The Role of Building Technology in Obtaining Sustainable Place
Selected buildings in Sulaimani, Kurdistan Region, Iraq-as case study

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Abstract

The distinctive ecological issues from pollution, exhaustion of vitality and assets, pushed the sustainability wonder through the down to earth and theoretical application to take a vast part in the contemporary worldwide patterns, as a way to discover answers for the world natural strains and its results. As the supportable engineering associated unequivocally with the biological system on one hand, and to different frameworks identified with the natural frameworks, from alternate, this has turned out to be a standout progressive the most dynamic topics in feasible applications and research. This research was to simulate this idea, with a review to the likelihood of applying manageability standards in contemporary engineering and the impact of the utilization of innovation in accomplishing this maintainability, which will prompt review the how and the approaches to accomplish sustainability in architecture and how to utilize the innovation as the potential instruments of this time in accomplishing these manageability, offering intending to the indigenous habitat as to keep up the soul of the place. The utilization of innovation as an instrument of the advanced period to accomplish economical design, the association with nature, and understanding the idea of "soul of the place"; lead us to concentrate the likelihood of utilizing innovation and IT to see more about the importance of place and maintainability in the current time to make a positive society interface with the contemporary necessities, and furthermore with the regular habitat they live in . This research aims to reach to the clarify the indicators of the Building Technology and Sustainable spirit of place, then the research will analyze these indicators in different public projects in Sulaimani city by the analyzing the average of the questionnaires answers , then reaching the conclusions and the recommendations of the research.

Keywords: sustainability, building technology, the place, the spirit of the place.

Introduction

Sustainability is the process of change, in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations, The organizing principle for sustainability is sustainable development, which includes the following interconnected domains: environment, economic and social. Sub-domains of sustainable development have been considered also: cultural, technological and political. Sustainable architecture is architecture that seeks to minimize the negative environmental impact of buildings by efficiency and moderation in the use of materials, energy, and development space and the ecosystem at large. Sustainable architecture uses a conscious approach to energy and ecological conservation in the design of the built environment , The idea of sustainability, or ecological design, is to ensure that our actions and decisions today do not inhibit the opportunities of future generations.The sustainable (Wandemberg,2016) .

This research focus on the relations between the concepts of place and sustainibility and the effect of building technology on this relationship.

Place

The research deals with the place from a philosophical side and the impact of spiritual factors in it and by what its given from spiritual properties reflecting a certain thinking. place is characterized by its physical and spiritual themes, thus giving to it these characteristics and features which distinguish it from somewhere else, so the research deals with the concept of place, the spirit of the place, the concept of place

in nature, and the physical and spiritual factors of nature.

The Concept of Place

Heidegger defines the place as the location that provides all the human, physical, economic, cultural activities, and at the same time affects and is affected by cultural and social behavior (Al Asadi, 1997, p 151). Place is attached to human life more than time in metaphysical meaning because the place embodies the human dimension of reality and contains the time which dissolved on it or accompanied by and perceived by a direct perceptual begins with the human experience to his body , which is the place of his mental, emotional and mental power. As that the human who aspires to establish his presence dwells the land cannot talk about the existence, without reference to the place as a factor to establish belonging of this presence (Al Asadi, 1997, p 151). The place is a territory that its boundaries defined as the sense of presence inside and this supports the sense of presence in somewhere unlike just being in anywhere. And the place must refer to the existence of the other and interacts with the environment. The place exists in the depths of human social action with cultural concepts. Thus the place is a space enabled with social interaction, and employee with cultural concepts. (Harrison & Dourish, 2002, p 39).

We can illustrate two types of place:

- The Existential Place (Physical)

This is associated with the existence of the thing itself that gives significance to be achieved within the universe of possibilities. And actually the presence of humans in this place is its stability, which is extended and encompassing to the farthest point that the physical existence can reach, and appears as a direct symbol of his existence. (Bachelard, 1980, p 226)

- The Virtual Space (Communicational)

Represent the possibility case (probability) that provided by technology means for humans. And that should not be regarded similar to the real presence in the place, but as an image of self within the place which takes the form and dimensions associated with the nature of the used medium. It does not only exist in our era, what applies to the modern technological means for finding someone in more than one place, applies also to what is apparent in the delivery of letters and messages, but it takes physical dimensions more embodiment and closer to the truth and not the truth itself, and thus realizing the concept of community at a distance (Telecommunity) (Toffler, 1990, p 408).

The place located by time lost its placement in the technological era and turned into a timeless case, the concept of speed and wholeness exist (exist everywhere and at all times) displaces from the traditional concepts of the city and place. The society of today has become focused on the movement and not on stability.

The Spirit of Place

Schulz mentioned that the "spirit of place" is these meanings that define the space and gave its identity, and there are natural and artificial phenomena repeated in different forms reflect the fact of that space (Gedo, 1993, p 69). The spiritual meanings of the place lay in symbols, signs, events and life modes that interacted with the place to generate interaction between space, human thought and spiritual aspects of it. The place expresses the event, time or thought, and this interaction generates spatial belonging to group of people live and enjoys the place (Johnson, 1997, p 22).

