 9.3% of the market for engineering services (figure 14). HOK, the largest architecture-led firm, in terms of revenue, totaled $331.9 million in 2003. This was just over eleven percent of the revenue totaled by the largest engineering-led firm, URS, which totaled $2.85 billion (figure 11).

That engineering-led firms dominate the building-design industry is not without consequence for architecture-led practices. Engineering-led firms, with capital to leverage, are in a position to acquire the larger architecture-led firms when the building-
design industry consolidates. Bill Helmut, partner at HOK explains he hears every day the larger engineering-led firms will acquire the largest architecture-led firms, and that frequently the largest engineering-led firms offers to buy HOK (Russell, 82).

Some of the largest building services firms are not large enough to handle the projects and business pressures of the market but that will not remain the case for long when there is a wave of mergers and acquisitions on a scale unprecedented in the American building-design industry.

While the strength of the engineering-led firms comes from markets and services architecture-led firms are not participating within, the engineering-led firms are eager for more markets—markets that are the ones of the architecture-led firms. It is not difficult to imagine in the next ten years various individuals and the companies they lead in the building-design industry will soon embark on industry consolidation to match other American industries such as department stores, biotechnology, cable TV, commercial banks, or restaurants (figure 13). Mergers and acquisitions will bring industry consolidation and mega building service firms.
Some Merger Principles

Mergers are a more recent growth-trend in the building-design industry. In the past growth has been internal, such as in the examples of BSW and Gensler mentioned above. Although, mergers are nothing new to American economic history, they have been around since before the coming of the Industrial Revolution.

Companies are interested in mergers and acquisitions because it provides them with economies of scale, markets, the ability to control supply chains, and better control over inputs and outputs in order to deliver goods and services more efficiently.

Financial efficiencies for companies resulting from mergers are often found in economies of scale in their operations and overhead. After mergers and acquisitions companies eliminate redundant operations and defray the cost of the remaining operations over a larger company and thus reduce their cost of doing business. Examples of these economies of scale were mentioned above with the Stubbins-Kling arrangement. Additionally, investments in technology and new processes are costly for companies but with more projects and operations over which to distribute the cost it is easier for companies to invest in new systems and make improvements.

Larger companies are also able to achieve certain critical masses that are important to developing and maintaining a company of quality and size. Staff development costs time
and money for any company. However, larger companies are more able to retain talent because they have a constant stream of projects, positions and opportunities for employees.

When companies merge within their market, if they form a large enough new company and have a certain critical mass within the market the new company has real market power. This enables companies to control supply chains and gives them the ability to set prices. However, the presence of competition and substitutes within the market will make it difficult to set outrageous prices. The market for architectural services is evidence of this. Larger architecture firms are the ones with capacity and special expertise, as established above, they also, on average, bill more per employee than smaller firms. In fact, the average billings per employee at architecture-led firms are almost directly contingent upon the size of the firm. Smaller firms billing less and larger firms billing more (figure 12).

Financial efficiencies and market power mean big firms have more capital available internally. Additionally, external finance with interest and service to pay is more costly that internally generated funds. When it comes to external capital larger firms also have more access. Small and medium firms find it harder to raise capital because banks demand a premium from small firms; banks view the loans as riskier. In times of really tight money, lenders will take care of the needs of larger firms, to minimize exposure to risk and to maintain vital business contacts. Cyclical lack of money for financing results
in larger firms having more “staying power” in the face of adversity, even a well-managed small firm may find itself insolvent in a cash crunch. So larger firms, with more and cheaper capital available are more capable of investing in themselves, for example, to improve their own internal operations or acquire other outside companies and recourses. That larger architect-led firms are able to perceive through economic downturns and smaller architect-led firm close up shop illustrates this point.

If a firm is growing in an effort to expand its markets it is preferred to merge versus enter a market afresh. The benefit of merging over entering markets afresh and growing is the preservation of the merging firms’ franchise values. Merging firms gain the reputations, experience and clients of each other. Entering into new markets, both for services and geographically, but wishing to maintain franchise values was presented as one of the basic premises for the Stubbins-Kling arrangement.

Mergers command respect. One of the best ways to effect change in a process is to hold more control over the process. An example of this today, outside of the building-design industry is in logistics services firms.

Major shippers, such as Nike are growing and needing more shipping services. The shippers would rather maintain existing relationships with their vendors than turn to unfamiliar suppliers but their vendors are not large enough. The vendors do not offer all
of the services the shippers demand. Shippers are pushing their vendors to expand their service offerings. This is another example of clients driving firms to expand.

