



THE IMPACT OF CYBERSPACE AND GLOBALIZATION ON THE FUTURE OF ARCHITECTURE: *VISIONARY INSIGHT*

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ABSTRACT

Rapid advancements in telecommunications and information technology are witnessed all over the world. Architecture, the applied art of building for people, is expected to alter in one way or another in response to the remarkable changes resulting from such developments. The objective of this study is to discuss how futuristic alternative scenarios of architecture can be drawn or highlighted by considering factors such as information technology (IT), globalization, and the resulting constraints. The Internet (i.e. cyberspace) revolution is emphasized and presented. Potential impacts on sample buildings and spaces are analyzed and a short-term visionary reflection put forward. It is becoming evident that cyberspace has begun to take over architecture from the interiors we live and work in. However cyberspace should not be perceived as a threat; as people in a society we need physical interaction, so buildings will still be required. Furthermore, the future of architecture within the framework of IT cannot be separated from the future of architectural education. Architectural education is the key to a new architecture that interacts with science and IT without undermining local heritage.

Keywords: *the future, information technology, cyberspace, globalization, and architecture.*

1. MEANING, MEANS AND IMPORTANCE OF PREDICTING FUTURE TRENDS

Professionals in many fields have always wished to be able to predict the future. The human mind continuously attempts to link today with tomorrow and blend the present with a blurred vision of the future. Knowing the nature and rates of developments of many different technologies and innovations, along with changes in the socio-economic dimensions and conditions, one can with systematic thinking and logic reasoning attempt to analyze the past, read the present and anticipate some of the alternative scenarios that may be possible in the near future. What sorts of architectural environments will we live and work in? What type of structures will be built with the aid of available computers and sensors, and advanced control systems? Architectural futuristic visions are essential for finding answers to such questions and at the same time pushing us to strive for innovative architectural designs and solutions. Although, the study will be confined to the impact of IT on architecture it is important to understand that the context and other dimensions must be considered for a comprehensive and realistic vision. The study emphasizes the potential influences of cyberspace on architecture in terms of function and space perception.

2. THE DIMENSIONS OF THE EVOLUTION AND CONTINUING EXISTENCE OF ARCHITECTURE

Architecture is one of the oldest and most important. Architecture is an art blended with science that requires subjective imagination and creative ability based on objective analysis and justifications. Many definitions of architecture exist, however architecture can be defined as the applied art of building for people to satisfy their particular needs in a known environment. The evolution of architecture has three primary dimensions, namely, the human dimension, the art/form dimension, and the technological dimension [Shalabi, 2000]. These three major dimensions can be considered the coordinates or the interrelated attributes of architectural space evolution as shown in *Figure 1*. Components of the human dimensions are exemplified in detail. In order to project reasonably the future of architecture, visionary insights have to take place simultaneously in the three dimensions if a comprehensive and sound projection is to be obtained. For example, the future of human beings in the context of the genome revelation, human cloning, human-like robotics and artificial intelligence have to be considered. Consequently, this approach requires the participation of experts from many other fields of activity, all working out and brainstorming a collaborative vision. It may be observed that the primary dimensions in *Figure 1* are intentionally not depicted in a Cartesian projection system format. That is, each dimension is not perpendicular in relation to the other two. This is because each dimension has its own character, growth pace, and trend. Knowing a change in one dimension may not necessarily impact the other two. A combination of aspects and influences of the three dimensions determines the image of architecture within the framework of geographic and climatic constraints and evolutionary time.