Architecture's mission is to clarify the true nature of the spirit of the place, every human reflects the impact of his being and his environment through for example building a house in nature from a certain type and certain construction that reflects a certain approach to life (Baker, 1996, p 318). Architecture become part of the ' spirit of the place' when signals and the architectural symbolic meanings interact with the intellectual time side of this place[1], architecture which represent the spirit of the place express the

[1] We mean by 'Intellectual side': the aspects of humanity ,affiliations of national , ideological, social and political events of that place, while the 'Time side ' represents belonging to the events with to be part of the intellectual heritage of the place continuing to the present (Johnson, 1997,p 23).

potential symbolic sides in that place in physical form (Johnson, 1997,p 22).

The place was and still a source of inspiration and intellectual literary and artistic creativity, for having the spiritual meanings generated to the man who holds inside of him the properties of belonging to the place, and the role of architecture here is the interaction with the place through its potential spiritual meanings to express the physical and symbolic "intellectual "architectural identity , and these meanings may be associated with the events to reflect social or political sides of the community ,in this case architecture expressed the event & place, or it may reflect the national and religious belonging to the place , the event here is the component of the intellectual identity of the community and architecture represent the physical identity (Ali, 2010, p 136).

The built place characterized by being linked to a group of properties, events and factors affecting it, so it reflects the spiritual and spatial properties that express a certain thought, and makes it imperative for architecture to reflect the spirit of the place.

Place in Nature

Nature as we know it was invented in the differentiation of city and countryside, in the differentiation of mental and manual labor, Nature' resides in place, whether in a city, suburb, and rural area. The work in place includes the "sense of place" or identity with the context - which was generated by living in - and to achieve privacy, and the locality (Regionalism) (Ali, 2010, p 135).

The natural environment is a main axis of the axes of sustainability, and it has a main part in the environment factor, and it's one of the foundations on which to build sustainability, actually it correlates with the locality due to the association of the process design of the sustainable building with the natural characteristics of the context . (Wandemberg,2016,P43) Local natural environment considerations lead to the integration of the microclimate variables of the building, which is capable of securing physiological requirements of the human being inside and around the space. And the characteristics of this axis also determine the building economies and the used technological methods. So it has come to label the natural environment properties in the design process with 'Environmental Determinants of design' (Ali, 2010, p 136). The environmental determinants known as 'the result of a combination of natural elements involving every element of them in giving the environment the characteristics that distinguish them from others, and the difference and contrast between the environments based on the difference of these elements qualities, and a study to the environment with its different elements is the base for understanding the potential and suitability for the different human activities' , The factors of the environmental determinants of design are topography, climate -represented by the solar radiation, wind and rain-, geological structure and natural resources and water (Wandemberg,2016,P44).

The relationship between nature and place represent a communicative relationship to achieve the sense of place, through the link between the natural environmental requirements and the design determinants, achieving through it immaterial spiritual meanings of human environment within the place.

Place in Built Environment

Alexander[2] descript in 1987 the principles of architectural design, he focused a bit on the structure of cities & buildings and much on the life that take place inside, pointed out those who are interested in building tend to forget that the life and spirit of the place is from its experiences there, and not dependent on the physical environment only, but on the pattern of events that test there (Harrison et el., 2002, p 5). Architects and urban designers are not designing three-dimensional structure (spaces), but are determined (places) to the presence of people , Although the environment is not the only factor, but the identification with the symbolic meanings of the built environment is an important way that

[2] Christopher Alexander: an Austrian architect, his book 'A Pattern Language: Towns, Buildings, Construction' 1977 with Sara Ishikawa and Murray Silverstein, and this book inspired design pattern movement in the manufacture of the software. (Johnson, 1997,p 24).

people get from it on their sense of belonging to the place (Ali, 2010, p 132).

The built environment represent the relationship between mass and space within the spatial organization, so the architecture gives the place distinguished characteristics, interacting with it to express the spiritual side of it, and the concept of place in the built environment represents the interaction between the place natural limits and the design determinants of the built environment to achieve the spiritual & physical aspects of place and architecture.

The Spatial Intercommunication

The concept of spatial intercommunication need to intercommunicate meaning with time and contemporary concepts to achieve intellect communication in time and space, the relative meanings which have spatial belong highly express about the architectural identity and these meanings reflect more about human and social thoughts not just the general meaning (Shulz, 1998, p 32 , 33).

The spatial Intercommunication lay on the communication between different belonging of architecture from the local regional to architecture global trends, based on intellectual and formal Intercommunication, the spatial belonging of architecture could be formulated on two levels: spatial belonging of architectural identity on the spatial zone (local regional belonging) and global trends, at the regional level the great potential provided by science and technology of how to understand the place and deal with it ,opened the option of possibility freely presence in a particular specific location for the modern human ,in the era the speed of communication and transportation expressed the human desire in transport and communication (Ottam, 1985,p81).

The regional characteristics has importance in configure the appropriate spatial architecture, through the study of the relationship between man and nature, adaptation to natural environmental conditions, provides methods and traditional local techniques in building style, dealing with the spaces and shapes, provide appropriate climatic solutions, emphasize on the impact of customs, traditions and beliefs in output final form (Al Sultani, 1996, p 38). The architecture should be distinguished by its belonging and intercommunication between the regional (local) and the global ,local and regional belonging don't prevent the benefits from the possibilities of the advanced building technology and the international methods in architecture and communication is achieved through intellectual timeless communication of the place with events and global developments, architecture and architectural identity communicate with spatial belonging and with the architectural global trend through the expression of the local and regional spatial belonging . Architecture takes advantage of the potential of global trends which gives continuity between the contemporary global characteristics and its spatial natural and social surroundings (Ali, 2010, p 131).

