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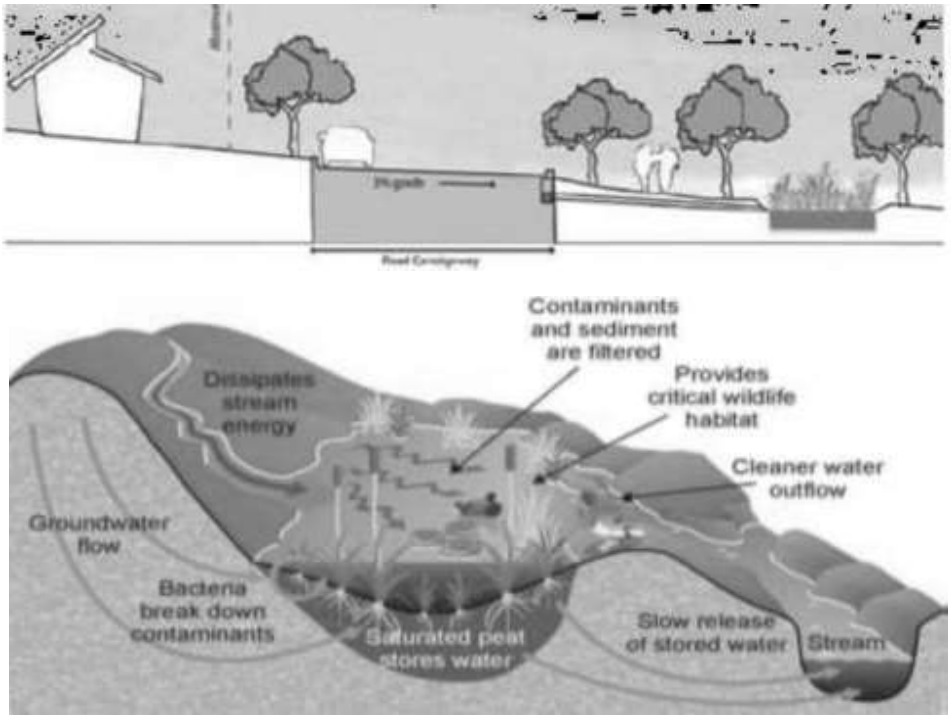

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The Nile River: River Tourism, Waterfront Development And Cultural Ecosystems

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ABSTRACT

Town dwellers in Europe and developed countries accorded great importance to rivers as a mean of transporting merchandise as well as tourism and waterfront development. River banks usually inhibit the cores around which towns evolve. They constitute the historic districts that have significant tourism sites and distinctive urban activities. On the one hand, various recreational activities have come to exist on the shores of rivers benefiting from such potential means of transportation and tourism development. This has led to the emergence of a new kind of tourism within European towns, namely river tourism, which relies on the various natural and human potentials on the banks of rivers.

On the other hand, river banks are considered mainly public spaces that include multiple layers of social interaction and community communication. Hence, waterfront development plans and consequent river tourism activities must promote the creation of a balance cultural and social ecosystems to guarantee smooth and sustainable usage of implemented projects. As the social value of public space lies in its relevance to the local context and in people's memory of places, successful public spaces must provide opportunities for social interaction, social communication, social inclusion, and also facilitate community ties.

This paper, therefore, aims to theoretically explore the evolvement of tourism development with respect to rivers waterfronts. It also aims to explore and document the connection between effective and sustainable public spaces with respect to balance cultural ecosystems within rivers waterfronts and consequent river tourism activities. Furthermore, using the case of the River Nile waterfronts, this paper aims to shed light on the shortcomings of the development planning process within waterfronts areas in Egypt. It helps the decision-makers to critically understand the impact of the evident lack of attention to the cultural and social ecosystems indicators on both the official regulations governing the development planning process as well as successive development plans of the Nile River waterfront and consequent river tourism activities.

KEYWORDS: River Tourism, Waterfront Development, River Nile, Cultural Ecosystems

الملخص:

منح سكان المدن في أوروبا والدول المتقدمة أهمية كبيرة للأنهار كوسيلة لنقل البضائع والسياحة وتطوير الواجهات للمبانى المطلة على ضفافها. عادة ما يتم انشاء وتطوير انوية المدن على ضفاف الانهار، لذلك فهى تحتوي على مناطق تاريخية ومواقع سياحية وانشطة حضرية مميزة. من ناحية، يتوطن العديد من الأنشطة الترفيهية على ضفاف الأنهار للاستفادة من وسائل النقل النهرى والتنمية السياحية. أدى هذا إلى ظهور نوع جديد من السياحة في المدن الأوروبية - السياحة النهرية - التي تعتمد على مختلف الإمكانيات الطبيعية والبشرية على ضفاف الأنهار. من ناحية أخرى، تعتبر ضفاف الانهار ضمن الفراغات العامة للمدن والتي تحوى اشكال وانماط متعددة من التفاعل الاجتماعي والتواصل المجتمعي. بالتالي، يجب أن تعزز خطط تطوير ضفاف الانهار والأنشطة السياحية النهرية انشاء وادارة نظم ايكولوجية ثقافية واجتماعية متزنة لضمان الاستخدام السلس والمستدام للمشاريع المقترحة والمنفذة. تكمن اهمية الفراغ العام فى قيمته الذهنية الثابتة فى ذاكرة المجتمع المحلى والمستخدمين والزائرين حيث توفر الفراغات العامة الناجحة فرص للتفاعل والتواصل والاندماج المجتمعى.

تهدف هذه الورقة البحثية إلى المراجعة النظرية لتطور التنمية السياحية فيما يتعلق بتنمية ضفاف الانهار. كما تهدف إلى استكشاف وتوثيق العلاقة بين الفراغات العامة الفعالة والمستدامة وتنمية ضفاف الانهار والأنشطة السياحية النهرية وما يترتب على ذلك من انشاء وادارة نظم ايكولوجية ثقافية متزنة ومستدامة. كما تهدف هذه الورقة إلى تسليط الضوء على أوجه القصور في مخططات تنمية ضفاف نهر النيل بالقاهرة والجيزة لمساعدة صناع القرار على فهم مدى التأثير السلبي لتجاهل مؤشرات اتزان النظام الأيكولوجي الثقافي والاجتماعي بمرحلة التخطيط على عملية التنفيذ لمخططات التنمية المتعاقبة لضفاف نهر النيل وأنشطة السياحية النهرية.

1. TOURISM: BACKGROUND AND DEFINITIONS

Tourism is by no means a new phenomenon. Its historic origins can be traced in the ancient cultures of Ancient Egyptians, Greek, and Roman social activities. People have always travelled to distant parts of the world, to view great buildings and works of arts, learn new languages, experience new cultures, and taste of different cuisines (Casson 1974; Chakraborty and Chakravarti 2008; Onor 2015). Tourism has been associated with the Industrial Revolution (1760-1840), especially in the United Kingdom, the first European country to promote leisure time for the increasing industrial population (Singh 2008). The transition to modern tourism happened principally due to the revolutionary changes in technology, transportation, and communication; rising personal incomes due to rapid industrialization; and the enterprise of middle-class professionals related to tourism activities (Allan 2002). Till the mid-1940s, academic tend to define tourism as:

> "the sum of the phenomena and relationships arising from the travel and stay of non-residents, in so far as they do not lead to permanent residence and are not connected to any earning activity" (Hunziker and Krapt 1942:11 cited in Onor 2015:41)

The above predominant definition of tourism continued throughout literature till the very late 1970s in spite of the mega shift in the tourism paradigm after WWII (1939-1945). In the aftermath of WWII, the long and deprived war years led to an increased desire to travel to foreign destinations. The war had given rise to great numbers travellers, especially of British nationality to witness the sites of battles such as Normandy beaches and St. Nazaire. North Americans and Japanese were flocking to sites of conflict in the pacific as Iwo Jima and Guadalcanal. Meanwhile, the surplus of aircraft in immediate post-war years paved the way towards the growth of private-sector airlines (Holloway 2006; Onor 2015). From its humble, tourism started to be recognized as a very important economic activity worldwide as:

> "an activity essential to the life of nations with its direct effects on the social, cultural, educational, and economic sectors of national societies and on their international relations" (Manila Declaration 1980:1)

Yet, it has not been until the rise of the globalization movement and the consequent entrepreneurial approach in urban development during the very early 1990s that the relationship between tourism, urban development, and consequent local physical planning of waterfronts and harbour zones, has been recognised practically and academically. The globalisation movement grabbed countries attention to the importance of cities and localities. The slogan of "think global act local" has been the

driving force to trigger another mega shift in the tourism paradigm, urban planning, urban governance and city management. Tourism no longer only means travelling for leisure and entertainment yet also means experiencing culture diversity and social interaction (Gladstone 1998; Vallega 2001; Chen 2015; Huang *et al* 2015). This new perception has been reflected in The World Tourism Organization (WTO) definition of tourism as:

> "The activities of a person travelling outside his or her usual environment and culture (…) and whose main purpose of travel is other than the exercise of an activity remunerated from the place visited" (WTO 2001:1)

2. WATERFRONT DEVELOPMENT AND TOURISM

The waterfront is considered the origin context of human culture and economy because of trading and movement of humans and goods. The rise and fall of many cities were related to transportation and trading. Villages located on waterfronts turned into fishing villages and trading ports. During the Industrial Revolution Era (1760-1840), many industrial districts were established by seas and rivers mainly for the purpose of efficient transportation (Hayuth 1998).

