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RELATIONS BETWEEN ARCHITECTURE AND MANAGEMENT

David L. Hawk

Architects are being swept along by forces they seem not to appreciate and fail to manage. The quality of people in the profession remains high, yet the qualities of their professional contributions are ever more open to question. One response is to add general management knowledge onto the traditional core of what architects know so as to better organize business-as-usual. Managing to financially survive, while marketing a variety of employee skills and keeping accounts on project costs is the fare of modern management. This is available in most United States MBA programs and can be readily used to top off a studio-based education. A different approach is presented herein. Instead of learning to manage what is known, it is here argued that which enables while unlearning that which disables. This requires something more robust than what is found in modern management education and can be seen in the innovative business operations of some firms in other industries. Considerable potential exists to bring this into architecture. A means outlined here comes under the title of virtual systems, as it developed from general systems theory. As an arena it is especially friendly to architectural aspirations and values. With it, innovative firms have demonstrated that the ultimate measure of success of the virtual manager is as a manager of aesthetics phenomena. As such, a virtual manager does not in actuality exist, except for all practical purposes manages situations that transform themselves, their environments, and those who participate. Using this, innovative organizations have learned to make who they are and what they do more valuable.

INTRODUCTION

Most professions are having difficulties responding to a changed and challenging socioeconomic fabric. Professionals are expected to do more with fewer resources. They are expected to know more things with greater depth. They are expected to be responsive to the individualized needs of the most local while responding to the interdependencies of the global. This sets the stage for significant problems and opportunities. The difficulties in meeting changing societal agendas are apparent in the profession of architecture. Architecture is being asked to reconsider what it is, knows, and does. Architecture is passing through a phase-state change.¹ Business-as-usual becomes meaningless business.

There is little work for those wanting to design buildings for a usual client set. This situation demoralizes those who wish to follow the path of their mentors, but it opens up exciting possibilities for those who seek a new way. Architects with ideas for significant improvements to the means for designing and delivering better buildings are needed. The developmental excesses of the 1980s are now gone. The fabric of economic exchange and human well-being is restructured. Production, consumption, trade, wastes, services, and employment are redefined.

New measures of success are coming from demands for quality and concerns for efficiency. More and bigger no longer symbolize success. Clues to how architects may best respond can be seen in the circumstances of the former clients of architects, which have seen their operations transformed. Corporations, school districts, hospitals, state agencies, and households have been restructured and now require ways to accomplish more with less. This challenge is passed on to those who provide buildings. New possibilities have come onto the stage, as well as new ambiguities about the play that is being performed.

While the future is ambiguous, it is clear that the qualitative limits the conditions of success. How a building space is produced and how its qualities relate to actual user needs is more important than traditional design concerns for what the space is (or "wants to be"). Architecture, a profession that prides itself on valuing innovation, ought to be well-positioned for this situation, but does it have information of the kind needed to take advantage of its position? Probably not. Architects see need for their services, yet potential clients do not associate architectural service with their needs. Clients see architects practicing activities that are far from the kinds of services they see as value-adding. Is it the customer that is wrong? Perhaps, but ascribing low qualities to the consumer is seldom a helpful way to explain a problem. This was what GM did in the 1970s, which pushed their customer base to others in the 1980s. Regardless of its truth, it is largely counter-productive to discuss client quality or lack thereof. It is better to examine how the threatened party, in this instance architects, is perceived by clients.²

Clients associate the architecture profession with drawings, which, while they may be pretty, are seen as static, two-dimensional representations designed more for architects than their customers. In addition, architects are seen as generally uninformed and uninterested in the substantive issues of building as represented by the arena of building materials and technologies. And finally, architects seem proud of their disinterest in the economic processes in a building's success or failure. Engineers have responsibility for the structural, mechanical, electrical, and material systems that define the success of a building's third dimension. Developers have control of the economic decisions that define a building's success in the fourth dimension. Architects' contributions to the total value-adding building process have remained largely with two dimensional media. It has thereby been diminished.

Opportunities for improvement of this situation lie in changing the way in which the growing parts of the building process are managed. This begins in appreciating and then organizing the resources found in the different visions of what a building is and how it ought to be articulated.³ Where successful, this approach results in greatly enhanced final building products. The limit on success in this process lies with the limits of the managerial. Architects should and must learn about this kind of limiting condition and how best to expand it.

Innovations in the socioeconomic managerial process necessarily confront the traditional power struggles that have been used to energize and drive the building process. A decade ago, when resources were abundant, the politics of power could motivate the process. Now, when resources are scarce, traditional processes tend only to disorganize the results. There are more beneficial alternatives to the power-oriented, socio-Darwinistic approach, but they require high levels of organizational skill. Where successful, these open up an enhanced process of design and production and go well beyond traditional dreams of integration, such as what is seen in modified design-build approaches. Newer approaches must respond to a situation where impossible demands become minimal requirements in a changed value-adding process.

The accelerated rate of change has also shifted the definition of normal; past and future have collapsed into the present. Traditional architectural posturing and "winging it" have become liabilities to relations with users who have little time to absorb errors and omissions. Clients now demand substance, and their traditional timelines have been reduced to the omnipresent of real-time. Building industry professionals are expected to do more, do it more quickly, and end up with higher quality results. Architects schooled in the tradition of Wright see this situation as simply wrong. In fact, it is as an opportunity for improvement. It requires a different kind of architectural activity, one that involves managerial approaches that can transcend the formality and limitations of hierarchies and structures of rule-systems. The objective of this change is to arrive at a means to softly manage dynamic, non-linear forces in ways that exceed client needs.

Clients desire to see their problems resolved in the present. This is given precedence over designer needs for future recognition and requires a very different design attitude. It modifies the tradition of peer recognition as the motivator of design. Such traditions are too slow for organizing highly dynamic situations. In response, some architects have experimented with courses and degrees in economics, business, and/or management. This has been useful, at least to those who did it, but the results have made little difference to the core of the profession — design. Those who went down the business school route were often attracted off to banking, real estate, or insurance investment concerns once they learned that interest rates were more important to project success than decisions on window arrangement. Those who learned a bit about economics and management and yet stayed near the core of architecture too often ended up worsening their situation and that of the building industry. The economic, financial, and managerial models they tasted, in the few courses they took, ended up being superficially inappropriate to the challenges they later faced. Another approach is needed, and argued for herein. Economic and management theories have their own internal difficulties. These are at least as bad as those of architectural theory.

Applying the shortcomings of bad economics to the shortcomings of bad architecture raises the level of frustration not knowledge. It is better for all parties, architects, business managers, and economists, to be skeptical of the models on which they rely. From this basis for inquiry, various attitudes about what a building is and should be can be integrated and then elevated above the limitations of any one viewpoint.

In the following paper, an alternative is outlined. It includes a model of process management that allows mutual appreciation of the strengths and weaknesses of all aspects of the building industry. This can be seen in activities in some architectural firms and educational programs. One firm was Caudill, Rowlet, Scott, and Serrine (CRSS), which no longer exists. One school, New Jersey Institute of Technology (NJIT), uses client consultation and a dual architecture-management degree program to participate in a changed building industry. NJIT offers a series of joint architecture-management courses to combine the strengths of architecture and management. It uses an introductory architecture course designed to help students consider alternatives to business as usual. Architecture is presented as a part of a larger building production industry. The course equips students with models to consider new forms of architectural operations.⁴ While it does not accomplish the full agenda as proposed in this paper, it does set the stage for ways to move forward.