Communication represents the special characteristic of sustainability in architecture through spatial intercommunication between man and nature (local characteristics of the place) and achieves belonging and communication with the man and society's contemporary requirements through communication with the world.

The Regionalism (Locality) of place

Locality is a spatial architecture that expresses the properties of the place and potential meaning in it, and it generated from the relationship between the spatial physical properties and the spiritual properties in that place, the spatial factor effect significantly in deep and surface structures of the architectural identity through this interaction (Al Jaderchi, 2007, p163). The place exceeds the mere physical meaning to become a wholeness phenomenon which cannot reduce their attributes , In order to understand the spiritual meanings of the place we should know the intellect spiritual factors in it, the place cannot be described by analysis ,scientific concepts, or only bare objective terms ,but by the study of human daily life and appropriate spatial planning methods to him (Shulz, 1996, p 21).

It is necessary to reach rational solutions to reach to an architecture deepen the sense of belonging to its surroundings ,understood by its user and the recipient of its letter, which increases the human experience in this field and increase the

richness and the value (Al Sultani, 2000,p 420). The relationship between place and human manifested through the perspectives of intellectual human society, which is also the recipient of this thought, that generate a case of communication between the place and the intellectual level and highlights the spiritual meanings in, and the spatial characteristics of the identity generated by connecting intellectually and locally with the place and achieving communication with the contemporary social and human requirements within the regional (local) spatial , the community generate the architectural symbols which represent the relationship between ancient and modern through the application of the suitable method of connection and communication mechanisms between regional and global (Ali, 2010, p 136).

The concept "spirit of place" gives the built place within local limits the spiritual characteristics and gives the feature of the spatial intercommunicate through the expression of locality and the characteristics of human society, also the communication between the local and global gives the place spiritual characteristics reflect the social and modern technological requirements giving the place a property of regeneration and intercommunication with human thought and social changes, The sustainable place refers to the understood of sustainable architecture , building and design by gatherin all of them in the concept of place.

Technology

Technology has an active role in the processes of change in the society structure and so in the city urban structure, due to the change of cognitive structures of man, and what technology does is a necessity of the Imperatives (development) to promote the human structure, the end of the twentieth century witness impressive progress which achieved radical developments in community, administration and economy, these developments cannot be compared only to the changes of industrial revolution, the importance of technology lies in the great changes that have taken place in the community , the rapid technological capabilities and the use of IT in most areas of life (Al Adhami, 2007, p 88)

The Understood of Technology

Ortega suggests that technology becomes a condition for living due to what provide to human from ability, ease and pleasure in life, it is the gift of god for human beings, and the technology is a form of mind. And lead to creation a new nature or environment, represents the joint that connects the human with nature. Semper shows that technology has arts represent what human do to get a microcosm within the natural world, seeking to find the integration that lacks, İt is the process of adaptation of means to serve man and not vice versa. Technology reached to the case of man existence, it is a picture of him at that time and that place (Semper, 1981, p 11) . Heidegger mentions that technology as a concept and as a case is larger than it can be described or expressed by machine, material or construction or industrial method, it may be more correct to consider all of them a copy of its changing images but at the same time frequent as a case in every time and place so it is a picture chronicle that time and place, architecture is a case of bringing, it is a form of technology in every time and place. (Semper, 1981, p 13)

In general, the principles of architecture is a series of ideas arise in the consciousness of human mind due to his influenced by all the conditions and variables surrounding it, whether consciously or unconsciously, so that if the circumstances and the reasons changed, the ideas must change with it, otherwise the ideas will prove failures and lack of continuity.

Information Technology

Humanity faces a quantum leap forward, it faces the deeper social upheaval to build a new structure and arrange it in clearer way. Humanity has experienced two great waves of transformation, each of them wiped out the first civilizations and cultures and was replaced by new methods of life no one imagine it one (Shkara,1998, P 70). The first was the agricultural wave it took thousands of years to be completed, and the second was the industrial wave, it represented by machine and the enter of car into the city, it lasted 300 years, now we live the third wave which history move rapidly large in our time, changes wrought by the information

revolution similar to the change wrought by car in the urban infrastructure . The new civilization has new behavioral symbols with the dominant rapid spread of technology at all levels (Toffler, 1990, p 18). It changed the concepts of people, their behavior, their habits, and traditions. Information technology is the process of using the technological possibilities to exchange a huge amount of information through the availability of communication means, it's one of the features of our era and one of the aspects of culture, where, information revolution or information technology revolution played a major role in our lives and dovetailed with each event to affect the concepts of people, their lives, traditions and affected on the long history of peoples in various parts of the world (Ali, 2002, p 64).

We can say IT represent the potential of technology which reflect the need of age, and correlates with the social need of contemporary society to achieve the communication between the community and intellectual & cultural development in the world, and that gives the local place the property of intercommunication between local and global, and realizing the concept of sustainability in place .

Building Technology

Technological factor represent one of the four aspects that work together to achieve the sustainable development, together with the economic, environmental and humanely aspects in order to make progress in this field and connected with each other. Sustainability requires a continuous technological change in the industrial countries to reduce gas emissions and reduce the use of resources. It also requires rapid technological change in develop countries, especially in the emerging industrialized countries, to avoid repeating the mistakes of development, and to avoid the doubling of the environmental damage caused by the industrialized countries. Technological improvement is an important subject in reconciling development objectives and environmental constraints. Sustainable development requires a fundamental change in current policies and practices to achieve the concepts of sustainable development and sustainable architecture (Adib, 2002, p 16).