Nevertheless, after the industrial revolution, the epic advancement of technology and communication and the rising awareness of negative environmental, health and social impact on communities has led to a dramatic shift of the industrial structures all over the world. Industrial companies, areas, and districts moved their activities to edges of cities and in most case outside cities borders. Consequently, the unused land of old industrial districts and ports became one of the main foci of urban planning practitioners and academics for their favourable usual geographical positions in approaching downtown (Hoyle 2000; Chen 2015). Hoyle (1999) claims that the redevelopment of waterfront land became a global urban phenomenon, from advanced countries to developing countries from cosmopolitan cities to small towns, have been affected greatly by the success experience of Baltimore inner harbour renewal since the mid-1960s (i.e. the Baltimore Type) with massive spatial, economic and ecological change to waterfronts all over the world.

Vallega (2001) points out that the waterfront development has passed two distinctive stages. The first stage (1960- 1990) waterfront development focused on saving local GDP and employment rate via commercial and national tourism activities and their consequent physical planning activities. The second stage (since the mid-1990s), the rise of globalisation, sustainable development, diversity, cultural heritage, coastal management, city image and city labelling concepts had a major impact on waterfront development activities pegged with soaring international tourism. Since the mid-1990s, the notion of sustainability and globalisation, governance and management have been the cross-cutting edge as well as the connector of all development disciplines including urban development, tourism development, and management, environmental management, strategic planning, etc. Hence no development plan could be formulated without the taking into

consideration all underpinning corners of sustainability (i.e. economic, social, environmental and urban dimensions).

3. WATERFRONT DEVELOPMENT: CLASSIFICATION AND PRINCIPLES

From the literature review, there are many classifications for waterfront development, however, could be collectively presented in three main types of classifications. The first type is classifying waterfront development according to location and function of activities. This is summarized in six main categories as ecological protection zones, new urban development outside cities, rebuilding and/or extending old ports and industrial zones, new development connected to residential areas, new development connected to downtown area, and finally new development for leisure and travel (Chang *et al* 2001; Keith 2004).

The second type of classification reflecting the only function of waterfront development regardless of its location which some scholars and practitioners perceive as a disadvantage. In this type waterfront development is categorized into commercial, cultural, educational, environmental, historic, entertainment, residential, services, and work zones (Breen and Rigby 1985; Malone 1999). The last type of classification reflects the added-value by waterfront development. It classifies waterfront development into three main categories: added-value labor (i.e. traditional aquaculture and fishing, fishery, and offshore fishing), added-value production (i.e. goods distribution, product processing, trading, and logistics), and finally added-value services (i.e. leisure and recreation, tourism, culture preservation, and Marine research) (Toffler 1980; Vallega 2001; Chen 2007; Chen 2015).

It is crucial that decision makers decide what type and location of activities, as well as the added-value type, will be included in concerned waterfront development. Such decision helps to guide the physical planning process during both the formulation and implementation of plans. Moreover, it is of great importance to deeply understand the factors of success of any waterfront development projects. Many scholars and practitioners such as Chang *et al* (2001); Dovey and Sandercock (2002); Huang *et al* (2011); Kojima *et al* (2013); Flood and Schechtman (2014) stress the importance of satisfying the four study population of any waterfront development project in order to guarantee it success (i.e. the government, the planning agencies, the developers, and the public interest). First, to satisfy the government, waterfront development shall: contribute to economic growth, help to increase employment, and help to improve the city image.

Second, regarding the planning agencies, waterfront development shall respect, confirm and present the distinctive characteristics the city, echo the future development vision for the city, and if necessary, promote sustainability, globalization, culture diversity, and social interaction concepts. Third, concerning developers, waterfront development shall provide enough development profits as well as social recognition. Finally, waterfront development shall provide the public with improved living standards, quality of life, and elevated sense of belonging and pride.

4. WATERFRONT DEVELOPMENT: GUIDELINES AND PROCESS

As a part of urban development, waterfront development follows the very same underpinning methodologies. It also deals with the same public policy, planning and implementation institutions and agencies of each country. Hence, waterfront development requires a very committed deliberate political will that helps ensure its success or failure. On the one hand, this leads to the formulation of distinctive urban vision and urban planning public policies on the national and local level that reflects the specific culture, social, economic, environmental, and urban context of each individual country and city (Huang and Chu 2003, Shetawy 2004). On the other hand, equally important, waterfront development shall comprehensively explore, document and analyze in details current problems and its origins, current potential and constraints locally and nationally. Empirical case studies from all over the world present some hard evidence on the importance of such analysis for the success or failure of waterfront development (Church 1988; Krausse 1995; Bassett *et al* 2002; Ryan and Cooper 2004; Kojima *et al* 2013).

Although there are three distinctive methodologies to follow when formulating and implementing development policies and plans (i.e. Blueprint methodology, scientific rational methodology, and communicative rational methodology), the one that stands its professional grounds since the emergence of the urban planning discourse in 1947 is the scientific rational methodology. It follows a specific set of successive phases that summarizes the process of development. It starts with the data collection phase that includes the exploration and documentation of current physical, economic, social environmental, culture, and policy contexts on both the local and national levels and relationship with international development trends. The second phase, data analysis, helps in documenting current development potentials, problems, and constraints via one or combined analysis techniques (i.e. PCP, SWOT, and TIT) (Shetawy 2004).

The third phase, finding solutions, includes the formulation of concerned development vision and mission that aligns with the city and country main development visions. It also sets to formulate various development strategies and consequent structure planning alternatives. Moreover, it includes alternatives evaluation and the choice of proper development strategy and structure plan and consequent masterplan and detailed plans that achieve the most of preset goals and aims of development vision and mission. The final phase, implementation, sets to explore and decide the effective and efficient implementations techniques, institutions and agencies to ensure the success of the implementation process. It also sets the mechanisms through which decision makers and involved professionals follow-up, update and amend plans where needed (Shetawy 2004).

5. RIVER TOURISM: GUIDELINES AND COMPONENTS

Although river tourism is a distinctive important form of waterfront development that can represent and/or include all categories of the above waterfront development classifications, it has been long neglected by tourism development academics, researchers, and practitioners. It was not until 2009 that a systematic

academic attempt to map and shape the literature of river tourism via the analysis and documentation of several case studies from all over the world.

> "Rivers are an important but surprisingly neglected aspect of the global tourism industry. Yet rivers form the basis for many of the ecosystems that underpin ecotourism and other recreational activities, in addition to providing water to sustain urban growth, farming, agriculture-related experiences such as viticulture and the transport of goods and people. (…) rivers have apparently been of little interest to tourism academics, although the same cannot be said for leisure and recreation scholars, who have demonstrated considerable interest in fluvial systems as outdoor recreation resources" (Prideaux *et al* 2009:1-2).

From the literature review of various case studies, it has been noticed that rivers have many factors that affect their functions. Factors as physical (e.g. length, width, seasonality, location, navigability, reserves, etc), political (e.g. local, state, national, legislative, border conflicts, etc), management (e.g. planning, catchment, resource allocation, etc), river banks land use (e.g. urban, agriculture, wilderness, recreational, etc), Biological, (e.g. species composition, fishing, trophic structures, etc), industrial use of rivers (e.g. irrigation, manufacturing, sewerage disposal, water intakes, hydroelectricity, etc), recreational (e.g. swimming, diving, boating, fishing, etc), transportation (e.g. industrial shipping, passengers, pleasure cruises, etc), environmental (toxicity, invasive species, salinity, etc) are crucial to study before setting river tourism plan. Neglecting any of the above factors in some sector of the river might have a severe unanticipated impact on development plans elsewhere along the river (Cooper and Prideaux 2009).

Prideaux *et al* (2009) identify four main relationships between rivers and tourism development. First, rivers provide a wealth of attractions, amazing natural landscapes, beauty and interesting history and aesthetic appeal for tourism. The second relationship is rivers as transportation corridors, commerce and trade, and cruises. Third, rivers are an important resource for tourist destinations in three ways: to provide drinking water for tourist establishments, to facilitate the development of intense tourism-oriented environments such as landscaping and golf courses and to fill swimming pools, fishing activities and watersports facilities especially important considerations in arid regions. Finally, river water is necessary to grow agricultural products and generate the electricity needed to sustain tourism.

Furthermore, conducted analytical and exploratory research and implemented several projects on river tourism, commonly agreed that there are three main fundamental groups of physical activities underpinning the formulation and implementation of river tourism plans that are river tours, water sports, and fishing activities. It has to be stressed that the existence of all three fundamental physical categories and consequent activities underpinning river tourism is not a pre-requisite for river tourism planning. One or more of such basic activities can sustain booming river tourism that might work as a pulling factor for the existence of other required activities. It has also to be emphasised that the more availability of such activities on

river banks the better river tourism plans can be formulated and the better environmentally-sound physical development plans on river banks can be guided and sustained (Abd Elrahman 2006, Abd Elrahman *et al* 2010).

Table (1) Basic Physical Activities Underpinning River Tourism Planning

Activities	Pre-requisite activities near and/or on river banks
River tours	Traditional and historic buildings and areas
	Natural reserves and/or national parks
	Recreational and open spaces and entertaining activities
	Accommodation overlooking riverbanks and/or floating
	Museums, Exhibitions and Show Rooms
Water sports	spaces that can be equipped for marinas and boat anchors
Fishing	slow water flow zones

Source: (Abd Elrahman *et al* 2010)

6. CULTURAL ECOSYSTEMS, WATERFRONT DEVELOPMENT, AND RIVER TOURISM

Public spaces could be presented in various forms such as streets, promenades, waterfronts, plazas, parks, playgrounds, and neighborhood spaces in residential areas, etc. (Worpole and Knox 2007; Abou El-Ela *et al* 2010). El-Sadek, (2011) stresses that the ownership of a certain public space (i.e. public, private, public-private) and its appearance do not define the public space but rather its shared diverse range of activities by different societal groups of different socio-economic classes. Public spaces, including waterfront development and corresponding river tourism, play a vital role in the social life of communities. They act as a 'self-organizing public service', a shared resource in which experiences and value are created and shared. The social value of public space lies in its relevance to the local context and in people's memory of places (Whyte 2001).