To expand their services and geographical presence quickly, large logistics firms are buying small firms and/or merging with other firms. For example, FDX, the parent of express package carrier FedEx, purchased Caliber Logistics, a third-party logistics services provider, and RPS, a ground package delivery service, to expand the scope of services FDX can provide (www.rand.org).

FDX believes that by integrating the services of Caliber and RPS into its own company, and controlling more of the process FDX can offer better services to its clients because it will have more control over the process’ inputs and outputs; better control and services than if FDX acted merely as an agent and contracted out particular services.

Building-design firms today are merging just as logistics services firms and a variety of other firms in other industries. Clients are driving building-design firms to expand their scope of services and geographical presence just as they are driving other vendors, and building-design firms, just others, are merging and acquiring to control more of their processes. Mergers are a means to an end. Mergers provide those things that are required to restructure a fragmented industry.
Large-scale mergers and acquisitions across an industry lead to industry consolidation. This is a major trend in the world economy. Industry consolidation is not a major trend in the building-design industry, yet. Other industries are far more consolidated than the building-design industry. Other industries have companies that are recognized leaders, who command significant shares of their respective markets. These leaders control more of the processes in their respective industries and are able to affect greater change in their industries and processes.

As mentioned above, change and new processes are already underway in the building-design industry. However, the full extent of the change for the architectural profession cannot be predicted, as significant change restructuring the industry is still ongoing. Meanwhile, architects have not emerged as leaders in the building-design industry; architecture-led firms commanding less market share, smaller companies and lead a small portion of the new single-source delivery process (figures 14, 11 and 2).

Ultimately, what change in the building-design industry means for the twenty-first century cannot be known, but the nature of the period of change can be anticipated. Within the study of business there are theories and history to explain the character and nature of an industry consolidating as a result of mergers and acquisitions—what we are now witnessing in the building-design industry. Knowing the nature of the building-design industry in consolidation is an important device for architects seeking a leadership position, affecting change or even surviving on their own terms in a changed industry.
Market share of top five companies, in percent

- Retailers: 76%
- Department stores: 75%
- Cable TV: 57%
- Major commercial banks: 45%
- Oil field services: 37%
- Chemicals: 77%
- Biotechnology: 73%
- Restaurants: 44%
- Paper/plastic: 34%
- Newspapers: 25%

*This information dates before 1990 when some of these industries experienced the largest scale mergers and acquisition deals in their histories. Source: Rand Corporation

figure 13

2003 Market share of top five companies in building services industry, in percent

* A-led: architecture-led, E-led: engineering-led

Source: US Department of Commerce, Bureau of the Census and Engineering News Record

figure 14
From the Business Schools: Mergers’ Meanings

Acquiring firms are not interested in acquiring too many insolvent and poorly run firms. The possibility of being taken over can act as a curb that otherwise would not exist on management, causing them to run the firm more efficiently. With increases in the number of potential buyers there is found to be increased industry discipline, which reduces the number of poorly run firms and generally raises profitability. In the environment of mergers and acquisitions there is an imperative towards focus and simplicity. The price of a target firm rises when they are profitable or have significant market share.

Small architecture firms are notoriously insolvent and poorly run. It will be only those firms that are profitable and/or have significant market shares that will benefit, remain or be capable of taking a leadership position in a consolidating market. As the industry consolidates the medium to large firms that are well managed, have a focused areas of expertise and are leaders in a market will be attractive firms for mergers and acquisitions.

Larger, more efficient firms take over smaller, less efficient ones in part to spread the expenses or operating policies and procedures of the more efficient firm over additional branches, and markets etc. This is related to the motives for mergers mentioned earlier—improvements in financial conditions and economies of scale. Those firms who are willing and able to leverage their size and grow will be the leaders in the building-design industry of the future. It would appear from a list of the largest design firms today that
very few architecture-led firms are currently in a strong position to lead in a consolidating market which is drawn widely to include architecture, engineering, and project management firms (ENR, 54-72).

Takeovers provide a vehicle to change particularly bad processes too. Efficiency gains are made by changing input or output quantities in ways to reduce costs, increase revenues, and/or reduce the risks associated with various services and increase the value of those services. This is already being done with the design-build process where contractors and architects work together changing the time at which certain input is made, reducing their conflicting interests and providing a better process which the market is embracing (figure 1).