The relationship between technology and architecture seen through the architecture output - in many applications - reflecting the contents of technology that serves the stated goals of architecture, and this trend does not make the technology a burden on architecture, but qualified it to be one of the basic elements that support the main considerations of architectural act to ensure its success despite the many obstacles that impede the course of the process design in its various stages, and this compatibility between design considerations that reflect the trends of architecture on the one hand, and technology on the other hand, represents an essential pillar of the pillars of sustainability in architecture (Jones, 2000, p 38). It is not limited to the use of technology - which is expensive in most cases - it can exploit the cheap natural resources and apply it in successfully formulas maintain the quality of the micro climate inside the building and not poses toxic products to the environment and pollute it, as example the use of unpolluted recyclable building material which is used frequently in the applications of modern sustainable architecture. (Kharoufa, 2006, p 32).

Technology is an introduction to sustainable architecture when it meets with other considerations to achieve the desired goals of sustainability. It offers high potential in developing the methods and formulas that show the other considerations (environmental, social, economic, etc. …) (Jones, 2000, p 40).

Technology represents one of the age's potential, it achieve sustainable architecture and spatial intercommunication between global and local. Technology uses all the available capabilities from information technology to ensure human and social requirements to the contemporary societies and ensure having built environment with characteristics of humanity and modernity, reaching to have sustainable architecture which works to communicate with the environmental, economic and also social requirements.

Sustainability

Architecture represents the biggest challenge in the field of sustainability, as the construction

process consumes large amounts of resources ,produces tons of waste and release gases and pollutants to the environment, also it requires a lot of energy during operation and over the life cycle of the building. If the architecture in the past was seeking to achieve the triple of Vitruvius: durability, functionality and beauty, it's now aims to have a role in developing the environmental level rather than on the scope of the site itself but on the regional and global level .

Sustainable (Place- Architecture)

Sustainable architecture known as architecture which aims to meet the requirements and needs of the community at the present time and save the possibilities for future generations to achieve their potential, It also defined as the architecture that have less negative impacts on the natural and built environment, whether at the local environmental level or regional and global level. Sustainable architecture is devoting a qualified integration to economic, social and environmental performance according to a holistic perspective, the rational consumption of natural resources and appropriate management to the built environment has an essential role in the rationalization of resource consumption, reduce energy use and preserve the sources, as well as improving the quality of the environment (Steele, 1997, P 3) . Many proposals discuss the principle (continuity of architecture) or (sustainability) through the idea ' that the organic system is the law behind the architecture of nature', beside it must be recognized as the art of human architecture, the architectural art must be understood as an organic and social art has a task of finding healthy civilized atmosphere surround the human by its rhythm, materials and colors (Saarinen, 1986, p 33). Architecture engineering (the sustainable one) gives a mating between science and art, and applies practical formulas to these different fields within environmental framework lead in the end to achieve environmental continuity in its real sense (Kim, Rigdon, 1998, p 11). Also, the sustainable architecture is a product of the interaction between human and natural world, it is a summary of a set of options that the human deal with the environment, it embodied these options through the human sense with the site determinants and factors: (heat / light, ventilation, deal with color, green opened and closed areas, the rational consumption of energy, maintenance the resources, materials& water recycling, waste control, prevent all pollution type , control the sustain systems of building and its operation networks regarding the infrastructure services) as well as all function considerations related to design (John, 2003, p 0.7).

It has been classified two types of buildings according to the degree of fulfillment the conditions of sustainable design:

- Healthy Buildings: are those buildings which designed to be its inner climate tailored with the human comfort's considerations, sustainable building reflects the finest state of human coexistence with environment, so it is a healthy building by all standards, it is a building its internal environment compatible the external one and integrate together (Kunszt, 2003, p 7).
- Sick Buildings: Are those buildings that depend on unsustainable energy sources (non-renewable), the ratio of dependence on natural lighting & ventilation are very small compared to the ways of industrial lighting and ventilation, the lack of healthy ventilation and lighting make the internal space farm of many types of bacteria and sick's viruses. And the high degree of industrial energy & physiological comfort process make the space confused, uncomfortable for the human mind to work effectively on rational levels. They cause drowsiness, tension and intellectual stress. And at the end reduce the rate of work performed and production due to the high irregular frequencies to the building's operational energy (Smith, 2005, P 197).

Sustainable design is different from the green design as the first has a continuous, prosperous and adapt with environment, the green design includes environmentally sensitive materials, healthy buildings and depends on operations do not adversely affect the buildings before or after or during the manufacturing &construction, and the deconstruction include mechanical systems efficiently designed of high performance, the sustainable design compact and contains the

principles of green design and goes beyond that of being a positive and effective structure which is designed to maximize the benefit of the sites and renewable resources (Williams, 2007, p).

Sustainable architecture represent architecture reflect life and spatial requirements, and interact with them to achieve the continuation of the building from intellectual and physical sides, the sustainable architecture characterized by renewal, prosperity and communication between human and spiritual meanings of the place through the use of technological capabilities.

