CYBERNETIC ARCHITECTURE
PROCESS and FORM
The Impact of Information Technology

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Submitted in partial fulfillment of the requirements
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CYBERNETIC ARCHITECTURE
PROCESS and FORM

The Impact of Information Technology

A thesis presented

by

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To

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THEESIS SUMMARY

CYBERNETIC ARCHITECTURE - PROCESS and FORM

The Impact of Information Technology

STATEMENT OF PURPOSE: To provide an analysis of the impact of technology on the design process and the practice of architecture; and the initiation of a theoretical framework for a broader consideration of IT strategies relative to emerging project delivery methodology.

TOPIC DESCRIPTION: Information technology and the architectural design process are evaluated from a historical evolutionary perspective. The role of the architect, communication networks and the interplay of technology is mapped as a comparative reference benchmark for the practice role choice of the contemporary architect.

RESEARCH METHODOLOGY: Qualitative exploratory normative using case study methodology.

EXPECTED CONTRIBUTION TO LITERATURE: The mapping of the evolution of the architect and the interplay of technology in the process of architecture in history. The proposal of the return to the pre-Renaissance vision of architecture where design and building are integral. A new economy Information Age digital environment "conceptual framework" for collaborative integrative design and building in the practice of architecture.
Walter Gropius, early twentieth century architectural theoretician, envisioned the architect as the *generalist integrative* design leader in an increasingly technological society of evolving complexity and specializations. Le Corbusier spoke of collaboration and unity in architecture; however, the necessary inter-organizational relationships and *in-formal* communication networks did not exist. Consequently, twentieth century architecture often resulted in liability and conflict for owners, contractors and architects.

The architect's transition from the 19\(^{th}\) to the 20\(^{th}\) century brought a vision for expansion of the role of the architect, resulting in clarity of purpose and adoption of corresponding *manufacturing technology*. However, the transition from the 20\(^{th}\) to the 21\(^{st}\) century occurred contrastingly, the role of the architect was diminishing as *project-leader and integrator*. *Information technology* (IT) is impacting architecture dramatically, both in *process* and *form*, so the question looms, will the 21\(^{st}\) century architect lead, or be led? How is IT empowering the architect and what is the effect on the design process? Is the historical *Master Builder* re-emerging as a dynamically networked and specialized team of design and construction specialists? Will the impact of IT result in increasing specialization and compressed time frames?
Failure to analyze the value-chain of the process of architecture, and appropriately respond to technology disruption, could result in a diminution of professional status for the architect.

In this dissertation, I propose the concept of Cybernetic Architecture and show six different architectural firm Case Studies that gives examples of how this emerging process is manifested in the practice of architecture. The proposed model suggests a reevaluation of the role of the architect, either as project-leader "integrative-generalist" or "design-specialist."

Six Case Studies, of variegated architectural firms, indicate some architects are using IT for empowerment as project leaders; thus, maintaining or regaining project leadership. Additionally, some architects are increasing value in the "process-chain" through differentiation and focus on an area of specialization. The traditional segmented linear design-bid-build process is diminishing, and collaborative integrative design is increasing. Information technology is driving bi-lateral knowledge exchange resulting in integration among discrete groups of owners, architects, engineers, builders, craftsmen and machines, resulting in a transformation of the traditional architectural discipline, what I term, Cybernetic Architecture.

Larry R. Barrow
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DEDICATION

To

Mom and Dad

Melva, Amanda, and Brenan

and all

my Relations
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Glossary of Terms

**architect:**
One who designs and supervises the construction of buildings or other large structures.

**architecture:**
The art and science of designing and erecting buildings.

**artificial**
Made by human beings; produced rather than natural.

**cybernetics:**
The theoretical study of communication and control processes in --- systems, especially the comparison of these processes in biological and artificial systems.†

**design:**
To conceive or fashion in the mind; invent.

**ethical**
A set of principles of right conduct. A theory or a system of moral values.

**fiduciary:**
Of or relating to a holding of something in trust for another.

**form**
The shape and structure of an object. The essence of something.

---

**hypothesis**
A tentative explanation that accounts for a set of facts and can be tested by further investigation; a theory.

**information**
Knowledge derived from study, experience, or instruction. Knowledge of a specific event or situation; intelligence. A collection of facts or data. The act of informing or the condition of being informed; communication of knowledge.

**process**
A series of actions, changes, or functions bringing about a result:

**professional**
Conforming to the standards of a profession: professional ethics.

**proposition**
A plan suggested for acceptance; a proposal.

**service**
Work or duties performed for a superior. The occupation or duties of a servant.

**system**
A group of interacting, interrelated, or interdependent elements forming a complex whole.

**technology**
The application of science, especially to industrial or commercial objectives.

**thesis**
A proposition that is maintained by argument.
EPIGRAPHS

You must turn and face the tiger to learn it is made of paper.

Zen saying

A problem adequately stated is a problem well on its way to being solved.

R. Buckminster Fuller

Most of the shadows of this life are caused by our standing in our own sunshine.

Ralph Waldo Emerson

In order that a man be capable of straightening himself out, he must find his way from casual, accessory elements of his existence; he must find his own self, not the trivial ego of the egotistic individual, but the deeper self of the person living in a relationship to the world.

Martin Buber