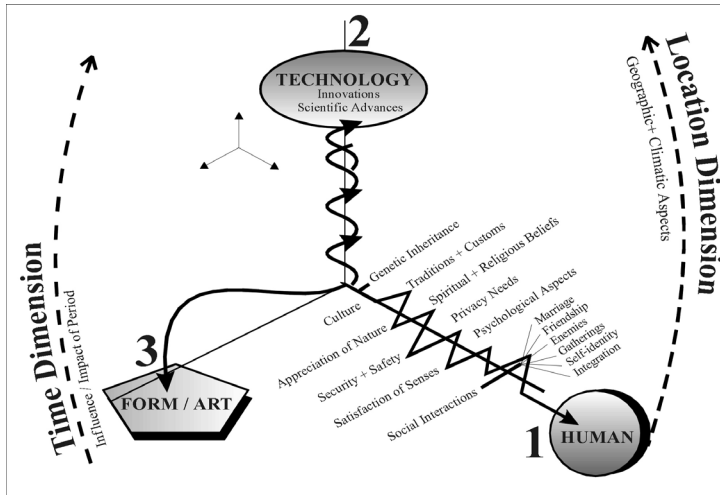


Figure 1. The dimensions of the evolution and continuing existence of architecture
[developed by the author]

3. APPROACHES FOR VISIONARY INSIGHT

Three approaches can be adopted to help us predict the future of architecture; *the first*, a comprehensive thought, is to trace history in terms of a timeline. The purpose is to study and analyze the socio-economic conditions, and concurrently investigate the thoughts and imaginative ideas of pioneer architects and architects who have made substantial contributions to architecture, and then attempt to link all to the resulting architecture in a particular period of time. Many trends dominated the architecture of the 20th century, starting from the end of the First World War and continuing up to the present day. The ideas, movements and concepts that influenced architectural design in the 20th century are comprehensively presented in references [Sigfried 1987, Erfan 1978 and Zeitoun 1993]. However, since architecture cannot be separated from its context, this approach needs comprehensive and thorough investigation and requires the collaboration of historians, architects, social workers, futurists and other experts. With employing this approach there is also the difficulty of sharply distinguishing past from present. One may also argue that the present may not echo the past nor impact the future and what suited the past may not be adequate for the future. *Figure 2* illustrates the interrelationships among the past, the present and the future, and represents a typical means of foreseeing the future of architecture. *The second* approach needs less elaborate investigation by identifying the impact of major historic events, crises and/or capstone technological developments taking place either in the near past and/or the present on architecture. Consequently, the implications for architecture may easily be traced and a short-term vision of the future can be highlighted with logic. The approach of projecting the future of architecture via major events and/or capstone developments is

depicted in Figure 3. The third approach bases the prediction of the future on unconstrained subjective vision and wild imagination with no links to the past or the present.

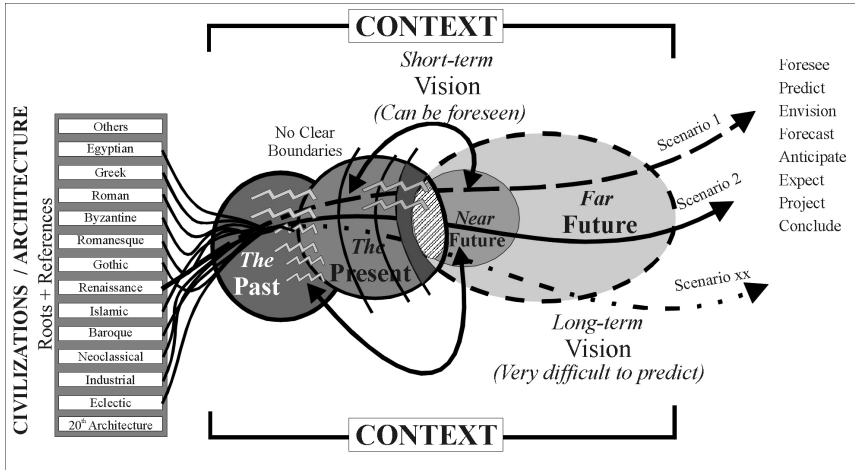


Figure 2. The past, present and future inter-relationships, a comprehensive approach for forecasting the future of architecture via tracing the past, present and foresee the near future by many professionals in a collaborative manner [developed by the author].