It was mentioned above the design-build process is largely not being led by architecture-led firms, significantly for lack of financial resources. It will take restructuring and a new understanding of architectural practice to change this trend. Leadership is dependant upon access to significant financial resources. Those firms that have access to financing will survive and lead as the building-design industry trends towards single-source delivery.

Applying the principles discussed above we can begin to understand the type of firm that will emerge as leaders in a consolidating building services industry. The firms will begin medium to large in size and have access to capital and strong management. The type of firm, architecture-led, engineering-led or another is not as important as their
determination in seeking new markets and talent from firms that are well managed and market leaders. The management of the leading firms will be willing to grow the strength of other disciplines within the firm and to compete not within single narrowly defined markets in which they are content to rest but redraw their market shares within the larger building services industry.

With the international consolidation of markets, larger firms with capacity are better able to compete in today's international climate. The Globalization of markets contributes to cross border mergers and acquisitions. Globalization has also led to deregulation of geographical or product restrictions. Barriers that once existed for multi-national businesses are decreasing. As with so many companies and industries, we have yet to know the full implications for globalization but it is an undeniable force. Already there are many cross-national mergers in the building-design industry.

Some US companies are concerned about international consolidation in the industry as right now they are in a weakened position. The dollar is falling in price against foreign currencies and so firms in the US are a bargain deal for European firms. Foreign firms are interested in buying US brand named firms for these firms' instant credibility and markets (Tulacz, 44).

Industry consolidation helps make markets and the industry as a whole more efficient through the elimination of excess capacity. Excess capacity means there are too many
firms and some firms are below efficient scale and/or have inefficient product mixes. Market redundancy or excess capacity is usually dealt with through financial distress in an industry or markets and individual firms going bankrupt.

Excess capacity is detrimental to firms. It means the loss of market share to competing firms and services. When there are too many firms competing within an industry they all loose market share and thus are hurting each other. Often to compete in a market of excess capacity firms scramble to provide a service cheapest; this is not necessarily the best practice to ensure survival.

The market for architectural services is an excellent example an inefficient market. The vast majority of architecture-led firms are new, most are under ten and not many are over twenty years old. Architecture firms are not remaining in their markets for long because they have bad business practices, have bad product mixes and are not finding the clients necessary to stay in business. There is too much competition and alternatives for architectural services and this trend shows no sign of reversing unless there is consolidation to eliminate excess capacity.

Industry consolidation eliminates excess capacity. With consolidation firms that are providing excess capacity and not providing services efficiently go bankrupt. The market efficient firms are bought out and higher barriers to entry are established because of presence of the big, market efficient firms. When the building-design industry
consolidates this leaves only the market efficient firms capable of survival and leadership.

For decades, and through to today a great deal of energy and ink is spent in architecture on new modes of design and building delivery. Perhaps, it is only with a consolidated building-design industry, free from spending so much capital and resources on excess capacity and inefficient competition that real innovation in manufacturing and processes for delivering buildings can eventually happen. Business theory holds that consolidated industries have more money available for research and development. With the availability of more internal capital and diversified talent and interests available after mergers, firms have more money and resources to expend on research and development. In consolidated industries with research and development and the ability to control supply chains there are more opportunities to change the way an industry delivers its goods and services.

Small firms still exist in consolidated industries and markets. So, should there be any doubt, small, experimental and innovative architecture practices will exist in the consolidated building-design industry. The value and expectations of alternative services is raised with market consolidation because these differentiated services can be provided without having to compete for resources within an inefficient firm, market or industry.

Another alternative is small, experimental, innovative or highly differentiated services existing within larger firms to capture prestige in a market. There are already examples of
boutique firms existing within larger building services firms. One of the world’s most celebrated architects provides such an example. In 1996, threatened with bankruptcy and the survival of his office Rem Koolhaas sold controlling interest of his firm, OMA to the large Dutch engineering-led firm de Weger. Itself a subsidiary of the larger building services firm Royal Haskoning. De Weger began managing OMA’s back office functions and three years later, in 1999, OMA for the first time turned a profit. Koolhaas, explaining the benefits of the buyout, said the association gave OMA the flexibility to be big or small as they exchanged people and capacity with De Weger (www.classic.archined.nl).

A consolidated market encourages the flourishing of new services by providing increased new markets for services. Buyouts, when they free up capital, provide opportunities and incentives to invest in new businesses. When capital and market options are over-restricted or over saturated, potential investors are discouraged from starting new businesses, putting venture capital into new start-ups and succeeding.

