

Digital revolution and its role in the development of the applications of interior design technologies for smart house

Prof. Zakaria Sayed Saeed Ibraheem

Dean of the Faculty of Engineering, Arab University for Science and Technology

Supervisor of the Department of Interior Design

Kingdom of Saudi Arabia

zeeka2008@gmail.com

Introduction:

This era is called the era of advanced technology, where nations have become measured by the extent of their knowledge of advanced technology, which is known as (communication technology) and became an important part in our daily life, and one of the features of the era, where developed countries raced in the middle of the last century to develop automatic control systems. This development has resulted in many technological systems, and since then many techniques have evolved into contact control known as electromagnetic control, pneumatic control, hydraulic and electro-hydraulic control. The driving force behind this process of change was the developments in the sources of strength in the technology and communications industry, which called technological revolution, that had a great impact in all aspects of life, and benefited from the science of architectural and interior design as the rest of the branches of science. Once a natural dwelling was known as a place to rest, relax, enjoy and eat, the house has become a place of work, shopping and communication, and this technology has produced the smart home, which represents one of the most promising trends that have not yet been explored all the possibilities. This technology has contributed to flexibility in our current and future lives, so it was necessary to change the concept of interior design to keep pace with contemporary technology to achieve interactive living inside the home.

Key words:

Smart Home - Smart Design - Control - Contact - Electronic Applications - Communication Technologies.

Research issue:

To ignore the impact of this revolution on the composition of the home in many of our Arab societies, and to consider smart home technologies as a kind of entertainment, or what is outside the realm of existed reality, despite its great benefits in the appropriateness of life within it.

Research importance:

The latest developments in the world of technology revolutionised in all areas of life, including the field of interior design, that's why countries are interested in developing the technology of interior design of the house because they achieve the following:

- Easy handling and control of electronic devices in the home remotely and find solutions for many problems.

- Future Residence has become a place of business, shopping and communication, so it was necessary to know the applications that characterised it.

Research aim:

- Keep up with the accelerating changes that help the user in reducing cost, time and effort.
- Investing the development of smart technology and its applications and exploiting it in the interior design of the contemporary home.

Research limits:

Smart applications technology used in the interior design of smart homes.

Research theory:

Smart home can serve as a model for the ideal home of the century.

Research methodology:

To achieve the objectives of the research, the research uses the descriptive analytical approach to reach results that increase the cognitive value of the research.

To reach the objectives of the research is addressed through the following:

First: Theoretical study of research

What are smart homes?

With the advent of the use of Internet technologies, it made easy communication between all components of life, the devices are communicating among themselves and receive some orders via the Internet, and there is also a trend to develop homes for the convenience of users around the world, and the term smart homes came because of the intelligence of home-based devices in general , Not the intelligence of the house itself in particular, and the many forms and types of these devices that make up smart homes, either by the way of control, often a computer, or through an application loaded on the phone, to enable the user to control the house even if outside the home. Then Smart Home technology has begun to introduce the concept of integrating and connecting all home appliances to a single network for easy control.

The emergence of smart home technology:

Smart home technology emerged at the end of the twentieth century as a direct result of scientific and technological development, these systems have many applications and its importance emerged as a new technology, and many international conferences called for the application of this technology.

Smart Home Definition:

- Until the beginning of the eighties did not know for smart buildings definitions, but it is an integrated system consisting of:
 - Building Management - Business Support Systems.
 - Office Automation - Video Systems.
 - Telecommunications - Audio Systems.
 - Space Management - Security Systems.
 - Maintenance Planning - Redundancy Systems.

- At the International Conference on Smart Buildings in Toronto in May 1985, the Intelligent Building was defined as: "Intelligent Building is a building that combines creativity, technology and management skill “

Consequently, the concept of a smart home is the dwelling in which special electronic systems are used to operate some of its parts and to control the systems it contains, such as lighting, air conditioning, ventilation, security, energy, etc., as shown in Figure 1 Where the entire environment works within a single system, smart home is like a smart city. The revolution in communication technologies and the Internet will lead to the spread of the concept of smart home and even further improve the smart home technology in the world in the future.

