The City as a Cyborg: Influence of Digital Technologies on Architecture and on Cities

TRISTAN KOBLER
Federal Institute of Technology, Zurich
Switzerland

ABSTRACT

Metropolitan regions with emerging vast agglomerations constitute a seemingly insurmountable challenge to urban design and regional planning. We diagnose decentralization, suburbanization, and urban sprawl. New methods need to be developed. Digital information technologies are challenging established understandings of the city. New, fictitious realities as immaterial, dynamic communication systems supply and compete with the "direct" reality of built architecture. We are aiming at the connected, intelligent house, a machine or a cyborg in a global network. In this new mobility the interactive house could become the cover of worlds without places - to the place of all places. Cities will become to be centerless huge megacities, along with a loss of their old center functions. New virtual - not really functional justified - centers will be established.

OBJECTIVES

Contemporary metropolitan regions with a population of 15 to 20 million inhabitants are the primary field of study of the research work. The newly emerging and vast agglomerations of cites such as Los Angeles, Mexico City, Tokyo, Shanghai, Beijing, and Bombay constitute a seemingly insurmountable challenge to the disciplines of urban design and regional planning, essentially questioning traditional understandings of civic form. New methods and models need to be developed in order to comprehend prevailing processes of formation of the so-called megacities. The research attempts to identify structures and principles at work underlying urban developments - including such phenomena as decentralization, suburbanization, and urban sprawl.

Specific attention will be given to the role of infrastructural systems within the city. Strategies will be identified as to potential forms of interconnection between the architectural substance of the urban fabric and its technical support networks - encompassing systems for transportation and communication, supply and waste management, as well as energy generation, distribution, and use. In that, emphasis will be given to the formulation of strategies aiming at sustainable developments for the man-made environment. The research objectives are ultimately directed towards the redefinition of methodological and theoretical frameworks pertaining to contemporary urbanization and its physical form

RESEARCH

The forces at work in the formation of the human habitat are complex. Existing theoretical models within the disciplines of architecture and urban planning have partially proven to be insufficient for comprehending developments of current city regions. New methods need to be tested incorporation the notion of transformational patterns inherent within the changing conditions of complex systems - including, for example, the phenomena of large numbers, growth, change, system dependencies and disturbances, fragmentation, heterogeneity, and instabilities.

Based upon an understanding of the city as a field of interconnected systems, different scenarios will be defined as potential future changes.

In order to specify the approach, the investigation will focus on the role of technical infrastructures within the city, for they constitute the primary systems determining the formation of the urban tissue. Of primary importance is the identification of types of dependencies between infrastructural networks and the architectural substance of the city. Transportation, energy supply, waste removal, and electronic communication systems will be analyzed in view of their impact on urban structure - including patterns of growth, densification, and transformation. Based on such an analysis, potential strategies will be considered for the implementation of developments pertaining to the sustainability of the man-made environment.

Identification of infrastructural networks and their physical form. The following systems can be discerned:

- Transportation Infrastructures
- Energy Production Facilities
- Supply Networks
- Removal Systems
- Communication Systems

Identification of impact principles of infrastructural systems upon the urban fabric. For example:

- Density of the built environment
- Integration of natural resources within the city
- Decentralized energy production facilities
- Forms of relationships between infrastructure and architecture
- Impact of new technologies
- Impact of migration patterns within the city
- Changes in use patterns and interpenetration of functions
- Changing perception of life and daily patterns

Transfer of theoretical concepts and notational methods from other disciplines pertaining to interactive processes (catastrophe theory, topology, genetics, biology, system theory, etc.)

Definition of theoretical models for sustainable city developments within the fields of architecture and urban design. Methods and procedural means of implementation will be identified.

The developments within the fast expanding field of digital and information technologies are undoubtedly challenging established understandings of architecture. New, fictive realities supply and compete the direct reality of built architecture. Digital reproduction calls the naturalness of objects referring to materials into question. Architecture touches with the geographical surroundings and is part of an immaterial, dynamic communication system. Architecture will be forced to get part of this network. We are aiming to the intelligent house, a machine or a cyborg in a global network. In this new mobility, the interactive house will get the cover of worlds without places, or - to the place of all places. It will get the center of most activities. Cities will develop to centerless huge megacities with a loss of their old center functions. New virtual - not really functionally justified - centers will establish.

The impact of digital technology on architecture is primarily investigated in terms of inherent structures pertaining to methods, approaches, and strategies involved in design production. Such processes are essentially dynamic in nature implying a revised understanding of conceptual architecture. Such conceptual restructuring includes understandings of architecture in view of essentially immaterial qualities furthered by digital technologies. Considering the possibilities of globally based information networks - their dynamic and interactive potential - architecture as a material art will require fundamental reconsideration. It is the objective of this research to hypothetically identify the structures and consequences of such a forthcoming transformation.