THE ARCHITECT'S SITUATION: PROFESSIONAL ENDANGERMENT

Many believe the architecture profession to be in serious trouble.⁵ Its troubles can be seen in schools and offices. Architecture needs to become more adaptive and needs to find ways to reorganize itself so as to tap into newly emerging value-adding processes. The alternative is to continue to allow what now constitutes contemporary architectural practice to be incorporated into what other participants in the building process do.

Clues for how to improve architecture, and the industry of which it is a part, are seen in the events of other industries. Changes in auto, electronics, finance, and computer design and production were in response to an urgent need to find "better" ways. It is now widely accepted that the success of Japanese approaches to product development and delivery systems was key to moving U.S. and European companies to change their traditions. U.S. and European firms that traditionally added value through techniques of mass production and consumption needed instead to learn to accommodate individual consumer values and to move to more efficient design and production methods. The same may be about to happen in construction.

The U.S. building producing industry is hesitant to respond to significant changes as requested by its clients. The industry's clients have changed more than the industry. This presents serious dilemmas for those who behave as if they are immune to, or outside of, the changing societal value-adding processes. Perhaps architects presume that what they do is so sophisticated that they have immunity from the "whims" of changing consumer values. Perhaps architects see themselves as the leaders of societal value change and thus conclude that they have no need to change. Either attitude causes architects to see building-making as value-adding as repugnant to their internal aesthetic sensibilities.⁶

Conceiving of building making as a value-adding process raises questions about the traditions of the entire industry. It shifts emphasis from the supply side, with its focus on the making of personal monuments, to the demand side, where clients expect service. Requirements on the demand side are more demanding and systematic and include the values and ideas of various clients, suppliers, and stakeholders in a service-giving process. The measures of success on the supply side were easier to respond to — "Just do it."

Other industries have articulated viable responses to the transition from supply to demand functions over the past decade. Two items have been consistent with these responses and may be especially relevant to architecture:

- Traditional distinctions, such as that between design and production, and management and labor, should not be used to artificially separate activities that need to be naturally linked.
- Formal management routines are incapable of managing complex situations in motion.⁷ Accessing the powers of the informal often requires elimination of the formal, a radical change in the theory and practice of management.

Experiences from other industries illustrate the importance of tapping into the innovative potentials of individual employees. In this way, there is a larger resource base for responding to complexities that challenge industry survival. This becomes the major management challenge. The emphasis shifts toward improved human interaction and away from memos, bureaucracies, rules, and perks. A great deal has already been accomplished in this regard in other industries. They have invented new ideas for designing, organizing, and managing in the face of change.

Architecture now needs to access some of what has been learned elsewhere. Important to the theories used in other industries were ideas developed in the 1930s and 1940s for problem-solving through systems thinking.⁸ The work of the biologist who initiated these models was in response to consequences of solving problems through traditional analytical thinking where a problem gets segmented into fragments during the process of solving it,⁹ and thus the analytical process becomes the problem.

The problems and methods of early general systems theories have become mainstream instruments of contemporary management. Early systems ideas seem also to be complementary to the values of architecture. Architects are predisposed to use more systemic, and less analytic, approaches to the phenomena with which they deal. This means that the alternatives to traditional management appear consistent with the holistic dreams that attract people to architecture.¹⁰ This is important to bring a new alignment between new ideas about architecture and management.

Architectural training has historically shunned management practice. In large part, this was due to a belief that management was more concerned with general business operations than with expressions of individual freedom. Management was seen to be pagan, boring, and intrusive to the creative processes. A widely publicized expression of this logic was articulated in the book and movie, *The Fountainhead*: "I (as an architect) have clients in order to build buildings. I do not build in order to have clients."¹¹

The negative attitude of architects toward clients and business management has recently begun to change. A major reason must be the general decline in clients and business for architects. As a response, some architects are turning to management training books, sessions, and courses. There is a danger in this. Architects could end up in a worse situation by having adopted a tradition of business management practices that are seriously flawed. Architects' early shunning of such practices may prove to be vindicated just as they begin to adopt them.

Modern management practices evolved from the early needs of industrialization. Since WWII, they have failed to meet the needs of post-war industries. Traditional models, when confronted by complex realities, tended to further disorganize that which they intended to organize. It is highly unlikely that this tradition can be anymore beneficial to needs for managing the complexities of architecture and the building industry. Traditional models of management pose a threat to architecture in that a number of architectural schools and architectural practices are now encouraging their introduction and use.¹² While architecture should learn more about manage-

ment, it should not adopt the limitations built into modern management. Architecture could bypass modern management and move directly to the edge of management innovation.

The essentials of how best to manage complexity are vague. What is clear is that successful managers must develop skill in negotiating with change¹³ and organizing risk-taking associated with different parts changing at different rates. Successful managers are those who can couple vision with an ability to innovatively accomplish the ideals in that vision. Management thus becomes a guidance system for an organization that strives to continually reformulate its vision and itself. Management knowledge is no longer the province of a few over the many. The process for making buildings illustrates this. Shifting ideals of what constitutes a viable building have long been a design concern. When the needs that define the ideal shift, the challenge becomes greater. Much more is then required of the designer. Likewise, successful managers are those who bring good things out of bad situations.¹⁴

Some argue that the current situation of industrial society is little changed from what it has historically been. They argue that while titles have changed, the underlying societal, economic, and technological issues are the same. The conclusion of this logic is, if you are concerned about the future, simply look to the past for guidance.¹⁵ If you're not concerned, just keep on keeping on. A group of international clients of architects, with a sense of humor, tapped into this logic in a seminar on the subject. They pointed out that architects previously succeeded by not really understanding much of what they were responsible for.¹⁶ Through the use of liberal amounts of arrogance, they managed to bully their way through situations and convince clients and builders to be quiet. Their conclusion was that "the current low status of architects is appropriate — architects shouldn't be expected to know very much since they don't cost very much."

Client humor turns to client anger as significant errors emerge in a complex building project. These errors end up costing a great deal through a building's life cycle. To be fair, the same kinds of criticisms can be and are leveled at almost all disciplines and professions, including management education. In management training, there is an implicit assumption that a manager must know everything that his/her employees know. This was the traditional idea behind architectural education as well. As it becomes more impossible to know everything, due to sophistication of products, technologies, and demands, tradition finds a way to reverse itself. One result is a belief that it is easiest to manage those with detailed knowledge by knowing nothing of what they know.¹⁷ It is even argued that too much specific knowledge can obscure a manager's responsibility for "holistic" thinking.¹⁸

This process of finessing your way through situations where you do not know what you are talking about is found in many educational settings, including architectural studios and management classes. It is seen in school presentations and presentations to clients. A general building proposal, or a vague marketing mark-up, gets shown. In-depth discussions are avoided. Discourse centers on specific-sounding words like "is it functional" or "does it work."¹⁹ Students easily come to assume that this is the behavior expected of a professional.²⁰

The current situation is much too demanding for this approach. It requires innovative responses. Social and technological complexities, and their relations to natural conditions, have generated processes that demand qualities and efficiencies so great that no traditional style of architectural²¹ or general business management can measure up. Clients recognize those lacking in content and resorting to puffery to provide content for process.²² Architecture would be better served to redefine its current situation via articulation of the challenges facing it. A beginning might be seen in these three points:

- There is a societal perception that what architects do has little impact on the urgent and growing needs of contemporary society, e.g., playing with facade design while ignoring the sophisticated requirements of a building's contents.
- There are contradictions in the educational base of architecture that end up alienating students and confusing other disciplines on whom architects depend, e.g., architecture as the only "design" profession with a mysterious way to formally produce spontaneously creative people.
- There is a lack of architectural involvement in significant changes taking place in the products and organizational processes of the building industry, e.g., inspired facilities not designed by architects and buildings that build themselves.