Sustainable Design

Sustainable design is one of the most important development fields that must be taken into consederation. Sustainable design is integrated concept has a philosophical dimantion rather than mere external form of the building or a particular model. Sustainable design is in harmony with environmental surrounding with inserting the sustainable concepts, durability, longevity and building materials appropriate with the sense of place. sustainability is a concept which includes several axis including: energy, environment, ecosystem and community through gradual and overlapping relations with each other, all accede under the banner of sustainability .

The principles of sustainable design (Place) (Ibrahim, Muhsen, 2005, p 6-8),(Smith, 2005, P 203-204).

- The study of place: the beginning of any sustainable design must begin to study the place if we make attention to the different aspects of place, we can live in it without destroying it, designers help making the appropriate design like orientation and natural environment conversation and their compatibility with the design to access to an integration between the building, its built environment and available services .
- Contact with nature: whether natural or built environment, this connection gives life to the building and integrating it with the coexistence environment and its users
- Realize the natural processes: natural life is complementarity, it means that natural systems are going in closed circle (completion cycle of food and energy in the stage of virgin land) and meet the needs of all types come through life processes, through participatory processes that renews not deplete resources and become more vivid, the more the courses are natural and visual, the designed environment back to life
- Study of environmental impact: sustainable design seeks to realize the environmental impact of the design. Assessment of the site, energy, materials, energy efficient design, construction methods and knowledge of the negative aspects, and try to achieve it through the use of sustainable materials and less toxic equipment and supplements (use materials& tools recyclable at the site)
- Integration of environment design and support operations: the cooperation of all disciplines must be involved in the design process with including sustainable buildings in the initial stages to make a design decisions, with the attention to the user participation , local communities and neighboring areas of decision-making
- The study of human nature: sustainable design must care to study the nature of the users and the characteristics of the built environment and understand the requirements of population, community, cultural background, and customs & traditions. As sustainable architecture requires integration of aesthetic values, environmental, social, political, ethical, and the use of user expectations and technology to participate in the appropriate design process of the environment

From what is stated it can be said that the achievement of sustainable architecture requires to achieve the basic principles of sustainable design, which is to study the place and the spiritual characteristics in it, connect with the natural & built environment, maintain the vitality of the place to interact with the environmental aspects and the requirements of humanitarian, social, and use all the technological available potential for achievement the sustainable building.

Sustainable Building (Place)

To achieve the concept of sustainability within the scope of architectural work, this matter lay in two sides, the first is about working to rehabilitate previous architectural products and raise the efficiency of its performance for specific purposes (like extend the life time of a residential building or maintaining memorial monument which has a cultural dimension), to make these productions continuous with the requirements of this era, while the second aspect is about production of new models, should be considered successful within the present scales, but remains its main goals directed towards the future, in the sense that we expect future versions could be applied within acceptable time limits. See figure (1), (2), (3). From our analyzing to the international projects, we conclude that technology and IT are used to intercommunicate with the place threw using the High Tech. technology building, using the strategies of rehabilitation, intercommunicate the spirit of place and the human needs and contemporary needs of human beings to achieve sustainability in architecture and the intercommunication between human being, architecture and technology.

In brief we can mention the indicators of the relationship between sustainable architecture and technology in these indicates:

- Intercommunication with surrounded environment (Place – nature and built area).
- Intercommunication between heritage and contemporary.
- Intercommunication with contemporary human needs in architecture.
- Using IT and High Tech. in architecture.
- Using technology in achieving human needs.
- Expressing the effects of spirit of place (meaning and identity).

Practical Study

The practical side of the research deals with applying the indicators which has been reached by the theoretical side in a number of engineering projects in Sulaymaniyah city/ Kurdistan region of Iraq. The projects consisted of a number of modern public service buildings that have a direct interaction with the requirements of humanity, the research deals with these architectural models through graphic analysis approach and mechanism of indicators assessment to each project and then reaching to conclude the impact of these vocabularies in achieving sustainable architecture. Figure (5), (6), (7) (8), (9), (10), (11),(12) The researcher depends on the analytical feedback of(20) architects in sulaimani municipality city for the (8) projects and then discussed the conclusions of the practical case study which depends on the numbers and data that given to each indicator for each project ,the marks given from (0 to 4) and the value is shown the strength of each indicator in every single project (0 week, 4 strong) , tables (1).

Discussion

The conclude of the practical and graphical analysis:

- Project 01 :Has a medium to strong marks for the indicators of sustainable place and a week value nark for the indicator Using IT and High Tech. Project 02 :Has a medium to strong marks for the indicators of sustainable place and a week value nark for the indicator Intercommunication with human needs and Using IT and High Tech. Project 03 :Has a medium to strong marks for the indicators of sustainable place and a week value nark Intercommunication with environment. Project 04 :Has a medium to strong marks for the indicators of sustainable place Project 05 :Has a medium to strong marks for the indicators of sustainable place and weakness in Intercommunication with environment Intercommunication with environment. Project 06 :Has a strong and very strong marks for the indicators obtaining the sustainable place and weakness Intercommunication with environment Intercommunication with environment. Project 07 :Has a medium and strong value for the indicators obtaining the sustainable place . Project 08 :Has a medium and strong value for the indicators obtaining the sustainable place and weakness in Intercommunication with environment Intercommunication with environment

- The study analyzed the indicators in general , and the most indicator that appear in the projects was Using technology for the contemporary human needs , and the weakest one was, Intercommunication with spirit of place and Intercommunication between heritage and contemporary with a medium appear in the projects for the indicates , Intercommunication with environment and Using IT and High Tech. Intercommunication with human needs
- The practical study shows the role of using technology in achieving the understood of (sustainable place)with different levels , and in generally the architecture in Sulaimani – Iraqi Kurdistan obtained the sustainable place in a medium range changing to weak and strong , and that's depending on the using of the indicators threw the building technology.