Successful public spaces, including waterfronts, must provide opportunities for social interaction, social communication, social inclusion, and also facilitate community ties. The success of a certain public space doesn't always lie in the hands of the architect, urban designer, or planner. People make spaces more than spaces make people. Consequently, public space is a co-product of spatial and physical settings activated by dynamic and changing social patterns according to certain activities, cultures, and timetables. This explains why particular places are associated with particular social class, specific class culture, and/or social and economic activities with both negative and positive results (Bowers and Manzi 2006; Worpole and Knox 2007). Moreover, public space management has always had a vivid impact on social exclusion and reducing social and cultural diversity within public spaces (Ploeg 2006; Vaswar 2009).

The cultural ecosystem is a finely balanced system that is located in defined time and space edges. Any intervention in public spaces without studying the target

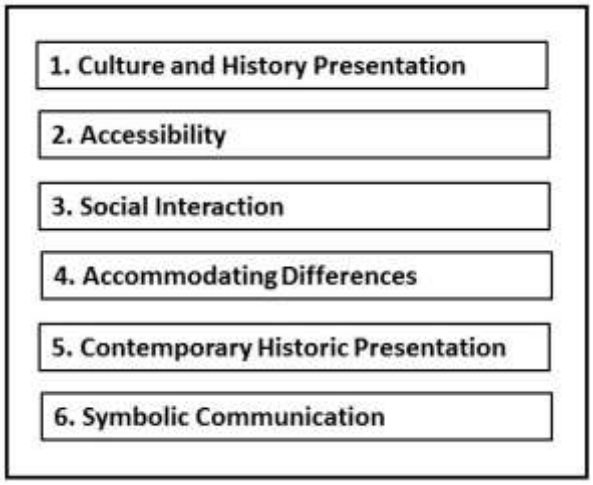
users, activities patterns and physical setting of space results in an unstable cultural ecosystem that may not be able to maintain itself and eventually collapses. The case of historic Parque Central in San José, Costa Rica shows that an intervention took place neglecting the social and cultural balance of the setting failed to maintain a well-balanced community where it became abandoned by the previous users and faced major security and safety issues (Low 2000; Worpole and Knox 2007). Consequently, in order to maintain a balanced stable cultural ecosystem, it is vital to critically maintain existing major activities and physical settings and even patterns of use of public space while introducing new activities, physical and social settings (Srivastava 2005; Mean and Tims 2005).

Although cultural diversity became a “politically correct” catchphrase during the 1980s, it has not been addressed in urban planning and design practice in terms of sustainable development till late 1990s (Mean and Tims 2005). While sustainable development includes “maintaining cultural diversity and community interaction" as a conceptual goal, there is little agreement on what it means. Nevertheless, cultural diversity and interaction provide a way to evaluate cultural and social sustainability and is one observable outcome of the continuity of human groups in culturally significant places (Low et al 2005).

> “Social sustainability is the successful maintenance of existing cultural ecosystems and cultural diversity. It is safeguarded when the systems of social relations and meanings are inclusive, rather than exclusive. In this sense, social sustainability is fostered by understanding the intimate relationship between history, values, cultural representation, and patterns of use in any culturally diverse context. In fact, the inclusion of local people, their histories, and their values ultimately strengthens any park's long-term social sustainability.” (*ibid*: 64)

Many scholars and academics such as Whyte (2001), Low et al (2005), Battesti (2006), Worpole and Knox (2007), Attia (2011), El-Sadek (2011) and Fleury-Bahi et al (2016) conclude main indicators to promote and maintain culture diversity and social interaction and consequently a balanced cultural ecosystem within public parks, each is derived from one or more of park ethnographies studies as shown in figure (1). Nevertheless, they all stress the rule that such indicators may not be applicable in all situations and are meant to provide an evaluation framework for culturally sensitive decision making in public space planning, management, and design.

Figure (1) Balanced Cultural Ecosystem Indicators



Source: Adapted by the Researcher from various References

The balanced cultural ecosystem indicators in public space are: (1) if people culture are not represented in historical national parks and monuments or, more importantly, if their histories are erased, they will not use the public space. (2) Accessibility is as much about economics and cultural patterns of public space use as circulation and transportation; thus, income and visiting patterns must be taken into consideration when providing access for all social groups. (3) The social interaction of diverse groups can be maintained and enhanced by providing activity patterns and safe territories for everyone within the larger space of the overall site. (4) Accommodating the differences in the ways social class and different groups' use and value public space is essential to making decisions that sustain cultural and social diversity. (5) Contemporary historic preservation should not concentrate on restoring the scenic features without also restoring the facilities and diversions that attract people to a public space. (6) Symbolic ways of communicating cultural meanings are important dimensions of place attachment that can be used to promote cultural diversity.

Provided the above cultural ecosystem indicators, it is evident that basic river tourism activities do not correspond to all indicators. This makes it extremely difficult for the urban planner, tourism developer, and city management to sustain a balanced cultural ecosystem. It will only provide the physical environment within which the social activities and interaction would take place rather than promoting social diversity, inclusion, interaction, and communication between different societal groups of user and visitors. Consequently, concerned waterfront development projects and corresponding river tourism plans would be unstable and unsustainable wasting time, efforts and resources of all institutions involved.

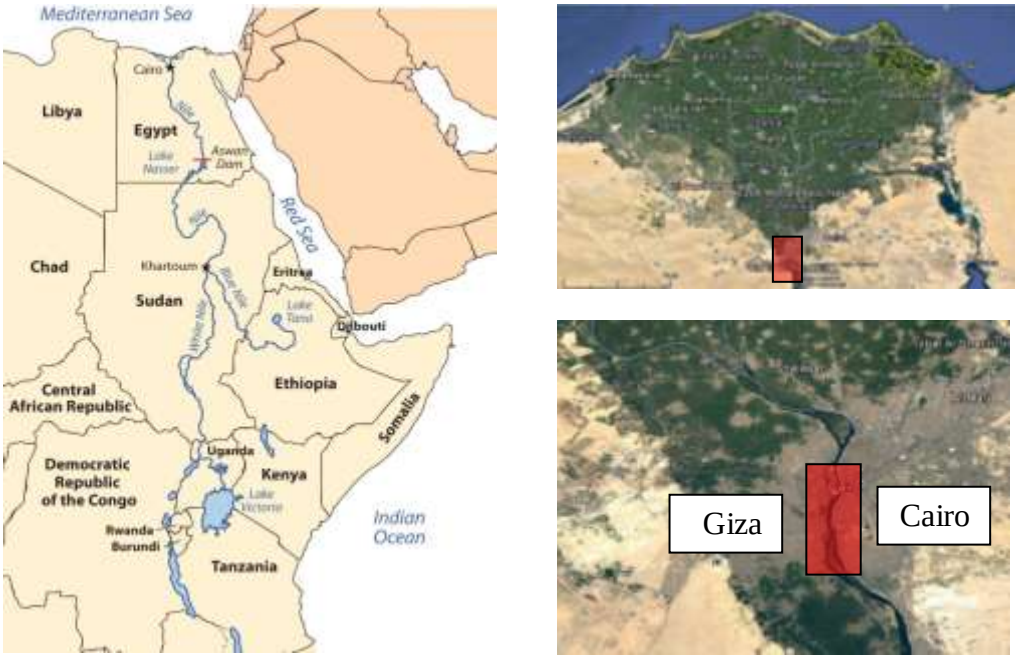
Over the coming section, the indicators of cultural ecotourism will be tested against rivers waterfront development regulations as well as successive waterfront development plans of the Nile Rivers banks in Greater Cairo Region (GCR). This would provide the city and project management and execution teams centrally and locally a clearer understanding of what to expect after and during execution. It will

also help decision-makers to take all necessary actions to remedy shortcomings before, during and after execution where possible.

7. THE NILE RIVER: WATERFRONT DEVELOPMENT REGULATIONS

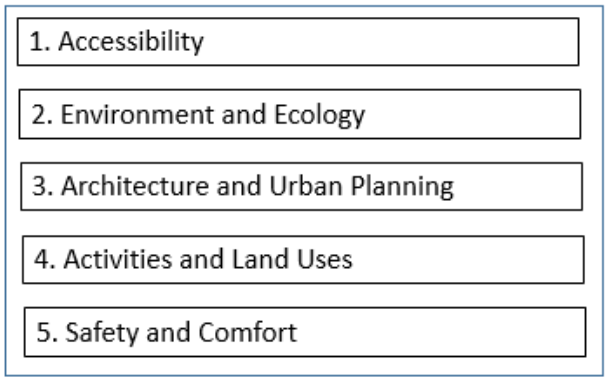
The Nile River is 6695 kilometers long and flows through a total of nine countries: Ethiopia, Zaire, Kenya, Uganda, Tanzania, Rwanda, Burundi and Sudan, and Egypt. The Nile River has been always playing an extremely important role in the civilization, life, and history of the Egyptian nation. It flows from South to North through most of the main cities in Egypt, from *Abo Simbel* to the South to Damietta (*Domiat*) and Rosetta (*Rasheed*) to the North. It also flows through the Greater Cairo Region (GCR) bordering Cairo and Giza Governorates as shown in figure (1).