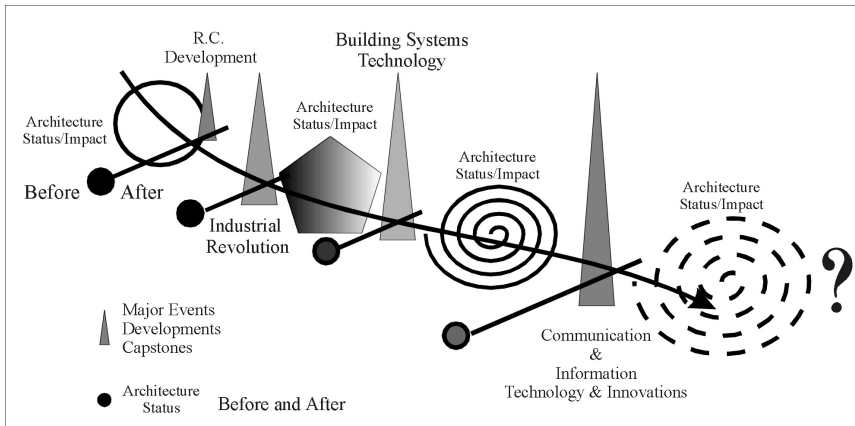


Figure 3. The second approach using capstone developments and events to anticipate their impact in isolation on architecture within the context of location and time [developed by the author].

4. FACTORS AFFECTING THE FUTURE OF ARCHITECTURE

Many factors may affect the near and far future of architecture worldwide. Technological advances in building materials, construction systems and building systems are important ones. Computer advances in software and hardware are expected to continue impacting on every activity in our daily life and subsequently on architecture. The communications revolution and advances in information technology resulting in the development of cyberspace began to impact architecture. Globalization, a product of transportation, communications, and IT advances, along with architectural education, is also expected to contribute significantly to the future of architecture. In addition, the increase of world population and the propagation of environmental crises such as the greenhouse effect and the decrease of world water resources are also of concern.

The definition of globalization, as interpreted by the World Trade Organization (WTO), was mainly confined to deregulating international trade [Salama 2000]. The process of globalization was meant to apply merely to the exchange of goods and services, intellectual property rights or investments; they undoubtedly will affect human rights and shape global opinion. Indeed, globalization is not just a means of lifting barriers, and removing geographic borders and nationalism or blending the national markets so that the countries possessing wealth and technology can spread happiness and prosperity throughout the world. Globalization, a product of the information revolution, will inevitably result in positive and negative political, social and dramatic cultural implications. These implications are in the process of ongoing intellectual debates [Asfour 2000, Moor 2000] that are expected to last for some time. Awareness of and response to human suffering, tolerance and ease of interaction with other societies are among the positive outcomes of globalization [Ahmed, 1998]. Since globalization calls for openness and standardization of taste and aesthetic values without regard to particular cultural values or specific local heritage, blind replication of world architecture is expected to be one of its drawbacks when applied to less-developed societies. For example many ready designs can be easily downloaded through the Internet for realization as is or for modification or perhaps adaptation. Eventually this process, if not tackled, may lead to chaos and identity loss in local architecture, on the level of architectural practice and profession. The implications can be far more serious on the architectural education level. This expected danger therefore requires pre-planning and protective action by changing the traditional educational process of preparing young architects providing them with self-protective analytical ability.

5. ARCHITECTURE: THE CONCEPT OF MULTI-DISCIPLINARY EVOLUTION

The world is witnessing rapid and dramatic advances and developments in all scientific and technological fields. Such developments inevitably influence science and the arts. The ongoing advances are not the fruits of this era alone, but a result of knowledge, experiments, and experiences in the art of building in concurrence with the thoughts and ideas of architects

from early times to the present day. The start of the 20th century witnessed the development of reinforced concrete and the use of iron and steel in buildings. With the evolution of new, non-traditional structural and construction systems, new types of buildings appeared and architectural expressions varied leading to different aesthetic values in modern architecture. Moreover, the design process has also advanced with the aid of computers. Structural sciences have advanced and many new structural and construction systems that achieve long spans with less use of materials have contributed to the image of architecture. New building materials have been developed such as plastics and synthetic materials, glass fibers and many others with unique properties. Building technology has included prefabrication and automation of traditional construction methods resulting in significant savings in time and money.