Conclutions

1- The place: place is the case of intercommunication between the physical and spiritual aspects, it reflects the continuous movement state and express the contemporary requirements, also it represents the spiritual, spatial aspects and events that generated by the relationship between man, nature and technological potentials.

2- The technology: it can be said that technology and information technology represent the technological potentials that reflect the need of this era, correlates with the social need of contemporary society to achieve the communication between the community and intellectual & cultural development in the world, which gives the local place the property of intercommunication between the local and global and achieving the concept of sustainability in the place.

3- Sustainable place: it is the architecture of the place that represents the life and spatial requirements as it interact with them to achieve the continuation of the building in intellectual and physical terms, the sustainable architecture characterized by renewal, prosperity and communication between the human and spiritual meanings of the place through the use of technological potential. we find the concept of sustainable architecture in the inherited architecture in the style of planning, design, implementation and dealing with the social, environmental and natural built environment requirements; consisting a continues spatial between man, architecture and spirit of the place, these had been affected on the sustainable architecture's trends, formulas and the how of using technology to communicate with the place and the requirements of humanity.

4- Impact of Technology in achieving sustainability(sustainable place): technology play the major role in the expression of communication between heritage, modernity and humanitarian & modern social requirements, it communicate with the spirit of the place through the use of the IT and high technological potential in contemporary design to achieve the requirements of humanity in the built environment. And the research reach to (6) indicators of the impact of technology in achieving sustainability in architecture, and they are:

- Intercommunication with environment (place and built environment)
- Intercommunication with(contemporary and heritage)
- Intercommunication with human needs
- Using IT and High Tech.
- Using technology for the contemporary human needs
- Intercommunication with spirit of place (meaning and identity)

Practical Study

The research studies (8) architectural models for contemporary services projects in Sulaymaniyah city, the indictors above have been analyzed in these projects according to a mechanism synthetically measurement, the research concluded through it to :

1- Interaction with place and surrounding environment: selected projects interacted with the surrounding place and with the concept of the spirit of the place by small and medium ratio, which shows the status of drift

away from the spiritual meanings and context spatial effects on projects.

2- Intercommunication with contemporary and heritage: most projects tried to achieve intercommunication between heritage and contemporary in a medium state to ensure the intercommunication between local and global (contemporary) reaching to achieve the concept of communication and sustainability in the built environment.

3- Using technology to communicate with the contemporary human needs: most of the projects worked to use technology in achieving the requirements of humanity and communicate with them, but the use of information technology and high technology was in a few percent.

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دور تكنولوجيا البناء في الحصول على مكان مستدام
مباني مختارة من مدينة السليمانية
إقليم كردستان العراق حالة دراسة

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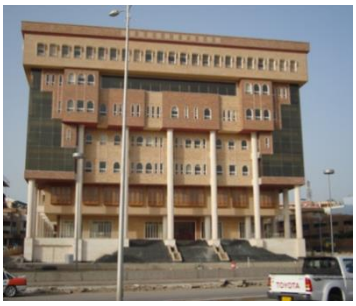
المستخلص

يمثل مفهوم الاستدامه ،حماية الجوانب المميزه للطبيعه من التاثيرات البيئيه و الملوثه للارض ،والذي يمث احد الجوانب الرئيسه في الحياة المعاصره للانسان في هذا العالم الجديد و يمثل مفهوم الاستدامه اليوم احد المفاهيم الرئيسة و المهمه في احياء النسيج العمراني حيث تمتزج مفاهيم الاستدامه مع مفاهيم علم الحياة و الهندسه و الارض و الاجتماع.و من هنا تظهر اهمية التواصل بين المفاهيم المختلفه لفرض تحقيق مفهوم الاستدامه و المكان المستدام من الجوانب الفكريه و الاجتماعيه و الفلسفيه ، يتناول هذا البحث المفهوم الفلسفي للعلاقه بين تكنولوجيا البناء و المكان المستدام المحقق للجوانب الانسانيه في وذلك من خلال تحليل الجوانب المعماريه لمفهوم المكان المستدام ومن خلال الحفاظ على روح المكان ، يتناول البحث الجانب النظري و المفاهيم النظريه للمكان و روح المكان والجوانب الطبيعيه للاستدامه اضافة الى مفاهيم التكنولوجيا و تكنولوجيا البناء و المؤثره على تحقيق مفهوم المكان المستدام و الحفاظ على الجوانب الروحيه للمكان ، يعمل البحث الى التوصل الى مؤشرات تكنولوجيا البناء المؤثره في روح المكان المستدام و تطبيق هذة المؤشرات في مشاريع منتخبه في مدينه السليمانيه في اقليم كوردستان العراق و من خلال التحليل الكرافيكي للمشاريع و بيان راي 20 مهندسا معماريا في بلدية السليمانيه لوضع قيم من 1 - 4 ومن ثم الاخذ بالارقام و البيانات لفرض استخراج المتوسط الحسابي و من ثم تحليل النتائج و مناقشتها ، و بيان راي الباحث في اثر المؤشرات المستنبطه من الجانب النظري في المشاريع المنتخبه ، ومن ثم التوصل الى استنتاجات و توصيات خاصه بالبحث.