How can architects best respond to the challenges resulting from these conditions? Learning more about management could be helpful, but it must be models of management sufficiently robust to accommodate change.

A SUMMARY OF THE ARCHITECT'S PLIGHT

Architects are now largely absent from important parts of the building industry. They receive low pay and face high unemployment for what they do. The fact of low pay feeds on itself and further lowers the perceived importance of the architect in society and to industry. The result is ever lower esteem for the architect in the value-adding process. Even lawyers, largely seen as occupying a very negative role in the building process, are seen as more important to value-adding in the industry than architects.²³

Architects have come up with several responses to this situation. One is an argument that construction is a cyclical industry and if one just manages to hang on, the cycle will turn up and business will pick up. There is little possibility that this can happen in the 1990s. The tremendous building spree of the last decade cannot easily be absorbed, nor its consequences easily accommodated.²⁴ In addition, the needs of clients are undergoing a profound transformation. Business-as-usual will mean little business for a long time.

An alternative to such rationalizations is acceptance that architecture, like other professions, must undergo change. There are two obvious choices for this. The first changes the argument, not the profession. It begins with a stable profession before moving outward to place blame with clients and society for the profession's troubles. The second begins by looking outward to find information and then works to bring what is learned back to the task of changing architecture.

Externalization of blame, the first approach, begins with architecture firms berating and criticizing the weaknesses of their employees. "My employees know nothing and expect much" is a comment typically found in this approach. The responsibility is given to the shortcomings in architectural education. After criticizing the local schools, then the Association of Collegiate Schools of Architecture (ACSA),²⁵ and finally the AIA, the individual in question shifts blame to bad clients and a rotten general society. Another clue to this approach is to look for a call "to educate clients. They must be taught to know, appreciate, and respect what architects do."²⁶ This is about where the discussion, and activity, stops.

The other approach is to internalize the blame. It is unusual for most organizations and almost always only occurs when the situation is hopeless. It begins with an environmental scan to seek clues and signs of what is going on. They get translated into ideas about improvement. Where successful, this ends with the internalization of means to avoid problems and realize the benefits in change.

The content of this paper points out that architecture now has a special opportunity to bring new knowledge into the profession. Most important to the success of this activity is demonstrating beneficial change to architecture.²⁷ This is why architecture should learn from the broad subject area of management and then seek models beneficial to its needs. The models must be sufficiently robust to accommodate issues of client relations, general business practices, and specific resource allocations. These will probably not be found in traditional management education.

A SHORT HISTORY OF THE SUBSTANCE OF MANAGEMENT TRAINING

The overall logic for how design professions and management principles are linked to each other can be seen in a book that connects the capability of management with the potentials of design.²⁸ It was written by representatives of many disciplines with a common objective of each discipline needing to find an interdisciplinary framework for design and for managing design results. Most parts of the book point to dangers in simply applying traditional management models to the phenomenon of design. The contents of this paper continue with that thesis.

Architects have avoided formal training in management. Exceptions would be those who entered MBA programs after architecture. Since most never returned to architectural practice they are not seen as a solution to the problem addressed herein. This returns us to the general concern in the paper: Assuming that management has something important to say to architecture, which of its models would be most beneficial? The well-publicized limitations to the traditional MBA model of management give support to architects who long questioned its relevance. Numerous MBA graduates are like the most successful car salesman in the U.S. The one selected each year often brags about being so good that he can sell without any knowledge of any technical or performance aspects of the product.²⁹ Who needs the vulgarities of management on top of the vagueness of architecture? Current models of management are seriously flawed, but their flaws do not justify lack of knowledge about management. Architects might feel good about management education being as weak as architectural education, but they should not. Instead they should see if there are parallels in the weaknesses of each. Increasing importance is being placed on decisions that involve the management of technology and of design, but technology development and product design issues are seldom mentioned either in MBA programs or in architecture schools. Change in both MBA programs and architectural schools is needed. Architects can easily see this by looking at the underpinnings of contemporary management legitimation.

The concept of management implies structure. A structure allows managers to bring their ideas and intentions to the accomplishment of some purposes. This gives shape, form, and direction to actions. Management structures come from a long history of ideas, intentions, and purposes. Three versions of "structure" are offered in the following. They give a sense of the historic progression of who managers are and what they do. The three are: 1) management by decree, 2) management by science, and 3) management by degree.

The history of management begins with who will be the manager then moves to what the manager will do. There has been an evolution in who is selected to manage, but the distance

traveled during many centuries is insufficient to current needs. The evolution begins in the royal courts of Europe and ends in the business programs of the U.S.

Phase I — Management by Decree

The activity called management has been with humans for a long time. In early society, rulers were thought to have been selected by a god³⁰ or presented by birth with membership in a specific gene pool. Regardless, those selected to be rulers were assumed to have been given their special status for life, over the lives of others, by fact of birth. Rulers were given the responsibility for management of societies. When an action was desired from the subjects, a decree was sent and it was so done, or was so assumed to have been. Where it was found to not be done, or done improperly, the consequences could be quick and severe. Instead of carrots and sticks, these "managers" used prisons and guillotines. The style of management was clear and came to be codified as such.³¹ This was an easier time for the managers than the managed.

The early history of the Western world is written via management by decrees, their initial acceptance, and their final rejection. The ruler was the manager, and a manager's legitimization came from hierarchical position in a royal family or a religious order. This is important because we continue to see residual traces of this belief structure in contemporary management structures. This is where managers come to believe they are rulers³² and their organizations are kingdoms.

The basic tenets of hierarchical management began in ancient courts and churches. The king or the pope sat atop an organizational pyramid with dominion over a vast array of subordinates just waiting to respond to every whim. Organizational specifics were dependent on the characteristics and character of the individual ruler. Such describes the management of societal entities like the Roman Empire, feudal estates, and the British Empire.

The next stage of development, one that overlapped with the prior structure, began in the seventeenth century. It resulted from the requirements in a preindustrial society for people with special talents to manage growing complexities. It was widely seen that birth did not guarantee competence. There was growing evidence of the weaknesses in giving control over societal processes for goods production and distribution to royal or inherited positions.³³ Societies began to seek people with talent or skill in leading others in organized production of goods and services. The term for this phenomenon came from the French concept of "manage."³⁴ By the sixteenth century this notion of formal management entered the English language. Its emergence marked a shift away from reliance on those born into a position of authority. Professional managers were required due to industrialization. The next level of management development in western society was the method used to bring industrialization to society — science.

Phase II — Management by Science

Changes in management theory and practice evolved in parallel to the industrialization of process. Great production gains were achieved, but the results were highly fragmented. This required management. Specialization was seen to result in highly economical mass production, but the extreme diversity of specializations produced a system that was heavily dependent on strong control for fitting pieces together. Operations and their management came to be based on hierarchical principles of organization. Production processes made greater use of scientific principles and so too did the management processes. Predictability of processes and products was paramount. Managers tried to make the human element the same. Consumers, too, had few choices.

Democratic ideas emerged alongside industrialization needs. It was shown that competence of managers was more critical to industrial success than was birthright. The need for new kinds of managers brought significant changes to society. Questions surfaced regarding who and how to manage. Society turned to people with highly specialized talents, one being an ability to manage others. This was the basis for management as a science. Its agenda began with the assumption that people can be motivated with carrots and sticks. Science provided knowledge of how much and when to use each.