Simultaneously, advances and innovations have been taking place in other building services, such as waterproofing, elevators, electrical installations, heating, ventilating and air-conditioning systems (HVAC). Lighting and acoustic sciences have advanced and solar and energy-conscious systems have become available. The modern building to a great extent has gained complexity and many specialized professionals from many related disciplines participate in the design process and realization of buildings. *Figure 4* depicts architectural evolution within the framework of a multi-disciplinary evolution.

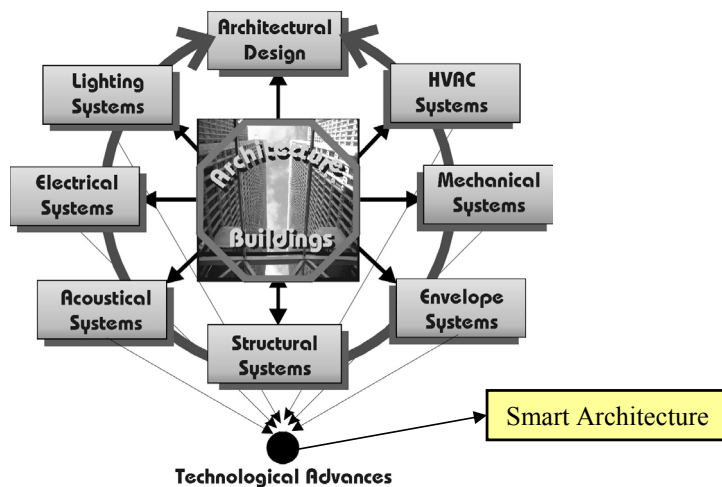


Figure 4. Architecture: the concept of multi-disciplinary evolution

These advances and developments have impacted on two aspects of architecture: *The first* is the creative and innovative aspect represented by the architects' thoughts and imaginations expressed with fewer constraints. This has led to new building images and types. *The second* is the technological aspect represented by the use of new and innovative construction methods utilizing the rapid developments in building systems and integrated services. The purpose is

to ease building realization and achieve a degree of comfort for its occupants. This has led to the evolution of a new concept developed in recent years in architecture called "*intelligent*" or "*smart*" buildings. The smart building integrates new technologies from such areas as computer automation, new building materials, and energy management and operation technology. The definition of an intelligent building given by the Intelligent Buildings Institute (IBI) is "*one that provides a productive and cost-effective environment through optimization of its four basic components: structure, systems, services and management, and the interrelationships between them*" [<http://energy.arce.ukans.edu>]. The resulting building/space has the ability to adjust and adapt to its occupants. However, smart architecture shows no major change in the form and/or the image of buildings.

6. THE IMPACT OF CYBERSPACE ON ARCHITECTURAL SPACE, PERCEPTION AND FUNCTION

The Internet is identified by many terms, such as the Information Superhighway, Cyberspace, the Digital Highway, Infobahn, Infopile and the Digital Information Network [Hickman, www.fbe.unsw.edu.sa]. It is an enormous network that links computers all over the world forming global digital source of information built on flexible communications technology. The Internet has grown exponentially [O'Leary, 2000]. *Figure 5* shows the exponential growth of cyberspace in the last 5 years.

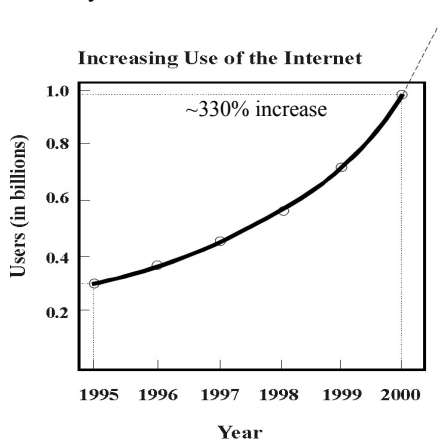


Figure 5. Cyberspace growth [adapted, O'Leary, 2000])