الكلمات المفتاحية : الاستدامة ، تكنولوجيا البناء ، المكان ، روحية المكان .

No. Of Project	Name of Project: **Sulaimani Municipality**	Location: Sulaimani – Iraq
01	Function: Services – Municipality	Implementation: 2010

Description:
This building is the presidency of municipality of sulaimani city, the design gathering the heritage and contemporary elements with using new materials.
Note:0= very week, 1= week, 2=medium ,3= strong, 4= very strong.



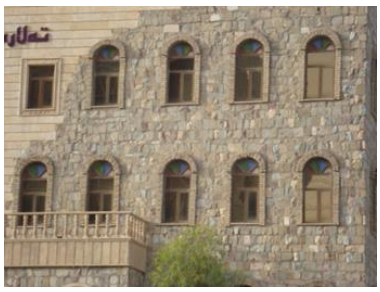
Conclusion:
This building has a medium scale of intercommunication with environment and human needs, with a big scale Intercommunication with contemporary and heritage and using technology for the contemporary human needs with a small scale of Using IT and High Tech Intercommunication with spirit of place.

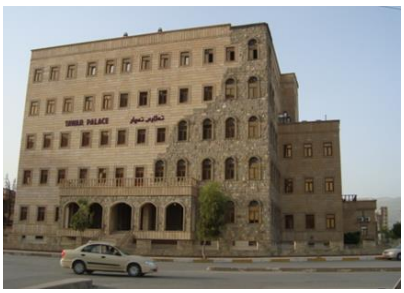
The measurement of indicates achieving sustainability	0	1	2	3	4
Intercommunication with environment			●		
Intercommunication with contemporary and heritage				●	
Intercommunication with human needs			●		
Using IT and High Tech.		●			
Using technology for the contemporary human needs				●	
Intercommunication with spirit of place		●			

Figure 5: Project (1) analyzing. (Source: Researcher)

No. of Project	Name of Project: **Tawar Building**	Location: Sulaimani - Iraq
02	Function: Services – M.G.O.	Implementation: 2010

Description:
This building is a M.G.O building, located in the middle of the city, with a heritage and contemporary elements.
Note:0= very week, 1= week, 2=medium ,3= strong, 4= very strong.





Conclusion:
This building has a high scale of intercommunication with environment and intercommunication with heritage and contemporary, with a low scale of Intercommunication with human needs and using IT and High Tech. and expressing the spirit of place.

The measurement of indicates achieving sustainability	0	1	2	3	4
Intercommunication with environment				●	
Intercommunication with contemporary and heritage		●			
Intercommunication with human needs				●	
Using IT and High Tech.				●	
Using technology for the contemporary human needs				●	
Intercommunication with spirit of place					

Figure 6 : Project (2) analyzing. (Source: Researcher)

No. Of Project	Name of Project: **Art Palace**	Location: Sulaimani- Iraq
03	Function: Conference Halls	Implementation: 2009

Description:
The Palace of Art, is a conference hall with seminar halls, it considered as one of the important buildings in the city, as a cultural building.
Note:0= very week, 1= week, 2=medium ,3= strong, 4= very strong.

Conclusion:
This building has a high scale of intercommunication with human needs and using IT and High Tech. for the contemporary human needs, with a medium scale of Intercommunication with contemporary and heritage and spirit of place.

The measurement of indicates achieving sustainability	0	1	2	3	4
Intercommunication with environment				●	
Intercommunication with contemporary and heritage		●			
Intercommunication with human needs				●	
Using IT and High Tech.				●	
Using technology for the contemporary human needs				●	
Intercommunication with spirit of place			●		

Figure 7 : Project (3) analysing. (Source: Researcher)

No. of Project	Name of Project: **Social and Cultural Centre**	Location: Sulaimani - Iraq
04	Function: Social and recreation centre	Implementation: 2009

Description:
The cultural and social centre of sulaimani with several activities and restaurants and halls.

Conclusion:
We conclude that this building has a big scale of intercommunication with environment and using technology for contemporary human needs, and a low scale of Intercommunication with contemporary and heritage, Using IT and High Tech. and Intercommunication with spirit of place.
Note:0= very week, 1= week, 2=medium ,3= strong, 4= very strong.

The measurement of indicates achieving sustainability	0	1	2	3	4
Intercommunication with environment				●	
Intercommunication with contemporary and heritage		●			
Intercommunication with human needs			●		
Using IT and High Tech.		●			
Using technology for the contemporary human needs					
Intercommunication with spirit of place		●			

Figure 8 : Project (4) analyzing. (Source: Researcher)

No. Of Project	Name of Project: **Sardam Cultural centre**	Location: Sulaimani - Iraq
05	Function: Cultural centre	Implementation: 2008

Description:
The cultural center of Sardam, for publishing, located on the main road in Suliamani city, with a contemporary form and building materials.
Note:0= very week, 1= week, 2=medium ,3= strong, 4= very strong.

