

Digital design technology and its impact on contemporary architecture, in light of digital architectural trends.

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Research Summary:

The information age had a great impact on the speed of the successive technological development, as it became a part that cannot be overlooked in its impact on architecture, as these technologies have become an integral part of the architectural tools to formulate the design process thought. Architectural creativity has become linked to the integration between human creativity on the one hand and Digital architecture technology on the other hand, as contemporary architecture is witnessing a major intellectual shift that has been affected by the era of digital technology and the information revolution that has imposed itself on the scientific and architectural arenas. Digital architecture and its advanced thinking have brought about a fundamental change in the form of architecture, and in light of the controversies of the preservation of the local identity or the problem of catching up with globalization. There were various reactions related to the extent of change in contemporary design thought and the tools and mechanisms of its realization that led to this transformation, and the role of architects in keeping pace with that development, and the problem is that local architecture was not keeping up with this change in form. It is sufficient, and not to benefit from technological developments and advanced methods, whether in design or implementation, and this confirms the need to know their ideas, components, vocabulary and mechanisms, so that the architect does not find himself on a remote island, or be part of the change without violating the essence of his identity, and the truth of the matter is that the digital revolution has resulted in an unprecedented architecture represented by different architectural trends based on creative and renewable design ideas, in terms of form and content, the architect cannot reach them in light of his/her old traditional tools. The research aims to shed light on one of the most important topics that the architect is interested in, which is to identify the latest digital technological systems used in contemporary architecture, and to monitor the most important contemporary architectural trends and thought on which it was founded and has influenced its architectural form.

Results:

The digital revolution was reflected in architecture, as was the case in other scientific and life fields, as its impact on the product and the architectural form became evident. It is not limited to, design by traditional methods or being produced as drawings by computer only, but forms have become the product of a design intellectual process, that is directly influenced by circles. Digitalization, through an integrated thinking system, a change in one of its elements changes the design outcome itself.

Digital design technology facilitated the expression of the design, but the great impact was on the design process itself, as a result of the use of ideas development programs, which helped transfer these ideas from the designer's imagination to reality, and one of the important considerations for the efficiency and success of the project, so there was integration between

the design process, the construction system, digital building technology and methods in raising the structural and design efficiency of the building, which led to the release of the freedom to create unprecedented designs.

The design skills that an architect possesses and his ability to create are no longer the only criterion that can bring his project to the ground and into implementation, as the design process has become based on two basic factors: the architect's ability to innovate on the one hand, and familiarity with digital applications on the other hand, by which he can develop his design idea and transfer it from virtual reality to visual reality. Thus, the imperative appears for the architect to be familiar with the advanced technical systems of the data of the digital revolution.

Digital architecture showed the prominence of structural frameworks on the surfaces and volumes of the shape, and the translation of structural structures and their explicit use of expressive use as formal technological elements.

Through the digital architectural trends that have been dealt with in the study, it is possible to visualize a future vision of what the intellectual movement and architectural product will be in the coming period, which is based on the great technological development that is happening now, and the extent of its impact on the movement and course of architecture in the future for the emergence of a new era in architecture, and their design methods will be light structures whose physical form will disappear through their transparent and composite layers.

Digital architecture has produced creative and renewed design ideas in terms of form and content, so new and innovative creative formations have emerged that it is difficult for the architect to reach in light of his old traditional tools, and technological development has become a part that cannot be overlooked in its impact on architecture, and one of the important architectural tools to formulate the thought of the design process, and the methods of implementing it on the ground, where architectural creativity has become associated with both human creativity and digital architecture technology, its forms have been borrowed from different sources, **where the characteristics and sources of shape in light of the digital revolution can be summarized as follows:**

First: Characteristics of shape in light of the digital revolution:

The design idea develops in the digital environment most of the time through computer manipulation and the development of the shape, in addition to the availability of the ability to choose materials, components and structures for the digital form, the possibility of design manipulation on the model, and the exploration of the external appearance directly, which allows easy judgment, and decision-making, as the shape can be seen in the digital environment early in the kinetic design maneuver processes, where the change to the element can be made directly by means of materials and components, replacing the traditional design habits.

It can also be considered that digital shapes are those shapes that depend in their design on the use of the digital language and computer as a basis for design. This was followed by the spread of these shapes in various engineering and artistic fields, and they came to express the renewed experiences and theories of sculpture, architecture and industrial forms. It represents a new trend that is becoming increasingly widespread and expresses a new generation of artistic thought, which has been reflected in various areas of the urban environment, architecture and interior design, **where the emergence of this new approach is due to the following reasons:**

- Continuous development of computer programs.
- The emergence of a new, growing system of information networks.

- The contribution of advanced technology to the development of new technologies and industry systems.
- The emergence of new materials such as platinum, which helped confirm this new approach.
- The spread of digital culture at all technical and urban levels in addition to the industrial spread, and the emergence of a new generation of architects interacting and coping with this new thought.

Second: The sources of inspiration for digital shapes:

Digital applications helped create virtual spaces by merging organic and engineering forms with relationships similar to chemical or biological interconnections to generate free forms, as well as the effectiveness of adopting formative architectural elements, generating line and grid points to generate physical shapes that connect shape, materials and space, where it is possible. Defining the distracting classifications of the form of digital architecture into three groups that are expressed and represented by formal features that differ among themselves, but they carry within them high technological and technical values, their dynamic features in form and content, as the shape of digital architecture and its sources of inspiration can be classified into three main sources; they are shapes inspired by "hard ware" digital components, such as shapes of digital devices and the tools themselves.

1. Shapes inspired by "hard ware" digital components such as shapes of digital devices and tools.
2. Forms that are inspired by the digital medium "Software" Shapes that can be produced by digital software, such as interactive and dynamic architecture.
3. Forms inspired from outside the digital milieu, "forms borrowed from vital fields," such as nature centered on:
 - Unexpected hybrid forms using a genetic algorithm.
 - Liquid crystal case strategy.
 - The abstraction of nature represented by structures and natural installations, snails and marine crustaceans and others.
 - Self-generated biological structures and installations.

That is, the borrowing in the first and second paragraphs of the digital medium, whether it is a component or a graphic form, while the second paragraph is borrowing from outside the digital medium, forms inspired by nature.

Recommendations:

- The teaching materials for digital applications must be developed by computer and their outputs and the teaching of contemporary digital architecture trends in the curricula of the architecture and architecture departments should be addressed, so that the future architects are aware of them to keep pace with the current development in their programs, and the effect of this on their designs.
- The architect should not be separated from what science presents with its new systems, technologies, and theses, and to remain interactive with it and absorb the capabilities of

modern technologies so that it does not separate from the future, and this does not mean separation from the architectural identity and local culture, but rather to display this identity in the spirit of the era in which we live and its new requirements.

- They must keep pace with contemporary architectural trends and the change they have brought about in thought, form and content, in parallel with flexible architectural and urban legislation, so as not to be an obstacle to the launch of architectural thought and creativity and to prepare the field and the urban environment for this change without strict restrictions that stop this development and keep up with it.
- Work to narrow the digital gap between us and the developed world with regard to information technology, as well as between local communities within the Egyptian society itself, and then work must be done to expand the use of information technologies.

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