Cyberspace is a recent challenge to architects as it allows architects to present ideas to clients, employers and fellow architects without leaving the office or their home. It also opens the door to the world of the "Virtual Architectural Firms", and "Virtual Design Studios" where architectural firms or individual architects (not in the physical sense) work together to design buildings. Nowadays, many of the services offered on the network mimic activities that exist

in the physical world. At present one can do shopping, banking, consult with doctors or learn from teachers, all from the comfort of one's home. More widely today, cyberspace is overlaying "real" architecture with "virtual" architecture. The following are a few examples of buildings and spaces where new technology along with cyberspace is changing our perception of space and altering known functions.

A. Concert Halls: Advances in the audio technology of digitally generating 3D sound have made it possible to listen and experience the sound quality of famous concert halls around the world. Recorded impulse responses in existing halls can be convolved with signal processing techniques to create the sound quality of the hall of your preference in the seat of your choice in your own living room at home without the need to be physically in the hall. Impulse responses are digital fingerprints of the impact of the space characteristics on sound and can be used to replicate sound fields. Thus it is possible at present that via cyberspace one can experience sound spatial impression in an immersive 3D sound generated by computer hardware and software integrated with sound system components as if one is physically seated in one of the well-known halls around the world. This indicates that the new electronic media, along with developments in room-acoustics modeling and simulations, is capable of suggesting visually and audibly altered perceptions of space and time. Will this reduce the need for people to go to concert halls or to build new ones? Humans are social beings by creation. They like to share their experience and feelings with others and therefore people will still desire to make seat reservations to listen to music in concert halls in their leisure time. *Figure 6* depicts examples of impulse responses, modeling and simulation of auditoria.

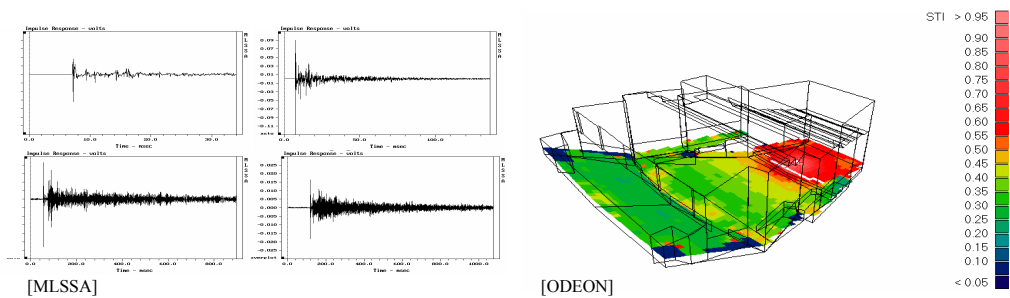


Figure 6 The audio technology of utilizing impulse responses, modeling and simulation of existing and new concert halls and auditoria. [MLSSA, ODEON]

B. Shops: Today many existing shop owners and managers are interested to develop sites (i.e. Homepages) on cyberspace where people can visit their shops and do online shopping. Consequently, in the physical world, some shops may be reduced to factory showrooms and the size of the distribution sector can be expected to greatly increase. Shops will face the challenge of continued existence in their current architectural form representing new challenges for architects. For example, architects, when designing shops, need to offer

attractive visual environments, furnished for the social and leisure activities, and offer related services to ensure people still visit shopping malls rather than buy from home. *Figure 7* shows the growth of e-commerce, summarizes the technological advances and gives example of the impact of online shopping on “real” (i.e. physical) shops.

7. THE FUTURE OF ARCHITECTURE EDUCATION

As is usually the case in third world countries, a time lag is expected to occur before we see the utilization of available and new technological advances and in particular IT. Most of the available technology is transferred from well-developed countries. The impact of the adopted technology is expected to take time till it is reflected on architecture. Replication and mimicking of architecture of others both on the level of practice and architectural education will remain for a while. It is the view of the author that architectural education is a key to escape to new architecture by reversing this trend. Incorporating building technology knowledge blended with art in the education of both undergraduate and graduate levels is required. Architects should develop technical skills along with the design skills. Buildings are not simple structures anymore: they are becoming more and more complex. Traditional design studios that emphasize the building form/art at the expense of being technically sound should reconsider their position. The design process should be thought through and practiced so that it leads to architecture that interacts with science and technology.