Once it was agreed that managers were those with special skills for getting others to do what they would not naturally do, some general guidelines could be drawn up, and they soon were. The results were used to direct managers in what they were to achieve and how they should achieve it. Adam Smith was an early leader in suggesting guidelines for managers to bring economic efficiency to society. He began with the division of labor into parts.

*The greatest improvement in the productive powers of labour, and the greatest part of the skill, dexterity, and judgment with which it is anywhere directed, or applied, seem to have been the effects of the division of labour.*³⁵

The importance of science to implementing Smith's guidelines was first argued in the writings of Charles Babbage. He took ideas from *The Wealth of Nations* and pushed them further. He combined Smith's economic logic with his own logic of machines.³⁶

*Perhaps the most important principle on which the economy of a manufacturer depends, is the division of labour amongst the persons who perform the work ... This division of labour into trades was not, however, the result of an opinion that the general riches of the community would be increased by such an arrangement; but it must have arisen from the circumstance of each individual so employed discovering that he himself could thus make a greater profit of his labour than by pursuing more varied occupations ... It is difficult to estimate in numbers the effect of this cause upon production. In nail-making, Adam Smith has stated, that it is almost three to one; for, he observes, that a smith accustomed to make nails, but whose whole business has not been that of a nailer, can make only from eight hundred to a thousand per day; whilst a lad who had never exercised any other trade, can make upwards of two thousand three hundred a day.*³⁷

The quest for clear principles of scientific management continued into the early twentieth century when Frederick W. Taylor clarified the modernist agenda and the search for final guidelines. He built on the work of Smith and Babbage but went on to find ways to manage men via what was known of science at the time. He attempted to apply principles of classical physics to managing men as well as materials and machines.

The search for better, for more competent men, from the presidents of our great companies down to our household servants, was never more vigorous than it is now. And more than ever before is the demand for competent men in excess of the supply ... In the past, the prevailing idea has been well expressed in the saying that "Captains of industry are born, not made;" and the theory has been that if one could get the right man, methods could be safely left to him. In the future, it will be appreciated that our leaders must be trained right as well as born right, and that no great man can (with the old system of personal management) hope to compete with a number of ordinary men who have been properly

*organized so as to efficiently cooperate. In the past, the man has been first; in the future, the system must be first.*³⁸

Taylor's desire to simplify and clarify management principles and practices, and the men who were to use them, came to be codified in concepts of time and motion studies, worker motivation techniques, and piece-work organization. All three become critical to modern management theory. Taylor's ideals continue today as mainstream guidelines for many students and practitioners of traditional business administration programs.

Phase III — Management by Degree

The Master of Business Management (MBA) is now almost synonymous to the concept of the modern manager. There has even been discussion of creating a professional society for managers, like those for the professions of architects, doctors, and lawyers. MBA graduates expect to manage, and employers expect their managers to have an MBA. Along with the success of this tautology, signs of trouble are emerging. Employees and employers are encountering weaknesses in the traditional MBA educational process.

Via the brief MBA education, students learn a few principles of accounting, finance, marketing, and management. Those awarded an MBA tend to present themselves as knowing more than they do, but that is what they learned to do in marketing. In addition, the management principles being taught are not far removed from Taylor's 1911 principles of scientific management. Current conditions of business are far more complex than the settings that Smith, Babbage, or Taylor envisioned. Making pins and nails for a public eager to accept any and all products is not typical of current socio-economic conditions. Complex technologies, extensive regulations, and demanding customers have become the rule.

The major criticism against MBA training has emerged in parallel to the growing importance of international business. International comparisons of successful business practices have brought much criticism to the MBA. Reviewing two decades of exchange with our major trading partners in Europe and Asia illustrates how others achieved significant management success without use of the U.S. version of MBA training and degrees.³⁹ Knowledge acquired in a typical MBA program is often counterproductive to management of complex difficulties in rapidly changing, technologically-based, culturally diverse environments. Its case-method basis can be counterproductive to real-time, empirical decision making.

The U.S. version of MBA training is now seen as one more of America's eroding institutions that has trouble effectively adapting to a changing world. A recent *Fortune* article suggests some reasons for this:

A hard look at what business schools are turning out suggests that it's little wonder that employers aren't clamoring for the product. The sad fact gradually dawning on both employers and academicians: Business education has become largely irrelevant to business practice. Corporate recruiters complain the Master of Business Management (MBA) lacks creativity, people skills, aptitude for teamwork, and the ability to speak and write with clarity and conciseness — all hallmarks of a good manager. Blame their teachers, in part: Professors seeking promotion churn out scholarly articles but somehow let the pivotal management concepts of the eighties get past them.

"Business schools completely missed the quality revolution," observes Robert Kaplan, a professor at Harvard Business School. They remain oblivious to time-based competition

*and breakthroughs in technology and information management, he maintains. Who needs managers who have just spent two years with such an out-of-date crowd? In response to the problem, business schools have begun trying to change how and what they teach, groping for relevance. It may be too late.*⁴⁰

The conclusion should not be that management knowledge is thus unimportant. As was pointed out in the first section, understanding management can be a critical element of future architectural success. What is needed is a more robust version of management than that taught in U.S. business schools. Alternatives do exist and continue to emerge. Some foreign and U.S. industrial firms are now developing them for and within their international operations.

The essence of the problem of MBA education, especially in its operations-related courses, can be seen in the skepticism posed by Ambrose Bierce's definition of the "logic" predominately used for the modern era:

Logic, a noun, The art of thinking and reasoning in strict accordance with the limitations and incapacities of the human misunderstanding. The basic of logic is the syllogism, consisting of a major and a minor premise and a conclusion — thus:

- *Major Premise: Sixty men can do a piece of work sixty times as quickly as one man.*
- *Minor Premise: One man can dig a post hole in sixty seconds; therefore —*
- *Conclusion: Sixty men can dig a post hole in one second.*

*This may be called the syllogism arithmetical, in which, by combining logic and mathematics, we obtain a double certainty and are twice blessed.*⁴¹

Traditional management practice has been conceived to help these sixty men dig their one second post holes. Now that we understand why it can take sixty men longer than sixty seconds to dig the hole, we should move to more robust methods of managing human activities. It is clear that management practices taught in traditional MBA programs have not helped to solve the problems U.S. business organizations are having in global markets. In some other countries, a manager is expected to resign in disgrace, or at least take a pay cut, when profits or product quality declines.⁴² U.S. managers, on the other hand, manage to get another raise in their pay. Management knowledge that was sufficient for early to late industrialization is woefully inadequate to current and emerging needs. With new competitors and new technologies, it is no longer possible to simply dream of managing product life cycles of cash cows.⁴³

MANAGEMENT CONCEPTS THAT CAN BENEFIT ARCHITECTURE

As suggested at the outset, management and architecture operate in different and separate realities. Management education seldom includes training in design,⁴⁴ and architecture avoids training in business management.⁴⁵ This situation benefits neither. Architecture requires some of the organizational skills found in management theory, and management practice needs some of the content in product, process, and organizational design provided by architectural knowledge. The potentials in increasing managers' awareness of design have been articulated by researchers such as Colin Clipson at Michigan. He initiated and built a program to demonstrate the importance of design to improving America's competitive edge, although that edge seems to have vanished along with use of his work.⁴⁶

We should look at studies like Clipson's and reconsider the basis for architecture's non- to anti-management postures. Management skills are essential if architects are to deal with their current economic, political, aesthetic, and technical problems, but they cannot be traditional approaches

to management. Many of the alternatives stem from a tight cluster of ideas that came from the action research of a group at the Tavistock Institute in London. Their efforts were initiated near the close of World War II and set the stage for introducing a radically different set of ideas about management. Two of their most widely recognized ideas are "autonomous work groups" and "socio-technical systems."⁴⁷

The Tavistock research groups initiated a fundamental shift in considering how work is perceived, organized, and managed. Their ideas are basic to emerging trends in management theory and could be helpful in the education of architects who seek to improve architectural practice.