Figure (1) The River Nile



The only government institution that is responsible for issuing standards and regulations concerning waterfronts and watersheds all over Egypt is the National Organization for Urban Harmony (NOUH), an organization created by the Ministry of Culture in 2004 to promote "the values of beauty all over Egyptian urban space" (Moursi 2011; Law 119/2008). Consequently, NOUH sets the standards and regulations regarding waterfront development and tourism activities of the River Nile and its banks, however, calls it "beach areas". NOUH (2016) defines beach areas of the River Nile as "those areas within urban and rural areas overlooking and physically, geographically, and visually connected to the river".

Figure (2) Aspects of Waterfront Development of the River Nile



Source: NOUH (2016)

NOUH sets the standards and regulations of any waterfront development activities of the River Nile in five main aspects that are: Accessibility, environment and ecology, architecture and urban planning, activities and land uses, and safety and comfort, as seen in figure (2). Of all regulations relative to the latter aspects only two vague and unbinding bands under the architecture and urban planning aspect touches the role of communities in the development process. The first is band states "the call for a public hearing to express their opinion and needs". It does not, however, state any criteria and/or guidelines of "the public" choice to attend the project meetings and/or outcome. It also does not state any guideline as to when exactly such meetings (i.e. public hearing) shall take place in the urban development process. Moreover, it does not state where exactly such meetings will be hosted. The second band of the architecture and urban planning aspect states "the possibility of community participation in the decision-making process", however, the questions of how, when, and/or where, is totally neglected. Furthermore, all other bands of all other aspects focus only on the physical dimension of the development process leaving behind any attention to the cultural and social development. Standards and regulations are set in a manner to guarantee an ordered physical setting outcome rather than setting up a balanced culture ecosystem to guarantee smooth project management and social interaction after execution. Yet, no guidelines and/or regulations are stated regarding the execution process.

8. THE NILE RIVER: WATERFRONT DEVELOPMENT PLANS IN GCR

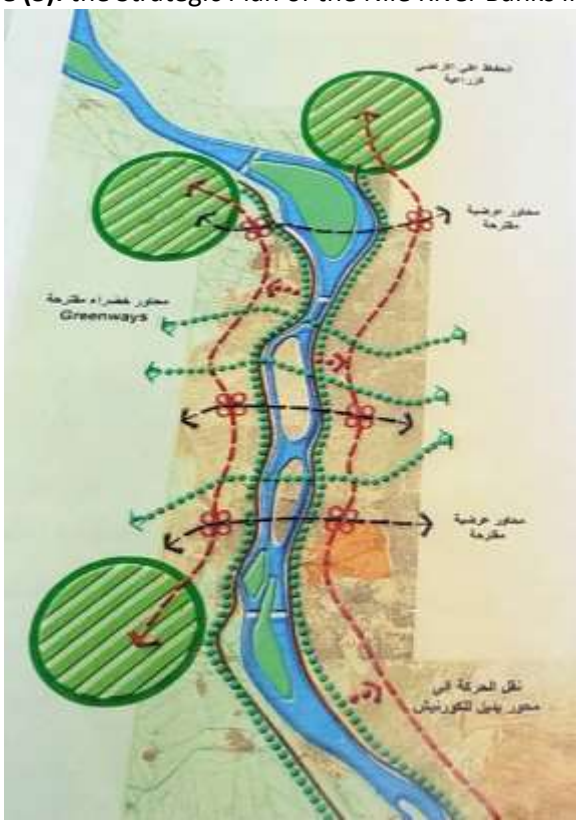
There has been three main studies and projects that have been commissioned by government agencies to deal with the waterfront development of the Nile banks in GCR. The three of which theoretically based their methodologies and analysis on the standards and regulations of NOUH.

The first study was conducted by the Faculty of Urban and Regional Planning (FURP), Cairo University (Yousri 2003). Throughout the study, considered as the first academic comprehensive attempt to understand the Nile banks and river tourism activities in GCR, the author presents a comprehensive documentation with respect to the existing land uses, heights, facades, building conditions, and many other fieldwork maps. It also tries to present the public (in general) perception about what is happening on the river banks and tourism activities as well as concerned activities behavior (i.e. commercial, tourism, industrial, recreational, agriculture, etc.).

Furthermore, it reviews all concerned laws and regulations related to the Nile River and connected activities and land uses (Yousri 2003). Nevertheless, the study does not include any analysis related to the culture ecosystem and social aspects. Although it tends to test the public opinion on the current situation at the time, it does not touch their vision and/or perception on the hoped future settings.

The second study/project was also assigned to the Faculty of Urban and Regional Planning, Cairo University by the Ministry of Tourism, The General Organization for Tourism Development (FURP 2005). The project was presented in three volumes focusing mainly on the physical setting of the waterfront development of the Nile River banks in GCR. The main aim was to provide a Masterplan of the river banks and related tourism activities. The project report states the aims of the concerned Plan as: the protection of arable land to the North and South of urban agglomeration of Cairo and Giza, providing alternative roads and consequent road network adjustments to divert crosscutting traffic from the river banks, and the concentration of tourism and recreational activities the river banks and watershed, and creation of crosscutting green corridors connecting the river banks with the city as seen in Figure (3) (FURP 2005). The social and cultural aspects were presented in vague general terms in two pages. Sentences like, the right of all society to enjoy and has direct access to the River Nile is very common and summons up the two pages (FURP 2005). No given methodology, framework, guidelines, and or recommended further studies related to culture diversity, cultural ecosystems, social communication, and/or social interaction are stated.

Figure (3): the Strategic Plan of the Nile River Banks in GCR



Source: (FURP 2005)

The third and final main project related to the waterfront development of the Nile River banks was also commissioned to FRUP but this time through the Ministry of Housing, Utilities and Urban Development, the General Organization for Physical Planning (GOPP) (FURP 2009). The aim was to provide the detailed execution Plans of the proposed Masterplan, Hence the focus was only physical (FURP 2009).

The three main studies/projects only focus on the physical aspects of the waterfront development and river tourism planning and merely touching the economic, social, and cultural aspects. Even though, none of the studies follows the regulations of NOUH with respect to the call for a public hearing and forming public groups to critically understand "the public future needs". Furthermore, none of the studies discussed the implementation process in relation to community involvement and/or required institutional framework.

9. CONCLUSION

The tourism discourse went through three distinctive shifts in its paradigm, concepts, definition, scope, categories and activities. The first is related to the social change that happened during and post the industrial revolution, especially in the UK. The second noticeable shift is related to World War II and the urge to discover and experience others cultures and environment all over the world. The third more recent shift is related to the globalization movement and technology revolution since the early 1990s. The waterfront development also went through three distinctive shifts for the very same reasons. From being the origin context of human culture and economy to being the physical focus of manufacturing, trading, and shipping, and later on being the focus of urban and tourism development to achieve distinctive global city images and local quality of life. Various academic and practical attempts have been carried out to set standards, guidelines, and practical methodology to merge the two discourses (i.e. tourism development and waterfront development).

Although river tourism is a distinctive important form of waterfront development that can represent and/or include all categories of the above waterfront development classifications, it has been long neglected by tourism development academics, researchers, and practitioners. It was not until 2009 that a systematic academic attempt to map and shape the literature of river tourism via the analysis and documentation of several case studies from all over the world. From the analysis of various case studies, it has been concluded that there are three main categories of pre-requisite physical river activities underpinning the river tourism development: river tours, water sports, and fishing. This is not to neglect the political, social, economic and environmental aspects.

As public spaces, rivers waterfronts and related tourism and recreational facilities must achieve cultural and social ecosystems indicators to guarantee the optimum and smooth usage. From the literature review, it has been commonly agreed between scholars and practitioners that the balanced cultural ecosystem indicators in public space are: culture and history representation, accessibility, social interaction, accommodating the differences, contemporary historic preservation, and symbolic communication. It has been noted that the pre-requisite physical

settings of river tourism only focus of the physical arrangement of the environment rather taking further steps and/or towards guideline to guarantee a balanced cultural and social ecosystems after project execution.

Taking the River Nile waterfronts in Greater Cairo Region as a case study, it has been practically evident that neither the official regulations nor the successive development plans and projects (urban and tourism) give attention to the culture and social aspects. Furthermore, they do not recommend any future guidelines, frameworks, and/or institutional arrangements that guarantee the involvement of "the public" in the development process (i.e. formulation and implementation). None of which provides a way forward to guarantee a balanced cultural and social ecosystems leaving the outcome of future development projects uncertain. The cultural ecosystem indicators must be embedded within the planning process of waterfronts and tourism development from the formulation of goals and interests through the formulation process of the development plans and for sure through the implementation of projects. Such intervention requires the change of NOUH official regulations to be clearly stated and bound to any development process. Furthermore, it also requires the amendment of Law 119/2008 to assign monitoring and follow-up enforcement techniques to NOUH to review and agree on development plans no matter the institution initiated the concerned plans.