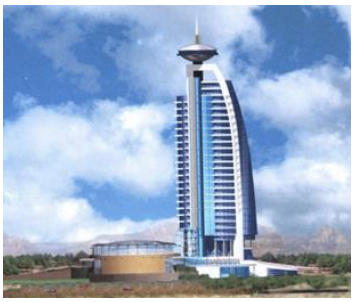
Conclusion:
This building has a low scale of Intercommunication With environment and Intercommunication with contemporary and heritage, with a medium scale of Using IT and High Tech. And low scale of Intercommunication with environment and Intercommunication with contemporary and heritage.

The measurement of indicates achieving sustainability	0	1	2	3	4
Intercommunication with environment		●			
Intercommunication with contemporary and heritage		●			
Intercommunication with human needs				●	
Using IT and High Tech.			●		
Using technology for the contemporary human needs				●	
Intercommunication with spirit of place		●			

Figure 9 : Project (5) analyzing. (Source: Researcher)

No. Of Project	Name of Project: **Jwany City**	Location: Sulaimani – Iraq
06	Function: Hotel and Cultural centre	Implementation: 2012

Description:
Shary Jwany – City of beauty- is a cultural and recreation project with hotels and conference halls, using high tech. and IT facilities with contemporary building materials and form
Note:0= very week, 1= week, 2=medium ,3= strong, 4= very strong.



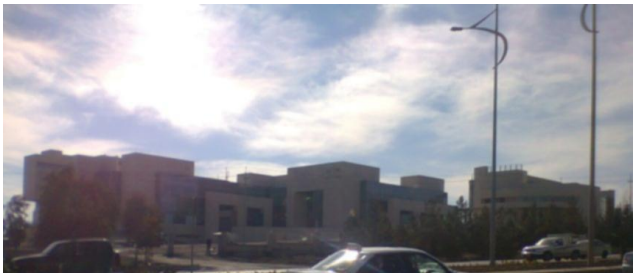
Conclusion:
This building has a low scale of Intercommunication with environment
Intercommunication with spirit of place.
Intercommunication with contemporary and heritage and a high scale of Intercommunication with human needs
Using IT and High Tech.
Using technology for the contemporary human needs.

The measurement of indicates achieving sustainability	0	1	2	3	4
Intercommunication with environment		●			
Intercommunication with contemporary and heritage		●			
Intercommunication with human needs				●	
Using IT and High Tech.		●			●
Using technology for the contemporary human needs					●
Intercommunication with spirit of place		●			

Figure 10 : Project (6) analyzing. (Source: Researcher)

No. Of Project	Name of Project: **American University – Iraq- Sulaimani**	Location: Sulaimani – Iraq
07	Function: Services – Municipality	Implementation: 2011

Description:
The American University in Iraq-Sulaimani, one of the important universities in the region, with a contemporary system of education and building construction.
Note:0= very week, 1= week, 2=medium ,3= strong, 4= very strong.



Conclusion:
This building has a low scale of Intercommunication with environment and Intercommunication with contemporary and heritage and Intercommunication with spirit of place, with a medium scale of Intercommunication with human needs Using IT and High Tech. Using technology for the contemporary human needs.

The measurement of indicates achieving sustainability	0	1	2	3	4
Intercommunication with environment		●			
Intercommunication with contemporary and heritage		●			
Intercommunication with human needs				●	
Using IT and High Tech.			●		
Using technology for the contemporary human needs				●	
Intercommunication with spirit of place		●			

Figure 11 : Project (7) analyzing. (Source: Researcher)

No. Of Project	Name of Project: **University of Sulaimani – College of Engineering**	Location: Sulaimani – Iraq
08	Function: education	Implementation: 2011

Description:
The new campus of Sulaimani University, College of Engineering, educational building with a cultural importance and new building materials and services.
Note:0= very week, 1= week, 2=medium ,3= strong, 4= very strong.

Conclusion:
This project has a big scale of Intercommunication with human needs.
Using IT and High Tech, and Intercommunication with spirit of place.
Using technology for the contemporary human needs, and has a small scale of Intercommunication with contemporary and heritage Intercommunication with environment.

The measurement of indicates achieving sustainability	0	1	2	3	4
Intercommunication with environment		●			
Intercommunication with contemporary and heritage		●			
Intercommunication with human needs				●	
Using IT and High Tech.				●	
Using technology for the contemporary human needs					●
Intercommunication with spirit of place				●	

Figure 12 : Project (8) analyzing. (Source: Researcher)

Table 1: Projects data analyzing (Average) (Source: Researcher)

No. of Project:	Intercommunication with environment	Intercommunication with environment	Intercommunication with human needs	Using IT and High Tech.	Using technology for the contemporary human needs	Intercommunication with spirit of place	The average of all indicators of the sustainable place for one building
01	2.5	3.54	2.83	1.42	3.66	3.62	2.92
02	3.5	3.42	0.69	1.3	3.74	2.82	2.57
03	3.20	0.68	3.15	3.66	3.40	2.70	2.79
04	3.15	1.68	2.22	1.67	3.48	1.90	2.35
05	1.4	0.86	3.61	2.24	3.20	1.31	2.07
06	1.7	1.56	3.21	4.00	4.00	2.62	2.86
07	1.45	1.29	3.64	2.62	3.77	1.91	2.44
08	0.85	1.69	3.29	3.81	4.00	3.42	2.84
Average of one indicator for all projects	2.21	1.84	2.82	2.59	3.65	2.53	