The autonomous work group idea has become the centerpiece of the Japanese model for group design and quality management. Their processes show high quality results for product development in a wide variety of industries. Very few American firms take this team-approach mandate seriously, including architectural firms. The major impediment appears to be attitude.

Much theoretical work on experimental forms of management was carried out during the 1970s and 1980s. The majority of it comes from the learning basis established in the work of the 1950s by Trist, *et al.* As M. Bucklow points out:

- Success in the use of the autonomous work groups was instructive, especially when used where other group techniques had failed. It exemplified the importance of first making basic changes in the structure of an organization's work, prior to expecting that the outcome of the work might be improved. This was clearly shown where a quality checker was added to an existing system of work organization and little improvement followed.
- Lou Davis's survey of management practices and assumptions about job design showed the strong continuing influence of scientific management. The adverse effects of greatly reduced interest in job content were thought to be adequately controlled by selection, training, incentives, and working conditions (Davis, Canter, and Hoffman, 1955). The Tavistock work illustrated that this optimism was not justified.
- Miles (1964) demonstrated that long exposure to the ideas of democratic management had not changed managers' perceptions and attitudes; these were closer to those of Taylor than to McGregor's Theory Y. Changing the perceptions and attitudes of managers would require much more than new bright ideas; it would require rude experience with the traditional models.
- Taylor (1947) and the early management theorists believed that their proposals would eliminate the problems of restriction of output, lack of cooperation, apathy, and worker-management conflict. The persistence of these problems over the years led to a succession of new approaches. Human relations and group techniques were part of this pattern and had only limited success.
- There is very little awareness that new thinking about the structure and the design of work is a necessary condition for the elimination of apathy, restriction of output, and similar problems. For this reason, the Tavistock research and the transformation of Non-Linear Systems are of major significance. They both involve basic organizational changes and suggest that the motivation of rank-and-file workers can be achieved by increasing job content and giving men control of their work environment.

- It has been argued that the Tavistock concept for the autonomous work group has more explanatory power than those concepts deriving from traditional group-dynamic thinking. Their coal and textile studies could well supplement the classical studies of Mayo and Lewin as the mainsprings of thinking and action.⁴⁸

Further support for the Trist approach is seen in the "negotiated order" approach to management. It comes from a combination of studies done in hospitals, coal mines, mills, and continuous production factory settings.

Related changes have taken place in architectural education. Architectural educators argue that the real potential of what they do is seen in the design studio process. This is where the content of architectural technologies, humanities, and critical thinking are, where possible, somehow integrated.⁴⁹ It seems more likely that the results end up as egocentrically-sponsored proposals. An observer might argue that the process teaches students to be inefficient while encouraging idiosyncratic behavior. Changing the belief systems behind architectural education may require much rude experience.

Architecture is perceived as having a method of practice that is anti-service. During two decades it has come to be accepted that, to survive, a business must be a service to those who pay for it. This has always been an important condition of economic exchange although the U.S. temporarily forgot about it during the good times of the post WWII environment. There were more consumers than producers during that era. Over the past two decades, the Japanese have helped remind the world of the importance of providing service. The implications of this are ominous for architecture if it does not find a way to redefine its assumptions about the designer's ego. Egocentricity has long roots, not the least of which comes from the lore of how the modern masters of design were allowed to treat their pesky, ignorant, yet necessary clients. These beliefs continue as part of architectural education.

To increase the importance of design to business, architectural design will need to be reconstructed. Recent research into international firms involved in the construction industry illustrates what might be done to change the role of architecture.⁵⁰ Results of the study suggest a negative perception, by clients, about the role of architects relative to providing service. A large group of clients believed that architects were often anti-business, as well as badly managed. They felt architecture was filled with "creative" people who could not perform. Architectural education will need to deal with this perception of its products. Explicit involvement of management training may help, but it will need to use management models that are interesting and applicable. A virtual systems model is here introduced as an example.

VIRTUAL CONSTRUCTS: A FRAMEWORK FOR MANAGEMENT AND ARCHITECTURE

Figure 1 points to three distinct modes of management, the evolution of the field, and to where the field must move if we are to meet the challenges of contemporary conditions. To understand the significance of the third mode, it is instructive to examine the first two.⁵¹ The diagram was largely the creation of undergraduate honors students from engineering and architecture while taking a basic principles of management course.

The first mode begins within the management confines of a narrow box. All a manager needs to do is get workers to head down the alley and then prod them to go faster and be more "produc-

THREE MANAGEMENT MODES

1. Order!

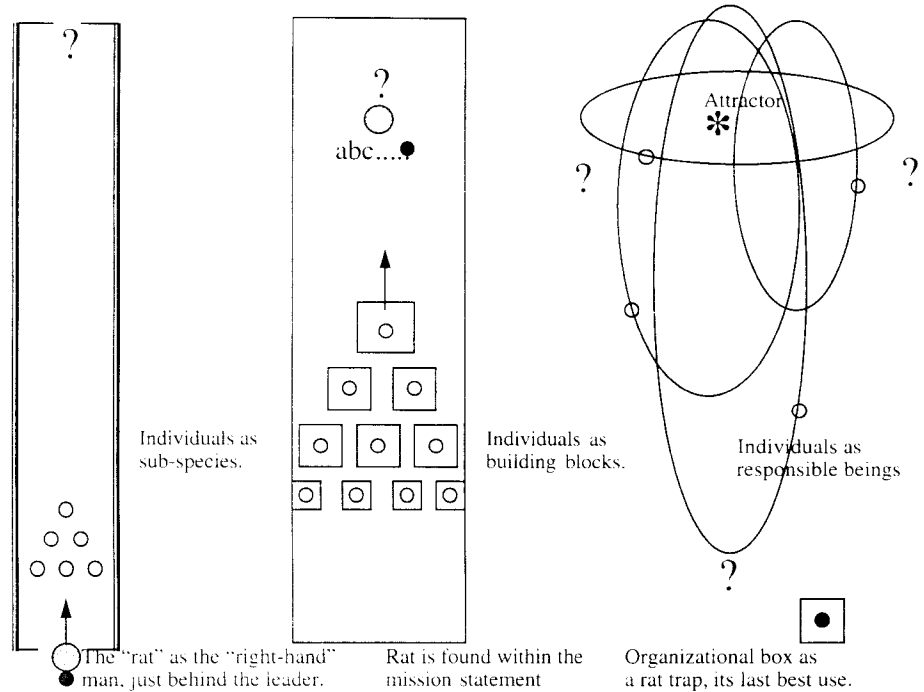
- Fascistic walls
- Unknown goal as director.
- A Dead System

2. Legal Order.

- Democratic boxes
- Mission statement as director
- A Closed System

3. Negotiated Order...

- Anarchistic autonomies
- Ideas/Ideals as attractors, no director.
- An Open System



Legend:

- | | |
|---------------|----------------------------|
| ○ Leaders | ==== Unquestioned Barriers |
| ○ Individuals | — Legalistic Definitions |
| ● Rats | ⤵ Self-defined Orbits |

FIGURE 1. Three modes of management — hard management for soft times, soft management for hard times.

tive." Workers need not know to where they are moving or why they work. That is the prerogative of management. It is important to note the phenomenon of the "rat" in managing the operation. The rat is a worker that informs management of the nature and depth of worker discontent. In this way, human problems can be neutralized prior to an upheaval.