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Smart Aspects Of Conserving The Integration Between Buildings Inside The Existing Urban Context

Dr. Gehan Ahmed

ABSTRACT

In the past era, the aspects of integrating the new building with the existing one appeared to be concerning the outer appearance or features of the tradition urban context. After the call of for sustainable development, the aspect of designing the building varies to suit the sustainability. So, Smart sustainable preservation is about evolving our existing building stock, instead of razing and building new. At the same time, the intelegancy of the materials and the aspect of the intelligent building seems to accomplish the need of sustainability ,as intelligence actually is a mental and sensitive deal with the matter which promotes motion and actions to solve much issues concerning it, but within these aspects their aren't a clear criterion to deal with old spaces in a smart manner without losing its style and taste .On the other hand, there aren't a fully respect for the future response of the urban design of such old sites which could be treated in such a smart manner. So the liability issue is : **1**st concerns the search for the main conventional applications that could be followed to support the presence of new buildings placed in these places but defiantly in a smart manner supposing that using techniques and tools being developed today to make complete high performance products is one of the main hypothesis that could be followed and the **2nd** one is the multi functioning of any element of the space .The followed methodology is measurable where measuring the main approaches applied in the smart or the intelligent aspects to deduce the main aspects that must be used to inform the integration between the new building and the tradition urban context.

Key words: *Smart aspects, urban context, sustainability, integration, clever system, performance*.

الملخص:

أصبح الاهتمام فى الأونه الأخيرة بتحقيق التكامل بين المباني الجديدة والمباني القديمة داخل المحيط العمراني يقتصر فقط على الشكل الخارجي للمباني بشكل يدعو إلى القلق، ولكن مع ظهور فكرة الإستدامه تغير الفكر التصميمى ليلائم ذلك التطور ويتغير مفهوم الحفاظ، والتكامل إلى الإبقاء على المبانى بدلا من هدمها. كذلك أصبحت فكرة إستخدام العماره الذكيه فى التصميم أداه من أدوات التصميم المستدام، حيث أنه فعليا نجد أن العماره الذكيه هى عمارة تتعامل مع المواد بطريقه فعاله لحل الجوانب المتعلقة بقضيه الاستدامة، ولكن لا توجد أسس ومعايير تصميميه للتعامل مع المبانى داخل المحيط العمرانى لتحقيق الإنسجام والتكامل فيما بينهم بطريقه ذكيه دون أن تفقدها هويتها، ومن ناحية أخرى لا يوجد احترام لمتطلبات الإستدامه الخاصة بالتعامل مع المحيط العمرانى الخاص بتلك المباني، ولذلك فإن الهدف من البحث هو

أولا: إيجاد الحلول اللازمه لتدعيم التكامل والإنسجام بين المبانى داخل المحيط العمرانى بفرض أن التقنيات والمواد التكنولوجية الحديثة المستخدمة فى عمليه التكامل والإنسجام هى أحد الفرضيات الأساسية للبحث،

ثانيا: تعدد وظائف العناصر المكونه لهذا الفراغ أو مانسميه بتحقيق المرونه اللازمة لتحقيق وظائف متعددة داخل الفراغ.

ولذا فإن المنهجية المتبعة للورقة البحثية هو قياس الوسائل والطرق الذكية المستخدمة لتحقيق تكامل الصورة البصرية بين كل ما هو قائم أو جديد داخل المحيط العمرانى.

الكلمات المفتاحية: الجوانب الذكيه، المحيط العمرانى، الإستدامه، التكامل والإنسجام، أنظمه ذكيه، أداء

INTRODUCTION

Both then and now, architecture is the arbitration between techniques, images, and the panorama of culture that presents at every instant. So there will be a struggle between the past and the new to reach the norm of the era, referring to the means of integration between the old and the new one. As there are two options while

integrating places: integration through harmony, or integration through contrast. As the advantage of using the harmonious approach is that it keeps the character of the place, and this can be achieved through assimilation of the style, scale, morphology, construction finishing details of the old buildings. Another option is using current events to link the new with the old, respecting the skyline and area building codes which should create good solutions. Another way is by making mental relations to the history of the place, and symbolic architecture .On the other hand the integration through contrast depends on the power of exploring the unknown and new ideas and ways of solving problems. This can be achieved through the use of transparency, hiding under ground, separating old from new, or making an unusual new building in the existing classical site if the new is a real important building politically or socially [1]. Building's conservation for the 21st century varies as it will focus on the sustainability issue, to sustain the use of older buildings rather than protecting them from change [2]. Today, architects are beginning to look forward to using the developments of technology which seems to be smart or intelligent, because smart materials brings new solutions to long-standing problems that involved in developing new building functions, forms, and responses. As they have wide variety kinds which have great probability for using in architecture. Moreover dramatically reduce the energy and material cost of the buildings, enables the human to design direct and discrete environments that provide better conditions in space for human occupants [3]. But to what level the intelligence could support the existing places specially while integrating the new with the old?

So the objective of the paper is concerns the search for the main conventional applications that could be followed to support the presence of new buildings placed in these places in a smart manner supposing that using techniques and tools being developed today to make complete high performance products is one of the main hypothesis that could be followed, also representing the multi functioning of any element of the space.

1 THE MEASUREMENT OF THE MAIN ASPECTS OF INTELLIGENCE

Referring to the intelligence in architecture there are three calls for it appearing in; smart materials, intelligent element and the smart building. As the aspects of intelligence all of them have to be deduced and analyzed.

1.1 Smart Materials

The world has recently undergone two materials ages, the plastics age and the composite age. In the midst of these two ages a new era has developed. This is the smart materials era. According to early definitions, smart materials are materials that respond to their environments in a timely manner. The definition of smart materials has been expanded to materials that receive, transmit, or process a stimulus and respond by *producing a useful effect* that may include a signal, which the materials are acting upon it. Some of the stimuli that may act upon these materials are strain, stress, temperature, chemicals (including pH stimuli), electric field, magnetic field, hydrostatic pressure, different types of radiation, and other forms of stimuli. The

effect can be caused by absorption of a proton, of a chemical reaction, of an integration of a series of events, of a translation or rotation of segments within the molecular structure, of a creation and motion of crystallographic defects or other localized conformations, of an alteration of localized stress and strain fields, and of others. The effects produced can be a color change, a change in index of refraction, a change in the distribution of stresses and strains, or a volume change [4]. This ability to produce a useful effect refers to the characteristics of smart materials; we discover that they directly focus on their actuation events and the ability of prediction, immediate response to the environmental conditions. With applying this we can group smart materials into:

- Property change capability
- Energy exchange capability
- Reversibility

1.2 An Intelligent Element

Intelligent elements can enhance product performance. By improving the mechanical properties of a system through adaptive assimilation to actual environmental conditions. As the architectural design always involve integrated systems and materials, then the biggest potential Application of smart materials will result in to separate the specific components (The development of smart materials will be involved in a variety of components such as sensors, actuators, the shape-memory alloys and etc.), behaviors or indoor environment[5]

1.3 Smart Buildings:

It could be defined as the automation involved somehow that makes managing and operating buildings more efficient.

Smart Buildings LLC (**a US-based engineering and design firm**) offers this definition: "A smart building is the integration of building, technology, and energy systems. These systems may include building automation, life safety, telecommunications, user systems, and facility management systems. Smart buildings recognize and reflect the technological advancements and convergence of building systems, the common elements of the systems and the additional functionality that integrated systems provide. Smart buildings provide actionable information about a building or space within a building to allow the building owner or occupant to manage the building or space."

Standards-based. The Smart Buildings Institute (a new Texas non-profit that's developed a smart building certification process), describes a certified smart building as one that,

1. Provides actionable information regarding *the performance* of building systems and facilities;
2. Proactively monitors and detects errors or deficiencies in building systems;
3. *Integrates systems* to an enterprise business level for real-time reporting and management utilization of operations, energy and occupant comfort;
4. Incorporates the tools, technologies, resources, and practices to contribute to energy conservation and environmental sustainability."

According to the European Commission, "Smart buildings means buildings empowered by ICT (information and communication technologies) in the context of the merging Ubiquitous Computing and the Internet of Things: the generalization in incrementing buildings with sensors, actuators, micro-chips, micro- and Nano-embedded systems will allow to collect, filter and produce more and more information locally, to be further consolidated and managed globally according to business functions and services."
Classic tech-speak. Cisco emphasizes the multi syllabic when he says that smart building development focuses on "Identifying responsible practices in *site location and materials selection for new construction;* Defining and incorporating intelligent information infrastructure into the building architecture; Developing simple, flexible, and scalable network systems for buildings; Incorporating power-management for network system [6].

1.4 The Main Aspects of Intelligence

Finally we summarize that the smart or intelligent aspects mainly concern the production of the useful effect, acting as a clever system which does not stop performance, and maintaining Efficiency.

2 APPLYING THE INTELLIGENT ASPECTS ON THE INTEGRATION OF THE NEW BUILDING WITH THE OLD ONE:

The same aspects of intelligence summarized have to be measured within the building while integrating with the urban context, as they are as follows:
2.1 Production of the useful effect
2.2 Acting as a clever system and does not stop performance
2.3 Efficiency

2.1 Production of the Useful Effect:

This aspect refers to the performance which is the synonym of *effectiveness* this term concerns the degrees to which objectives are achieved and the extent to which targeted problems are solved. In contrast to efficiency, effectiveness is determined without reference to costs and, whereas **efficiency** means "doing the thing right," **effectiveness** means "doing the right thing."
Effectiveness is the capability of producing a desired result. When something is deemed effective, it means it has an intended or expected outcome, or produces a deep, bright impression [7]. The word *effective* is sometimes used in a quantitative way. On the other hand, is the ability to produce a desired amount of the desired effect, or success in achieving a given goal [8].
This aspect could be measured within the unique design, Functional effectiveness, Security, Energy effectiveness and the Smart actions.