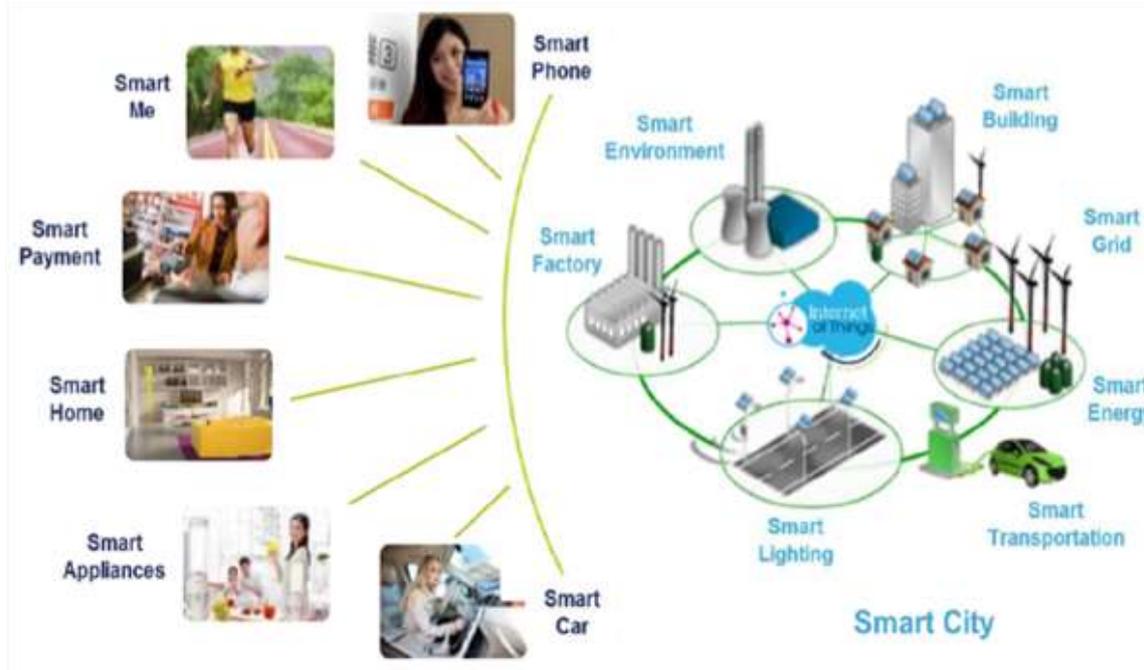


Figure 1 illustrates the context of the smart home itself being a unit of smart city

The role of design and its importance for smart home:

In order to meet the needs of smart home users, the design must meet all the current and expected future services, and be able to accommodate technological development and additions in the long run.

All of this is included in the design at the beginning of the planning of the house, you must take into account the following steps:

- Convenience factor that facilitates jobs.
- Accept design for future variables according to technological development.

The most important characteristics of intelligent housing:

Compatibility and flexibility It means self-compatibility with environmental variables and flexibility to face future changes and support the requirements of security, safety and user comfort and create the appropriate environment for him to achieve the highest productivity, and the ability to bring compatibility between all procedures, as well as to control performance and reduce cost.

The importance of smart housing in the service of a community segment "human side":

The houses were designed, prepared and equipped to help "people with special needs and the elderly as a human duty" help them to live as independently as possible. They provided many services that facilitated the normal living in life to preserve them. In order to help the elderly and the disabled to live with their communities better, and avoid resorting to the homes of the elderly and shelters.

Advantages of Electronic Control Systems:

- Create an electronic system characterised by speed and high efficiency.
- Replace human effort with electronic remote control systems with home appliances.
- Facilitating the control of the house by the electronic system.