The second mode is a logical progression from the first. In this case, the straight lines of the alley-way expand into "democratic boxes," within which people are undemocratically placed. The manager's role is to articulate the organization's mission and to convey it to employees that occupy the boxes. The "rat" retains a role, but in democratic circumstances its role is to help articulate the mission statement, which always tends toward the cynical.

The third mode is a different logical type. Management helps articulate the objectives and ideals of the mission, then falls back into a reduced profile. Each employee is expected to achieve the objective/ideals as he/she sees fit relying on teleological processes.⁵² Employees are allowed to question the mission by articulating a new ideal based on having gained better information nearer the front line of action. In this mode, the only use of the box is to house the "rat." Elsewhere, this third mode is known as the "negotiated order" mode of management.⁵³

Negotiated order processes of management are especially appropriate to the current difficult challenges of society. These require capabilities and capacities far beyond those of early industrial democracy, yet are consistent with ideas from ancient cultures. An example of this is seen in the validity of principles articulated by Laotse⁵⁴ in 500 B.C. China. His argument was that "he who manages least manages best." This philosophy was the basis of my own 1970s development of the conception of the ideal manager as the "virtual management," the manager who wasn't.

The virtual concept originated in mathematics as the "virtual point." A virtual point is one that is, as a phenomenon, not there, but that in fact operates due to the other phenomena that point to and depend on its existence. Although it doesn't exist, that doesn't matter. It is, for all practical purposes, there. This concept, as it comes from mathematics and as it is used in management, is clearly presented in the 1950s work of Susanne Langer under the heading of virtual space.⁵⁵ Ms. Langer points out how the presence of virtual space is the one constant characteristic of great art, including architecture. "It pulls the viewer into three-dimensional participation with a two-dimensional representation." Virtualness is the core construct. The Oxford English Dictionary defines it as: "That which is so in essence or effect, although not formally or actually; admitting of being called by the name so far as the effect or result is concerned."

A brief elaboration of how virtual can be used in a number of fields that relate to architecture and management follows.

1. *Virtual Space*: This is a vehicle for aesthetic involvement and evaluation. Virtual space is the property of a great painting, sculpture, building, landscape, or score. Its greatness comes from providing an additional dimension beyond that which is actually known to be there. A mirror in a room is a spatial example. "The Scream" by Munch is a painted example. By looking at either, your psyche is brought out of itself and into the other.
2. *Virtual Regulation*: This is the only known method to effectively regulate non-rational phenomena. In its essence, it provides self-regulation of the entity in question. It is used as part of a negotiated order to control an unfolding process of all stakeholders changing their ideas as they learn. The non-rational (aesthetic, poetic, political, and religious) must be included in the process. If not, it will later emerge in an irrational form. Research into this approach

demonstrates that the most effective regulator is one who does not formally exist, thereby requiring and allowing self-regulation.

3. *Virtual Management*: This is a form of management for non-rational phenomena. This begins with a reduction in the layers of management in an organization. These layers insulate the activities of the producer of a product from the values of its consumer. This insulation prohibits mutual learning. The essence of this type of manager is that he/she is not physically there, thus those being managed must assume responsibility for their own management.

Virtual has been directly applied to problems of management theory. It first emerged for this author over fifteen years ago during consulting work for IBM on design of new production facilities. The logic was that managers who used fewer memos, rules, and directives would end up having to manage least and therefore could also manage best. The optimum manager would have so little to do that he/she would not need to exist, except for all practical purposes would be there in the self-regulation of the employees. The same logic was used to argue that the ideal future technology and factory was that which did not exist. It would thus not get in the way of highly dynamic societal and production changes.

Virtual management is consistent with getting the membership of an organization to continuously design and redesign its products and processes. This is in line with the need to keep customers through continually improving the quality of results. Quality as such is associated with the systemic aspects of relationships between parts, not in the parts themselves. The scientific management of parts, via the Taylor model, is insufficient to contemporary challenges. Negotiated order is used to manage relationships between parts. The results are more robust and consistent with the idealized model of design now needed in architecture. Negotiation begins with systemic relationships between parts in holistic settings.⁵⁶

Virtual management attempts to find differences that make a difference, to encourage people to organize those differences in a way that matters, and to work to implement those differences that most improve the context of the activities being managed. The challenge is to go beyond the principles laid down by Smith, Babbage, and Taylor. The aim is to help each worker to know and appreciate more of the total process so that he can assume increasing responsibility for its success. Under the Babbage model, managers assumed responsibility for the relationships between all the parts. Under the virtual management mode, each part assumes responsibility for self-management of the whole. For Babbage, the optimum worker is one that does so little that it amounts to approximately nothing. For virtual management, the optimum worker is one that effectively appreciates everything, including self.

Where it is difficult to grasp the significance of virtual approaches to management it helps to consider three early applications. First is William Blake's poem that introduced the paradigm of each part representing the code of the whole via: "All the world in a grain of sand." This is a precursor to what we now know of the behavior of DNA. Second are more recent developments of holography where virtual is the attribute of the holographic plate, when each piece is inscribed with information of the whole. Third is how the virtual systems idea is consistent with the seminal work of the general systems theorist, Andras Angyal.⁵⁷ The concept of virtual is one means to move to the next generation of management modes and systems, and to do so consistent with a redevelopment of architecture at a higher level of potential.

It is clear that architecture must adopt and utilize some aspects of management knowledge. It is also clear that these will need to be different from the modern traditions of management. The

problem thus shifts from whether or not architecture should use management knowledge to which kind of knowledge would be most beneficial to architecture and those it serves?

Some architects might prefer a post-modern approach, with a little piece from here and a little bit from there, added to little pieces from elsewhere, but this has a low probability of success in an arena that requires coherence. Adopting a more deconstructivist theme would not help architecture prosper either. It could be argued that the piecemeal approach advanced by Babbage in 1836 was in fact consistent with the deconstructivist agenda of the 1980s. Something more constructive is needed. Virtual systems approaches suggest a means to articulate such for architectural management. Architecture must enter the discourse on the nature and organization of the building industry. Management issues are foremost in these discussions by organizations and institutions working to redevelop the industry.

Discussions on how to better manage companies, universities, individuals, projects, and technologies have become part of the making and remaking of facilities. It is of prime interest to the clients and institutions on which architecture depends. Architects have managed to stay aloof from the discourse until recently. Architectural schools and offices have ignored management studies, while they applied managed systems that were like modified feudal systems. In design studio, this is where there are many directives and little direction.

The profession was once well served by a few decision makers and many draftsmen. It no longer is. The complexity of the products involved in a building are sufficiently great to demand vastly increased access to the imagination, creativity, and enthusiasm of all stakeholders. Architecture is now a service profession that must serve through provision of high quality, efficient products called buildings. It has real customers with real needs. Just like other economic sectors, architecture must face its own challenges. Three of these might be:

- As a combined profession, it must relate to a rapidly changing socio-industrial environment;
- As individual firms, it must relate to complex sets of stakeholders in the building process; and
- As individuals, architects must relate to others and learn to learn.