2.1.1. The Unique Design

The architectural conceptual design should be unique and creative to achieve the objectives of the project. The conceptual vision should be in accordance to the

importance and the significance of the building. As it must exploit individuality, uniqueness and the differences between places [9].As shown in London City Halls House (table: 1)

Table (1) unique design of London City Hall

Example	Analysis	Figure
London City Halls is House chamber for the London Assembly and the offices of the mayor and staff of the Greater London Authority. One of the capital's most symbolically important new projects, City Hall advances themes explored in the Reichstag, expressing the transparency and accessibility of the democratic process and demonstrating the potential for a sustainable,	virtually non-polluting public building. Designed using advanced computer-modeling techniques the building represents a radical rethink of architectural form. Its shape achieves optimum energy performance by maximizing shading and minimizing the surface area exposed to direct sunlight which effectively decreasing the carbon emissions. Offices are naturally ventilated, photovoltaic provide power and the building's cooling system utilizes ground water pumped up via boreholes. Overall, City Hall uses only a quarter of the energy consumed by a typical air-conditioned London office building. The landscaping in the streets and piazzas includes tree planting and water features and extends to the design of paving and street furniture. Together they help to create a lively and congenial social environment. Finally the building appears to be **multi-functional** as it responds to the morphological aspect and sustainability.	**figure (1)** London City Hall House 

2.1.2. Functional Effectiveness

Whereas some references call it functional efficiency which is the functional relationship between spaces and the circulation, zoning of uses and functions should provide vitality, which encourages people to enter the building. (Table: 2)

Table (2) Sainsbury Centre for visual art in .UK. By Norman

Example	analysis
Sainsbury Centre for visual art in .UK. By Norman foster, it is constructed to be a multifunctioning building contains galleries, a new education Centre, shop, café, and other visitor amenities	Mixed uses and variable activities that are well distributed provide vitality [11]. The building succeeded in achieving a certain goal which is multifunctioning of the space . it integrates a number of related activities within a single, light-filled space
  	

2.1.3. Security:

Security can be classified into two phases as the first concerns the security inside the building itself and the second concerns the security of the whole physical urban context that the building represents a part of it.

2.1.3.1 Security inside the Building: The building should be characterized by security and safety. It should be provided by fire alarm and firefighting systems in addition to control and security systems [12].

2.1.3.2 .The Security of the Whole Physical Urban Context: the latest main urban conceptual refer to the attractive, intricate places related to the scale of people walking, not driving to give the sense of security and the feeling of well-being or comfort. So any building could be built newly has to agree with that conceptual [13].

2.1.4 Energy Effectiveness:

Within the hypothesis of using techniques and tools being developed today to make complete high performance products the energy effectiveness which is called in various references the energy efficiency concerns the following:

- Using renewable energy such as wind, sun, geothermal, etc.
- Use of smart technology: using technology to moderate energy and water use

As shown in Sage Gates head in UK. (Table:3)

Table (3) energy efficiency of Sage Gates by Norman foster,

Example	analysis	Figure
Sage Gates head in UK lies on a landmark waterfront site is structurally the largest event	Sage one was intended as an acoustically perfect space, its ceiling panels may be raised and lowered and curtains drawn across the ribbed wooden side walls, changing the sound profile of the room to suit any type of music [14]. The shafts	

space, a special 'spongy' concrete mix was used in the construction, with a higher-than-usual air capacity to improve the acoustic. The building is enclosed (but not touched) by the new-famous glass and steel shell. in Vienna.	Create a giant double glazing effect; air is sandwiched between two layers of glazing and insulates the space inside, as Architects limit double glazing to avoid the inefficient convection of heat. The shafts pull warm air out of the building during the summer and warm the building in the winter using passive solar heating. The shafts also allow sunlight to pass through the building, making the work environment more pleasing, and keeping the lighting costs down. Finally the shafts appear to be **multi-functional** as it responds to the acoustics and the lighting.	**Figure (3)** The Norman Foster-designed Sage Gates 

2.1.5 Smart Action:

The building should be known of its smart actions within the following:

-It should provide actionable information regarding the performance of building systems

-The presence of the proactively monitors which detect the errors or deficiencies in building systems.

-It should Integrate systems to an enterprise business level for real-time reporting and management utilization of operations, energy and occupant comfort.

- Incorporates the tools, technologies, resources, and practices to contribute to energy conservation and environmental sustainability .see the example of Asian eco-cities rise to climate crisis later [15].

2.2 Acting as a Clever System and Doesn't Stop Performance:

This aspect could be measured within the continuity with nature and the flexibility with the urban context.

2.2.1 The Continuity:

The continuity could be divided into two sectors as the continuity while the Integration with the nature and the continuity through the Integration with the urban physical context.

2.2.1.1. Integration with the Nature: Lately ,the equivalence of learning from the nature and using the nature for ecological accounting methods which results in making the nature visible and explicit as depending on Formal harmony and coherence with external context through transparency, continuity, and openness of formal surface to afford extension and communication with landscape. So concept of the integration with the nature could be directed as the following:

a- Making the Nature Visible and Explicit, depending on using intelligent glass over formal surface to control interior lighting quantity and heating loss or gain.

b- Using the Nature for Ecological Accounting Methods, depending on using open courtyard to increase climatic efficient, formal treatment like staggering, waving, interposition, and hierarchy to reduce heating loss or gain.

c- Formal Harmonize and Coherence with External Context through transparency, continuity, and openness of formal surface to afford extension and communication with landscape, efficient formal orientation, reducing the proportion of depth of formal building to supply more daylight [16].

Example: Asian Eco-Cities Rise to Climate Crisis:

Description: The Asian eco- cities Project is one of the world's largest greenhouse. Eco-cities, also known as sustainable cities, are designed with environmental considerations at their core. Such cities seek to reduce as much as possible their environmental impact and minimize the use of energy, food, and waste. The concept has gained popular recognition ever since the term was first coined by California-based planner Richard Register some 35 years ago, who defined it as a holistic approach where government, industry, people's needs and aspirations, nature, agriculture and the physical environment are "functionally integrated", The eco-city model: Practical, replicable, scalable Figure4.

Figure (4) Asian eco-cities rise to climate crisis

http://www.eco-business.com/news/liveable-cities-series-asian-eco-cities-rise-to-climate-crisis/

Analysis:

- **Form:** The core message of the project is one of sustainability, it was important to develop a design that could, regardless of size, be considered sustainable. The efficiency of spherical geometries is minimum surface area for maximum volume sounded like an economic strategy that was going to be hard to beat. These efficiencies extended beyond the structure and into the envelope and environmental systems. Spheres are minimal surfaces that have maximum volume. They allow direct sunlight to enter perpendicular to the surface at all times of the day, thus maximizing the free energy (Ecological Accounting Methods).
- **Position:** Maximizing solar penetration was a key target and knowing where this asset lay determined the optimal positions for the biome structures. The results of this mapping indicated that the design should be linear in profile with lean-to structures built against south-facing cliffs, a replicated foam geometries attached by linking bubbles in three dimensions, carefully following the solar boundaries whilst ensuring that the brief areas could be sustained (Ecological Accounting Methods).

- **Learning from the Nature:** One of the biggest concerns was the resolution of intersecting spherical geometries. As it results from studying nature for possible solutions and eventually came across a dragonfly's wing as a model for how minimal surfaces (Formal Harmonize and Coherence with External Context).
- **Cladding Systems:** Further effectiveness was gained when we began to assess the options available for transparent cladding systems. The design was developed using ETFE foil—a transparent Teflon foil system fabricated as triple-skin pillows inflated to 300 pounds per square inch. These pillows allow greater penetration of low-frequency ultraviolet light, are better thermal conductors, and weight less than 1 per cent of double-glazed glass panels. Maximum panel size on the biomes is 53 square meters, which greatly reduced the weight of primary steel structure and its subsequent shading effect [17]. (Making the Nature Visible and Explicit).

2.2.1.2. The Integration with the Urban Physical Context:

To achieve the proper urban solution with an urban scale, we need a clear appreciation of the urban grain and built form – what is sometimes called the morphological context. We also need to understand fully the local architectural typology – related to the uses and functions of the particular buildings. New proposals – Whether for a large piece of urban design or an individual building – must have a positive relationship to the existing morphology – by harmonizing with it, by adapting to it or, where there are clear reasons to do, by contrasting with it. The important thing is to take a positive design stance not just an arbitrary one [18] and this could be achieved by using the Regulating Plan and Form-Based Code*1 .As Form-based codes focus on building form and how it affects public spaces. By relating buildings back to the street and open spaces. This focus allows form-based codes to guide the creation of active, sustainable neighborhoods. Here are some of the more important aspects of form-based code.

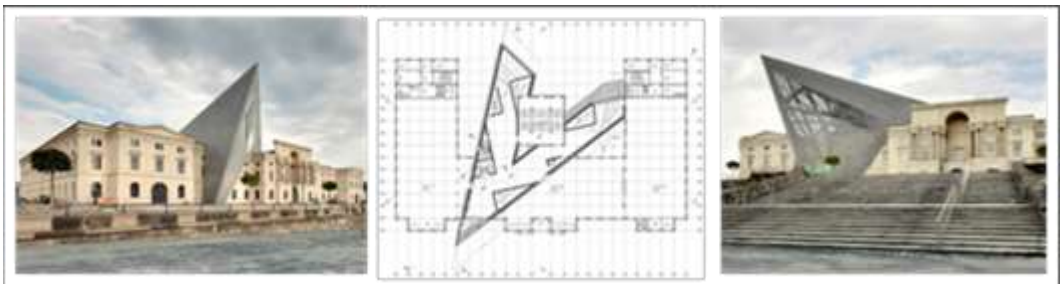
a. Focus on Form: each building type will detail building and parking sitting, facade and use requirements, and height. The regulations frequently include acceptable ranges, such as minimum and maximum heights or a build-to zone rather than a setback. These ranges allow for flexibility in development, and there is reassurance in the level of predictability that they provide. Since each code is created based upon the preferences of the community, codes will differ among cities and among neighborhoods within cities. Based on these preferences, the facade requirements especially will vary in their level of detail. At a minimum, pedestrian-oriented characteristics such as entrance location, transparency level, base type (treatment of the ground-story front facade), and cap type (including roof type) will be regulated, and a city may choose to include additional requirements [19].