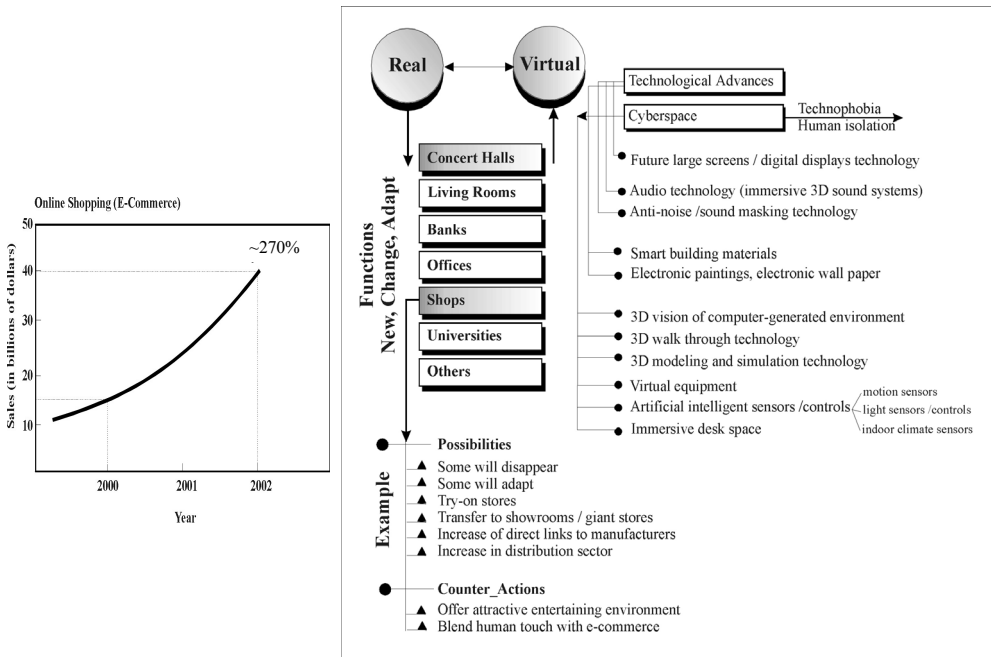


Figure 7. (a) The present and future use of e-commerce [O’Leary, 2000], and (b) Technological advances and example of the impact of online shopping (e-commerce) on “real” physical shops

8. CONCLUSIONS

Architectural futuristic visions are essential. Such visions in architecture do contribute to overall development, and encourage innovation. In architecture we now talk about “virtual architecture”. Immaterial and virtual spaces are increasingly overlaying actual built “physical” spaces. Subsequently, IT is expected to revolutionize design practices in architecture, for architectural design and imagination, the computer and cyberspace represent unprecedented challenges. In 1994, Christian Thomsen in his book called “Visionary Architecture”, concluded that:

*“Virtual architecture will increasingly penetrate into the realm of real architecture, partially **redefining** and **replacing** it. Cyberspace has opened out entirely new dimension of time and space, in which human beings and space not only confront each other but also are capable of mutually influencing one another”.*

Indeed his predictions are becoming facts as the new electronic media and virtual realities are capable of suggesting altered perceptions of space and time, in the form of persuasive imaginary virtual environments, and thus influencing our common relationship to architecture. It has just started and in the near future more spaces will be developed and defined by means of information and the electronic media. Architects must therefore learn to work in cyberspace and develop the requisite skills. Architectural design has endless possibilities when dealing with cyberspace. It is expected that “intelligent” buildings will be the future of architecture. Architectural curricula should offer design courses on futuristic architecture. Students studying architecture need to be encouraged to think of the future, to design futuristic spaces/buildings and to experiment designing utilizing virtual design studios.

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