It is important for architecture to innovatively respond to these three challenges in schools and offices. This means:

- Architectural schools and offices must establish processes to help people learn to learn as a continual process. Major international construction firms with their own campuses for continuing education illustrate the importance of this objective.
- Architecture must learn to change its lore about self, others, and management of the spaces in between. The limitations of traditional egocentricities are just too great. These stand in the way of learning and generate many of the problems found in the architectural firm's products.⁵⁸
- Architects should perceive the culmination of their work as products, not projects. Recent studies show that one of the great weaknesses of the building industry is due to conceptual pitfalls of reliance on projects. Projects are ambiguous shapes that somehow begin and

somewhere end and lack much of the focus on quality and efficiency that is possible with products. Shifting toward product design methods could help architecture overcome some of its current difficulties in project design and help achieve the first two objectives.⁵⁹

Virtual management of virtual architecture offers means to examine new forms of all three. Many of the traditional distinctions between design and production can then be replaced with more robust concepts for managing the provision of architectural services. The guidelines listed in the next section are intended to help with this.

GUIDELINES FOR ARCHITECTURAL MANAGEMENT

The following combine new approaches to management with new practices of architecture. These partially meet the agenda, challenges, and objectives outlined previously.

1. *Approach design as a non-linear, inclusive system that can organize the advances found in many areas in ways that enhance societal strengths and reduce societal ills.* Design needs to be used for context-building, as distinct from context-using. An interesting example of what this means is seen in a former Swedish design, construction, and finance firm.⁶⁰
2. *Hold broad-based discourse into salary and other reward differentials within the organization.* Since salary has become such an important indicator of value, it is critical to have general appreciation on the meaning of salary differentials. This will clarify why and how employees should invest their scarce resources. In most Japanese and many European companies, these differentials are much less than in U.S. firms (fifteen times instead of one hundred times).
3. *Make resources available to invest in the making of a better future.* This can be exhibited and manifested by ensuring that at least 1% of turnover goes into the R&D of finding better ways to do what is normally done, as well as ways to identify and articulate the non-normal that can become desirable. Almost no design firm ever does this.⁶¹ The argument against is that it can't be afforded. Evidence illustrates that an organization now can't afford to not do it.
4. *Work toward continual integration of the building process.*⁶² Future work in the building industry will need a management strategy that integrates the entire process from materials refinement to financial instruments. For some architects, this will mean being taken over by a large construction firm. For others, it will mean having a management strategy that allows an architectural firm to independently adapt to changes faster than large firms can.
5. *Emphasize both the local and global aspects of building and reduce concern for the national.* This guideline comes from the study of a wide array of small to large building projects. Local and global issues of building location and natural environment have grown in importance while national agendas have become increasingly counter-productive to improving efficiency. In addition, much of the regulatory, taxation, and financial power bases behind projects are being shifted from their traditional national bases to local and global bodies.
6. *Strive to continually improve efficiencies in process and product.* This will help employees who get lost and do not know where they are or what they are doing. They need only to return to the overriding objective of general efficiency of result, as distinct from improving productivity though laying themselves off.

7. *Question and improve these guidelines so they can better meet the needs of the situation in question, but ensure that they do not grow in number.* The timeless measures of success will be quality and efficiency, where both always have been and will be context sensitive, just as managers must be. Guidelines that are too numerous are worse than none. The complexity they generate becomes counterintuitive.

NOTES

1. This is a concept used in the physical sciences to denote a passing from one state of being to another. This occurs through transformations that are generally irreversible in their nature.
2. This information comes from a 1989-1992 study, *Conditions of success: Internationalization of the building industry*, David Hawk, Stockholm School of Economics, Institute of International Business. It will be described in greater detail later in this paper.
3. This is consistent with the process used by the architecture firm CRSS in programming their design process, except the "problem seeking" does not go far enough for current needs of inclusion. CRSS sold off its architecture division in 1994.
4. The course is taught each spring to more than 150 freshman architecture students by Urs Gauchat and David Hawk at NJIT. An array of executives from firms that participate in the construction process are brought to class for the students to interview. These include contractors, bankers, lawyers, zoning officials, and architects. Each student is expected to make a development proposal, including a pro forma analysis, prior to the end of the semester.
5. All professions are in trouble, but this fact should not be used to make architecture feel good.
6. Architecture has long served public and private organizations through its implicit activities. It has worked to help clients understand the critical importance of environmental qualities via an appreciation of aesthetic sensitivity. The shortcoming is that architects have not wanted to explicitly serve. They take great pride in the Frank Lloyd Wright model, typified by statements such as those made to Edgar Kaufmann in 1935: "Kindly refrain all interference with me in my work at this time. Send me what I ask for. There is only one doctor. Be thankful you didn't lose him. Now be good enough to realize the truth of what I say."
7. During the past decade, the business management literature has often used this logic as an argument for using rugby as the metaphor for guiding business operations instead of using relay races or American football. See, for example, an early article, "The new product development game," Takeguchi H. and Nonaka I, *Harvard Business Review*, Jan.-Feb. (1986) pp. 137-146.
8. Aspects of this are seen in the work of Ludwig von Bertalanffy in his book, *General system theory*, New York: George Braziller, Inc. (1968).
9. An early example of this is biologists seeking the nature of life through the study of frogs. They were relying on analysis to dissect life to find it. During the process of cutting a phenomena in two, they thereby destroyed that which they sought. It was concluded that a new approach was needed. In the new approach, the frog's environment was included and used to help understand the life processes of the frog as it was allowed to continue living.
10. Perhaps too much time and energy was being invested during this time in articulation of the modern movement of building design.
11. This is a famous idiom of Frank Wright and became the punch line in Ayn Rand's *The Fountainhead*. It remains popular in academic design reviews.
12. More will be said about this later, but the core of this approach is seen in Frederick Taylor's *Principles of scientific management* (1911) New York: Harper & Row.
13. Herein change is defined as difference "over" time and between time frames. Differences "within" time is the raw material of design, such as the difference between a kitchen and a bathroom. Change is the material of planning and connecting time frames, such as the difference between a married couple without children, then with children, then without children, then without each other. Being able to accommodate change is demanding. Where it cannot be prescribed and controlled, it can only be managed through negotiation.