Example: **Dresden Museum of Military History:** New York architect Daniel Libeskind has driven a pointed steel and glass fragment through the heart of the war museum in Dresden, which reopens on October 14 after a 22-year closure. Update 17/11/2011, Daniel Libeskind's winning design boldly interrupts the original building's symmetry. The extension, a massive, five-story 140-ton wedge of glass, concrete and steel, cuts through the 135-year-old former arsenal's structural order. A 98-foot high viewing

platform provides breathtaking views of modern Dresden while pointing in the opposite direction toward the source of the fire-bombs, creating a dramatic space for reflection. **"The dramatic extension is a symbol of the revival of Dresden from its ashes. It is about the neighboring between tradition and innovation, the new and the old. Dresden is a city that has been fundamentally altered; the events of the past are not just a footnote; they are central to the transformation of the city today."-** Daniel Libeskind.

The (MHM) offers different perspectives on German military history. The architecture, the new thematic exhibition, and the redesigned permanent (chronological) exhibition represent both traditional and new forms of perception and expression. The neighboring between tradition and innovation, of old and new interpretations of military history, is the cornerstone of the new approach. [20] Figure 5.

Figure (5) the new addition is about the juxtaposition of tradition and innovation, of the new and the old.



http://media2.picsearch.com/is?6L6kjpf4FUyAtioItb6cib9j9eP-4GopU8R7fQ8suxM&height=341

B. Regulating Plan: districts are created, each allowing for the development of at last one building or open space type. Each district is mapped in the regulating plan, similar to a conventional zoning map; however, this is done by examining each parcel and block individually, and is favored in form-based codes not by establishing large strips of one type of district. Besides mapping the building and open space types, the regulating plan also details how the street types are developed in association with the building and opens space types [21].

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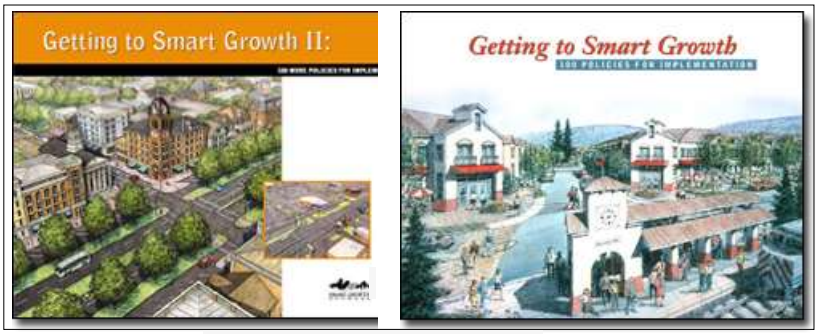
*' *A Form-Based Code (FBC) is a means of regulating land development to achieve a specific urban form. Form-Based Codes foster predictable built results and a high-quality public realm by using physical form (rather than separation of uses) as the organizing principle, with a lesser focus on land use, through municipal regulations. A FBC is a regulation, not a mere guideline, adopted into city, town, or county law and offers a powerful alternative to conventional zoning regulation*
Form-Based Codes are a new response to the modern challenges of urban sprawl, deterioration of historic neighborhoods, and neglect of pedestrian safety in new development. Tradition has declined as a guide to development patterns, and the widespread adoption by cities of single-use zoning regulations has discouraged compact, walkable urbanism. Form-Based Codes are a tool to address these deficiencies, and to provide local governments the regulatory means to achieve innovative objectives with greater certainty https://en.wikipedia.org/wiki/Form-based_code.

Figure (6) Smart Growth Network and ICMA that serve as road map for states and communities that have recognized the need for smart growth.



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The features that distinguish smart growth in a community vary from place to place. In general, smart growth invests time, attention, and resources in restoring community and vitality to center cities and older suburbs. New smart growth is more town-centered, is transit and pedestrian oriented, and has a greater mix of housing, commercial, and retail uses. It also preserves open space and many other environmental amenities.

2.2.2. Flexibility:

Adaptive buildings should be characterized by flexible functions, spaces, and internal furniture so that change could occur by time. And the structure used in this era is searching for replying this issue as shown in Telekom Malaysia Headquarters, Menara Telekom, in maize which is designed by Hijjas Kasturi Associates Figure 7, as the tower rises with a central core and two offset office curving office wings. The wings create open courtyards flanking each side of the tower core which support a series of 11 outdoor terraces facing to the southeast and the northwest. As one office wing tops out, a helipad takes over the set back with a large disc shaped cantilever extending out [22]

Figure (7) Telekom Malaysia Headquarters, Menara Telekom, in malizia designed by Hijjas Kasturi Associates

http://media1.picsearch.com/is?xajOGkokYxYC3Fwg6KOvEK86watAlFS885m2ZaNvJe8&height=181

And also shown in prefabricated building which is designed according to the customers' need, mobile, economical, recyclable, and environmental. Figure 8.

Figure (8) the prefab building mobile, economical, recyclable, and environmental protective

http://media1.picsearch.com/is?NSxluF_BYJu-OK8xeJsnuHt2z6Ku0m9sDCVVRveeHSo&height=111

2.3. Efficiency:

In contrast to effectiveness, Efficiency refers to the cost as it means "doing the thing right". So it can be shown through the integrated systems for Green building standard, the Integrated Design, and the Marketing initiatives.

2.3.1 Efficiency within Integrated Systems for Green Building Standard :

It is one of a number of voluntary leadership standards for enhancing the environmental performance of buildings. It combines minimal fixed performance requirements with an optional menu of sustainable building practices. Sustainable urbanism concludes that society will inevitably move to require high performance building (HPB).as shown Asian eco- cities Project [19].

2.3.2 Efficiency within Integrated Design:

Integrated design is a hallmark of the green building movement. By optimizing the performance of a building as an entire system, this design approach can improve a building's performance at little or no added cost simply by shifting money within the project. A classic illustration is to reallocate a building's construction budget to specify more insulation and better windows and recoup some or most of those costs by buying a smaller, less expensive mechanical system. The resulting building will incur a small construction premium but will produce an acceptable return of investment on that premium, using far less energy and costing far less to operate as shown in The Asian eco- cities Project [19].

2.3.3 Marketing Initiatives:

Most heritage spaces or districts suffered from contemporary change in the downtown retail market as it is now economically and visually diminished. There is widespread public concern about its economic health and a widely Acknowledged recognition of the need for its revitalization to promote the district and attract new business to keep it economically sustainable to insure the sustained maintenance. So the overall objectives concerning such issue as shown in existing red wing downtown walking tour –*Washington*- includes the following:

(a) The revitalization of the Street as a focus of retail, commercial, and cultural activity.

(b) To encourage restoration of heritage buildings and storefronts.

(c) To attract market specialty retail, cultural, and entertainment uses at street level.

(d) To fill vacant space on upper floors and encourage conversion to residential use.

(e) To improve HRM's image & marketing potential.

(f) To restore investor confidence and trigger private investment. [21].

As existing red wing downtown walking tour Fig.9 is an identifiable district within the downtown. It is well-recognized in the public consciousness as Halifax's existing main street. Its many Victorian, Edwardian and Early Modern commercial buildings give it a unique heritage character which is quite different from that of adjacent streets. The Red Wing Heritage Preservation Commission (HPC) has produced 28 podcasts featuring all of the existing buildings and sites featured in the Footsteps through Existing Red Wing walking tour booklet that are located in the Downtown and Heritage Mall Existing Districts. The narrated podcasts combine existing photographs, current photographs, video, maps, and other documents regarding Red Wing's history and the existing and architectural significance of each site. The Street is also recognized as the street which has suffered most from contemporary change in the downtown retail market, and the effects of traffic and transit. Once the bustling heart of the city, it is now economically and visually diminished. There is widespread public concern about its economic health and a widely acknowledged recognition of the need for its revitalization. There is a pressing need to re-establish private sector confidence in the street and create an environment which encourages private investment. There is a need to enhance its heritage character and physical attractiveness through building facade, storefront, and signage improvements, public realm developments, and sympathetic new buildings. There is also a need to expand commercial activity and to promote and market the street as a commercial destination.

Fig (9) the map of historic red wing downtown walking tour

3. CONCLUSIONS

The aspects of intelligence varies and used in architecture but not by that way which can affect the urban context to make it sustainable specially while integrating the new building with the heritage one. And the morphology of forming the city will varies while using the supposed intelligent criterion.

The following table could be considered the collective list to illustrate the smart aspects used while integrating a new building with the heritage realm.

Table (4) illustrate the smart aspects used while integrating a new building with the existing realm.