Second: Smart Housing Technology

The technological leaps that we are witnessing now make it clear that the future is going beyond the unreasonable limits. Through complex physical interactions, it became impossible yesterday because of the creative integration of integrated computing (intelligence), which led to the development of some concepts and applications that helped to achieve the possibility of the transfer of automation techniques to the field of interior design in general, and introduction to the emergence of terms related to these techniques in the field of architecture at all levels, from the level of the city to the level of components of the interior elements of buildings.

The term "Smart City" and "Smart / Intelligent Buildings" have emerged. The term "Smart Rooms, Vacuum Components and Smart Appliances" has also emerged. These terms reflect the extent of research and expansion aimed at employing these smart home technologies in particular, in order to control energy consumption and improve performance in the smart home.

The basic idea of the work of smart housing:

Depending on the presence of a central computer similar in function to the human brain, this computer is connected to an integrated network similar to the nervous system in humans, and branches of that network throughout the building where there are sensors distributed throughout the entire perimeter of the building, and all the internal systems of the house to that network. To be an integrated network where you can control all housing systems such as air conditioning system, security system and lighting and all functions of the housing.

The technological systems inside the house are divided into four systems:

Management Systems	Control energy sources and thermal comfort
Control Systems	Interested in monitoring all safety systems inside and outside the home
Information Systems	Process all data and connect all networks
Communication Systems	Enable users to communicate and share information



(Figure 2) shows the connection of smart home devices to the remote control

Smart Home Technology:

The smart house includes a set of technology integrated between them and linked to all devices which is a technique of sensing and receiving and means of remote control system (Figure 2) and all of which are digital signals converted into commands issued by the transmitter and be in the form of a digital code.

Applications running through phones:

There are many applications deployed to use smart home technology, including the Android application, which is the most widespread, through which we can control any device in the home remotely by smart phones, which provides the possibility of control of all devices, and through this application is programming using the environment Eclipse an integrated development environment And a system to add accessories.

Smart Home Technology Automation: (Figure 3)

Automation means the technologies and applications that are available in the system to make the house smart, and has the ability to control all equipment, providing the user with operational services that make his life and living more luxurious, and help him to achieve greater productivity. and includes the following elements :

- Security.
- Surveillance Cameras.
- Mood.
- Curtains.
- Spraying garden water.
- Lighting and windows.
- Hardware.
- Garage.
- Ventilation and heating.



(Figure 3) smart home automation

The most important components of smart home:

Living room: It is a necessary part of the house where there is no tools or entertainment devices such as television screens and other devices, can be controlled on and off all the contents of the room through the presence of the person in this space. It also includes smart seats that are customised to users' needs .

Bedroom: The room has intelligent climate control within the room, as well as entertainment devices, lighting and windows, and the bed is also equipped with a sensor so to monitor the movement of a person and detect his health.

Kitchen and Dining Table: The kitchen includes many smart technologies in its appliances. Refrigerators, freezers, ovens and water taps all work with smart technology to open and close water during use. It allows users to communicate with devices through mobile online, and has applications and programs for this purpose.

Smart Furniture:

Smart furniture is not modern furniture, but furniture like any other computer applications that allowed it to regulate the functions it performs. Some people think that functional is smart furniture, this is not the reality, but smart furniture is a type characterised by its easy way to use, which does not depend on changing the functions in one piece by physical effort but change in the way of sensing, or fingerprint sound or touch, or pressure or through the mobile and soon. It is based on advanced high technology that makes it easy to move, and if the multifunctional furniture includes these characteristics turned into smart furniture.

In general, smart homes have the ability to make life easier and more convenient for users. They provide an enormous amount of assistance, especially in emergencies. They also provide electricity, so the lights turn off automatically when you start moving around and then stop completely when you leave. As for air conditioning and heating, these devices work by automatic orders according to the needs of individuals and according to the nature of the temperature of the place. In addition, digital technology has produced modern means that the person interacts with voice or signal and meets all commands.