14. It can be argued, and demonstrated, that "good situations" by definition do not need managers. They need to be left alone to naturally progress. Management interference in a good situation can in fact turn it into a bad one.
15. This is somewhat like driving into the future through a rearview mirror.
16. The head of a major New Jersey law firm has used this logic as the basis for why they initiate suits against architects. They know the insurance firms will be eager to settle.
17. This is one part of the traditional KISS logic — "Keep It Simple, Stupid." Knowing or trying to know too much is thought to complicate management processes.
18. As will be discussed later, this is consistent with the primary business management teaching models used at premier schools of business in the U.S. You do not need to know much about finance, accounting, sales, production, or information systems if you know how to manage those who do know. This is essentially the model used in managing the industrial revolution since the writings of Adam Smith in *Wealth of nations*. This is also used by architects.
19. When examples like this surface in science, they are known as "misplaced concreteness."
20. The imperial approach to design, as distinct from the inquiry approach, shares much with the children's story, *The emperor's new clothes*. No one wants to speak up and say the emperor is naked, yet they don't understand what is taking place. It is easier to just go along and not ask the obvious questions.
21. The evidence for this is found in a recent book on the changes emerging in the building production industry via the requirements for internationalization — *Forming a new industry: International building production*, by David Hawk (1992) Solna, Sweden: Svensk Byggtjänst.
22. If not uncovered during the process, puffery certainly shows up in the mistakes and costs of the resulting products.
23. This is seen in the fact of their billing rate being about four times larger.
24. Since it was largely paid for out of public money, S&L foreclosures, etc., and the public has only debts left, it will be difficult to recreate the 1980s.
25. Association of Collegiate Schools of Architecture.
26. One attempt at this a few years ago was the AIA inspired effort to create "value architecture." Largely conceived as a response to the success seen in "value engineering," it essentially began and ended within a national convention.
27. This undoubtedly means having a serious impact on the core of the architectural process, meaning the design studios in both schools and offices.
28. M. Oakley (Ed.) (1990) *Design management: A handbook of issues and methods*. London: Blackwell.
29. A recent quote from the annual auto companies award for the slickest salesman illustrates how alive and well this attitude is. "Our top salesman can't tell you the first thing about a car, but he sells tons of them," says a salesman from the dealership that is in the finals. *The Wall Street Journal*, October 24, 1991, pp. A1 and A7.
30. They were responsible for management. It may be difficult for members in a democratic society to understand how kings attained their power. Perhaps it began when an individual did a remarkable job of hunting or fishing, leading to his fellows attributing him with "godlike" qualities. Because he was assumed to be special, it was easy to assume that his kin would possess the special qualities. A dynasty thus begun that was difficult to recover from.
31. The first record of such codification is seen in Hammurabi's Code, where if the product of the builder's work caused harm to a user, the hand of the builder was cut off.
32. One indication of this was seen during a 1987 visit to a Chrysler factory where at the end of each main assembly line aisle were floor to ceiling depictions of revolutionary war scenes of General Washington and his troops accomplishing incredible feats (i.e., crossing the Delaware). It is an interesting reflection on the management style of the company that in all the paintings the face of General Washington was replaced with that of the company's president.
33. The English have yet to fully recover from the limitations found in management lineage where lords and ladies pass on their organizations to their children. This is especially true in the construction industry and has been found to be a major reason for the difficulty of the same companies in today's dynamic global conditions. Results of the "Conditions of success" study illustrates the significance of this.

34. The term "manager" referred to a man, standing in the center of a ring of horses with a whip in his hand. He would manage to get the horses to perform.
35. Smith A (1937) *Wealth of nations*, New York: Random House, p. 3.
36. It is noteworthy that he is also credited with articulation of the first mechanical computation machine.
37. Babbage C (1836) *On the economy of machinery and manufacturers*, London: Charles Knight, 4th edition.
38. Taylor FW (1967) *The principles of scientific management*, Norton: London, first published in 1911, pp. 6,7.
39. The shortcomings in the MBA model in general and the Harvard management approach in particular are seen in the case-study methods describing managers as power brokers. This has been extensively pointed out by leading management consultants such as Tom Peters who goes so far as to argue that to have a level playing field in Japan, Carla Hills, our chief trade negotiator, should insist that Japanese firms be required to use American-trained MBAs.
40. Deutschman A (1991) The trouble with MBAs, *Fortune*, New York (July 29, 1991) p. 68.
41. Bierce A (1967) *The Devil's dictionary*, New York: Hill and Want, pp. 108-109. First published in 1888.
42. The executives of foreign companies seldom receive more than 20 times the pay of their lowest paid worker. In the U.S. it often exceeds 100 times.
43. Product life-cycle is the period that begins with the product's design and ends when it loses its market. The product is a "cash cow" during the stage between the time that no more research and development is needed until the market for it radically slips.
44. A study of 700 business schools by Richard Blackburn, University of North Carolina, concluded that "despite a growing recognition of the importance of design to business success, only a few business schools in the U.S. offer courses in design. More would like to do so." *Wall Street Journal* (October 23, 1991).
45. While the accrediting requirements for schools of architecture do require some exposure to management principles in three of seventy-four listed criteria, most schools do not see the subject matter as important.
46. Colin Clipson, Professor of Architecture, University of Michigan, organized ten case studies to be used in management courses in Michigan's Business School and elsewhere to illustrate the role that design can play in improving what a company does and how it does it (1986).
47. Trist EL, *et al.* (1959) *Organization choice*, London: Tavistock Publications.
48. Bucklow M, A new role for the work group, in Louis E. Davis's *Design of jobs*, pp. 199-212.
49. This highly ambiguous process shows its true colors during the times of major design reviews where students are expected to, and do, miss their non-design classes to devote themselves totally to "design." More often than not students learn during multiple semesters to procrastinate work on the design process while bypassing much in their non-design, content-based courses.
50. A study of 60 international firms involved in forming a new industrial approach to producing buildings. Done at the Stockholm School of Economics, Institute of International Business (1992) *Forming a new industry*, Swedish Government Publication, Hawk, DL.
51. This diagram was developed by an undergraduate honors management class of engineers and a graduate management class of executives. The "rat" notion was added by the second group of students.
52. This approach uses the Einstein notion that in contemporary physics the shortest distance between two lines being a straight line is irrelevant. What now matters to understanding physical phenomena is finding paths of least resistance.
53. This came to be so titled in 1977 in response to the question of how best to regulate activities of environmental deterioration. The conclusion was that the legalistic approach that relied on coercion would become too expansive to manage and even where it could be afforded it could not be successful. This is seen in *Regulation of environmental deterioration*, Wharton Ph.D. dissertation, University of Pennsylvania, David L. Hawk (1979).
54. *The wisdom of Lao-tse*, edited by Lin Yutang, New York: Modern Library (1948).

55. Virtual Space, *Feeling and form*, Susanne K. Langer, New York: Charles Scribner's & Sons (1953).
56. This is best exemplified in the book of West Churchman, *The systems approach and its enemies*. New York: Basic Books (1979).
57. *Foundations for a science of personality*. Cambridge: Harvard University Press (1941). The key idea was that when a system reaches its limits, the parts assume the whole.
58. One example of this came up via a debate in an ACSA forum where the noted architect, Gunnar Berkets, argued that in his firm there was no hierarchy, only a straight line with a bump on it (him). He went on to argue that quality in his firm's output was whatever he was responsible for. Mistakes were items he had not been responsible for. Architecture must overcome the "fountainhead" lore in both respects of people and project management.
59. Product design in Japan is carried out via this approach in most industries. It is now being introduced to the building industry as a way to reorganize it around the dictates of consumers for higher quality and lower costs. The work of Ikujiro Nonaka at Hitotsubashi University presents how this process is successful in Japanese firms.
60. The firm was Arcona. It was one of Sweden's largest real estate firms, although it included design and construction services in the same company. In the company, there were no memos, secretaries, or hierarchy. Everyone shared in the unpleasant jobs. They even eliminated drawings from the building process so that everyone, even construction workers, used a computer terminal to monitor and modify design decisions. They have since shifted from construction to other products.
61. One that does is Ove Arup of London. They believe that research and development are even more important in a design and engineering firm than to a building products firm, the segment of the industry where it is widely accepted that R&D is critical to long-term survival.
62. Extensive analysis of vertical, horizontal, and non-integration approaches in many industries shows that vertical integration results in higher quality and lower costs. Horizontal integration, known as diversification, seldom supports efficiency or quality, while fragmentation supports further complexity. Outlined in the report *Stockholm construction symposium*, David L. Hawk, Institute of International Business: Stockholm, Sweden, (1990).

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