In consolidated industries and markets, other firms pick up the services dropped by larger, merging firms or smaller firms develop alternative services when faced with competition and barriers to entry. New modes of practice flourish when there is value in doing so.
Rem Koolhaas again provides an example of this business theory. Because Koolhaas sold the interest to de Weger, he had a cash infusion and more free time. Shortly after the sale of OMA he started AMO and intensified his independent research projects.

A Consolidated Building-Design Industry

Following consolidation in the building-design industry there will be large global building services firms with tens of thousands of employees and tens, perhaps hundreds, of billions of dollars in revenue. The large building services firms will be single-source providers, as evidenced by the recent developments in the industry. However, the large firms will not be single-source providers alone, different services and different combinations of them are required at different times. Building services firms today and the mega ones of the future will offer services that may or may not be integrated. Much like the services offered by the largest financial services firms today.

The advent of the mega building-services firm does not mean the advent of one mega building services firm. The recent wave of merges and acquisitions and consolidation of other markets has not brought one financial services or healthcare provider or one automotive or petrol-chemical manufacturer. There are several leaders in a consolidated industry and the amount of consolidation with in an industry varies (figure 13). It may be that there are five strong leaders or eleven or twelve recognized for different strengths
and markets. Competition will still exist. This is because clients understand that there are benefits to patronizing multiple firms. Also, competition is guaranteed under anti-trust and similar laws and markets will always exist for smaller firms.

There will also be opportunities for firms that offer differentiated design services. There will always be a market for one-of-a-kind architecture and designs of distinction. To be sure, the large building services firms should provide such design services but there will also be small firms who will seek to provide such services, independent of the large firms. However, with large firms providing competitive services more market efficiently, in the future the barriers to entry for small firms in certain markets will be more significant. Small design firms need to provide information and expertise that are perceived as unique and add value to a project.

New modes of practice, new services and experimental design will exist and even flourish in a more consolidated industry, as small firms will innovate to survive. Small firms may improve on designs and processes and grow to compete with the largest of firms or their innovations will influence change amongst the larger firms.

The firms and services, large and small, that will survive and thrive in a more consolidated industry will be those that are most attuned to the understandings of their clients. The competition for the survival of services will be intense, given the largest companies will have the greatest access to markets and supply chains. Those who survive
will understand buildings as clients understand them, as capital assets, and in terms of productivity, income, expense, profit and aesthetics. If architecture schools are to train future leaders in the industry perhaps the time has come for the schools to begin to integrate more of these understandings into their curriculum.

The large building services firms will understand markets differently than the industry does today. They will have the motivation to stay in business, knowledge and resources to define their markets more broadly. Where once markets were understood locally and regionally they will be understood nationally. Where once they were understood nationally they would be understood globally.

Once markets and building programs are drawn more broadly economies of scale are introduced into design and delivery. This has the promise of improvement. The repetition of a design or process allows the cost of innovation to be shared over multiple projects. In a more consolidated industry, competition amongst firms, ability to spend more resources on research and development and reduced inefficiencies in the allocation of resources—in firms and the industry—will provide better buildings.

Industry consolidation will mean that the design and delivery methods that are present today will not be found in the future. There will be new methods of delivery and relationships amongst clients, designers, subcontractors, vendors and manufacturers. The integrative function will be important in the future. The leaders in the consolidating
building-design industry will be the ones who find new methods of delivery and relationships amongst design, delivery and manufacturing. The industry is demanding single source delivery, which means the better products will have a more integrated development process. Training and education today should begin to recognize the need for more collaboration amongst the various professionals and schools—architecture, construction, and engineering—to better prepare individuals for a more integrated design and delivery process.

Change is certainly amongst us in the building design industry; the developments of the last twenty years show no sign of reversing or slowing. However, at this point, the exact nature of the industry in the future cannot be predicted because the new methods and relationships are dependant upon the individuals, professions and markets that emerge as leaders to affect change within the building design industry. There are so many people and players who potentially could lead the industry; certainly engineering-led firms have the lead today—given their financial resources—but architecture-led firms could lead, given a restructuring and diversifying of a few firms, there is also potential leadership in large contractor-led firms or even full-service developers, such as a large housing developer who takes their knowledge of the industry, processes and management and enters new markets, say schools or healthcare. Leadership in the industry could come from several different types of firms and take many different directions in a drive towards consolidation, but the point of convergence is the same for all of them: large scale, multi-disciplinary and single-source.
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