Results:

- Smart home systems and applications are constantly adapting to technological developments accepting the integration of modern technologies to help users comfort and meet all their needs.
- Ensure that the system (applications) respond to all requirements of the smart home as it represents all control operations in the house effectively and is characterised by flexibility and code short cuts.
- The digital revolution has had a positive and effective impact on many segments and groups of many communities, where it contributed to clarify the solutions to the difficulties that faced them in their homes, especially the elderly.

Recommendations:

- The development of this trend hopefully serves the community by providing a suitable lifestyle, and economical cost of operation, as well as the environment in which these homes are built with the characteristics of sustainability.
- The need to pay attention to the Arab world towards this technological trend and we do not stand by as spectators or consumers of this revolution, which changed the features of the

house, and does not prevent the existence of some experiences and attempts in Egypt and the Arab countries.

- The level of specialisations should raise awareness in the field of smart home technology studies and utilize them in the field of interior design .
- Emphasising that smart housing, if today is a luxury, will become a prerequisite for its many benefits and suitability for all age groups elderly - patients - people with special needs.

Arabic References:

- 1- Al-badry Amjad, Abdelrazek Heidar- Mafhoom Al-manzomat attiqaniyah lifikr emarit al-abniyah azzakiyah- jame 'at Baghdad- majallit al-handasa a 'dad 13, 2008.
- 2- Sultan Ahmad, Abu bakr- attahawwol ela mojtama 'ma 'lomaaty- markaz al-amarat lildersaat wal bobos al-istratijiyyah- Arab Emirates 2002.
- 3- Frank Kleesh- thawrat al-infomedia al-ma 'lomatiyah wa kayfa toghayyer a 'lamna-tarjamat: Hossam El-din Zakaria, Abdelsalam Radwan- al-majles al-watany lilsaqafa wal fonoon wal adaab- majallit a 'lam al-ma 'rifah a 'dad 253- Kuweit 2000.
- 4- Heeba, Khaled- al-emara al-mo 'asera wat techonolojia: ro 'yah naqdiyah lita 'seer al-technolojia al-raqamiyah a 'la attawajohaat al-me 'mariyah assa 'edah ma 'matla 'al-qarn al-hady wal eshreen- jame 't Om El-qoraa Makkah al-mokarramah- KSA 2013- majalit Om El-qoraa lilhandasa al-me 'mariyah.

Foreign References:

- 5- Atkin, B. "Intelligent Buildings; Applications of IT and Building Automation To High Technology Construction Projects". Halsted Press Book, New York 1988.
- 6- Barbosa, J., Araújo, C., Mateus, R. and Bragança, L. Smart interior design of buildings and its relationship to land use. Architectural Engineering and Design Management. Taylor and Francis Group 2015.
- 7- International Journal of Advanced Science and Technology
Vol. 15, February, 2010.
- 8- Smart Home Applications", International Journal of Smart Home, Vol. 2, No. 2, April 2008.

:International information network

- 9- <https://www.gilgeek.com/2018/11/smart-connected-sofa-miliboo.html>
(browse date 8/7/2018)
- 10- <https://www.digitaltrends.com/home/eight-sleep-pod-review/>(browse date 22/7/2018)
- 11- <https://www.pinterest.com/pin/416020084329211837/> (browse date 13/9/2018)
- 12- https://www.facebook.com/elzohrri2007/videos/10157539353829903/UzpfSTEWMDAwMDkwMzI1MjMyODpWSzoyNjMwNjI3MzIwMjg1Mzgy/?multi_permaLinks=2630627320285382¬if_id=1553446166198306¬if_t=group_activity
(browse date 25/9/2018)
- 13- <https://www.straitstimes.com/asia/east-asia/at-alibabas-futuristic-hotel-robots-deliver-towels-and-mix-cocktails>
(browse date 2/10/2018)
- 14- <https://www.youtube.com/watch?v=i73n-LTXPIM&t=394s> (browse date 26/1/2019)
- 15- https://www.youtube.com/watch?v=B_8gu2cnWgw (browse date 11/2/2019)