The main aspect	The criterion		
1.Production of the useful effect	1.1 The unique design		
	1.2 Functional effectiveness		
	1.3 Security	1.3.1security inside the building	
		1.3.2 The security of the whole physical urban context	
	1.4 Energy effectiveness		
	1.5 Smart actions		
2.Acting as a clever system and does not stop performance	2.1The continuity	2.1.1 Integration with the nature	a. Making the nature visible and explicit
			b. Using the nature for ecological accounting methods
			formal harmonize and coherence with external context
		2.1.2 The Integration with the urban physical context	a. Focus on Form
			b. Regulating Plan
	2.2Flexibility		
3. Efficiency	3.1Efficiency within Integrated systems for Green building standard		
	3.2 Efficiency within Integrated Design		
	3.3 Marketing initiatives		

Recommendations:

- We call upon the architectural and planning community, professionals, decision makers and the government to acknowledge the urgent need to study, protect, and revive the existing realm and deal with it within a smart manner as this realm is an essential and progressive force to mediate the challenges of future urbanization.
- The existing Place is much more important than any individual architectural concept, furthermore a good understanding of the concept of the urban context is the key to solve problems of integration. So any research in such issue must highlight the importance the aspects of the era to establish a good city.

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Transforming Low-Income Communities Through Improving The Efficiency Of Architectural Energy Saving Design

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ABSTRACT

Housing problem in Egypt is an exacting problem facing all segments of society; it has accumulated over ages due to the economic, social and political conditions in Egypt since mid-twenties. By 2005, the National Housing Program (NHP) was announced, in order to accommodate the rapid population growth. However, the Governmental housing projects in Egypt did not meet all the housing requirements especially for the limited income groups either in number or quality. Whereas housing problem is not the number of units needed but also the problem of how to provide good environment respecting the social and cultural characteristics of the community. This paper aims to consider the effect of architectural design on the thermal comfort and saving energy in Building your Home project; as one of the main pivots of the National Housing Project. Research study on low-income housing experiment in New Beni-Suef City for enhancing the efficiency of architectural saving energy design with respecting economic, social, and environmental costs using Design Builder simulation software to transforming low-income housing by achieving citizen comfort and improving energy efficiency.

Keywords: Low-Income housing – Affordable social housing- Egyptian housing projects- Adaptive comfort standard- residential energy efficiency- socio-economic aspects**.**

ملخص البحث

يشهد العالم الان إهتماماً متزايد بقضايا البيئة، حيث بادرت العديد من دول العالم في اتخاذ خطوات عملية في سبيل توفير المأوي والمسكن الملائم بيئياً وذلك في إطار من الحفاظ على البيئة وترشيد الاستهلاك، ولإسكان منخفض الدخل دور كبير في العديد من الدول وخاصاً مصر حيث أن التصميم المعمارى البيئي من أهم موضوعات علم التصميم المعماري المستقبلي ونتيجة للاهتمام بالبيئة والحاجة إلي التعامل معها تصميمياً في ظروف اقتصادية مناسبة. من هنا جاءت أهمية البحث وهو وضع أسس لرفع كفاءة الأداء الحراري للغلاف الخارجي لأحد المشروعات القومية التى تقدمها الدولة وهو مشروع "ابنى بيتك" في المدن الجديدة وذلك دون التأثير علي التكلفة الاقتصادية لذوي الدخل المنخفض و مراعاة مدى تطبيق الكود على هذه المباني لتحقيق الراحة الحرارية والتأكد من جدوي هذه الأسس باستخدام أحد برامج المحاكاة الهامة Design Builder وذلك كمحاولة لتغير من مفهوم الإسكان في مصر وتوفير الراحة الحرارية داخل المبني بجانب توفير الاحتياج للمأوى والامان.

1. INTRODUCTION

The problem of housing in Egypt is not isolated from the problems facing the social and economic development of the country. Accordingly, the government turned to the project of self-construction which Known "Building your House" as one of the national projects that introduce a solution of the problem of housing in Egypt. In contrast the project facing the random and anarchy as a result to the lack of controlling and following-up during the implementation stages, besides the contest of beneficiaries to win the land. The causes of housing problem are basically a result of many factors such as: the shortage of housing units especially for low income sectors, increasing of population growth rates, the deterioration of the existing housing stock for the lack of maintenance, rural migration to urban areas caused the

uncontrolled urban growth, the shortage of money invested in low cost housing projects, the increase in the final cost of building due to the increase in cost of land, building materials and labor, and the lack of well-organized public participation in low cost housing. However, the main objective of building your house project is to solve one of the greatest social problems through enabling young couples to find a suitable flat at a reasonable price. But the actual situation indicates that most of housing projects do not meet all housing requirements especially for the limited income groups either in number of housing units or quality of life. Based on building your house residents' complaints," normality of designing models matchless the environmental or social conditions, therefore many modifications have been made for reaching citizen environmental and functional comfort by paying 600L.E."[1], this requires assigning specialized companies for execution and supervision to improve quality and quantity of comfort levels by avoid them to be tricked from the constructors. Study aims to concentrate on enhancing citizen comfort and improving energy efficiency, or in other words, transforming low-income housing by improving the efficiency of architectural energy saving design. Housing is NOT just a programmatic goal to be attained in a certain time plan, adequate housing must provide more than four walls and a roof; adequate housing as a component of the right to an adequate standard of living. Research problem on: Architectural design for low-income housing is not energy efficient although social housing is one of the more housing sectors that need to raise energy efficiency, reach thermal comfort and reduce costs". Causes of the problem: using the same architectural models in all cities without taking into account the environmental effects such like climate and topography as shown in [Figure1], where reflected passively in planning sites in some cities. New Beni Suef City has large problems as the disregard of citizen comfort and energy efficacy.

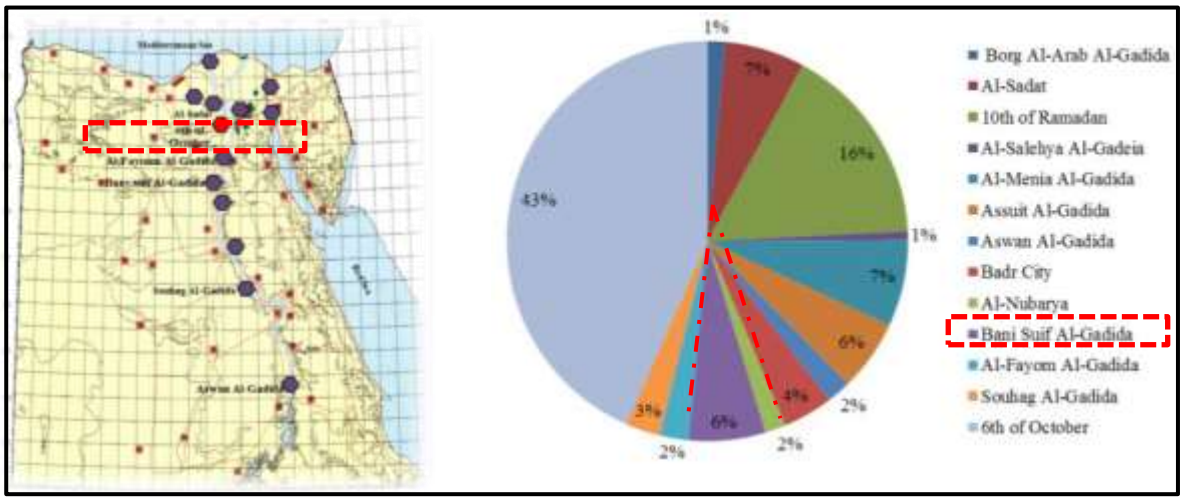
Figure (1) The Same Architectural Models in All Cities without Thinking in the Environmental Effects

2. THE NATIONAL HOUSING PROJECT (NHP)

The National Housing Project is considered to be one of the most important projects to overcome the problem of housing through the provision of adequate and appropriate housing for young people with limited income to provide 500 thousand housing units during the period of six years , this amounts to the construction of (85,000) apartments per year to solve the housing problem in Egypt [2], which is one of the biggest problems facing the Egyptian citizen who dreams to have a suitable apartment with a cost matching with his level of income. In light of the Egyptian government's strategy towards providing affordable housing for low-income category to face rapid population growth and avoid building informal housing in urban areas through suggestion new social housing projects which will be established in new cities. This is done through the project of social housing, which

aims at quick provision of plots for low and middle -income category who are the most important challenges facing the Egyptian society. Figure two represents location and percentage of building your home project throughout the Country [3], indicating the share of New Beni Suef City (shown in Red).

Figure (2) Location And Percentage Of "Building Your Home Project" Throughout the Country



The Ministry of Housing and Urban Communities plays a major role in providing planned plots having utilities for this project. On the other hand, there is a decreasing in government funding for housing projects, especially social housing projects , therefore ministry of housing is looking for alternative sources of funding such as public-private partnership approach (PPP) to reduce the government financial allocation for housing projects and get a benefit from Previous successful experiences of private sector in this field [4]. It has been known that the housing process is divided into different steps: decision making, planning, design, implementing, controlling and maintenance. Community participation could be activated in one or more of these steps: So whenever the more participation in these steps, the more reduction in the total cost of housing is realized. It depends on the form of participation which is affected by the social and cultural characteristics of the community. Ministry of Housing on 2005 has announced that there are seven types of projects as shown in the following table (1). [5]

Table (1) The Seven Types of the National Housing Project (NHP)

Project type	Project Characteristics	Proposed housing units	Area
First type	Provision of titling system for housing units	327141	63 m^2
Second type	land granting for low-income people to build their housing themselves (Ebni Betak project)	93756	150 m^2
Third type	Land sale for investors to build housing units	85050	63 m^2
Fourth type	Bet al aliyah project and provision of titling system for housing units	3020	63 m^2
Fifth type	Awla bel re'aya" project	28294	42 m^2
Sixth type	providing rental system for housing units	37807	63 m^2
Seventh type	providing titling system in desert	14563	63 m^2

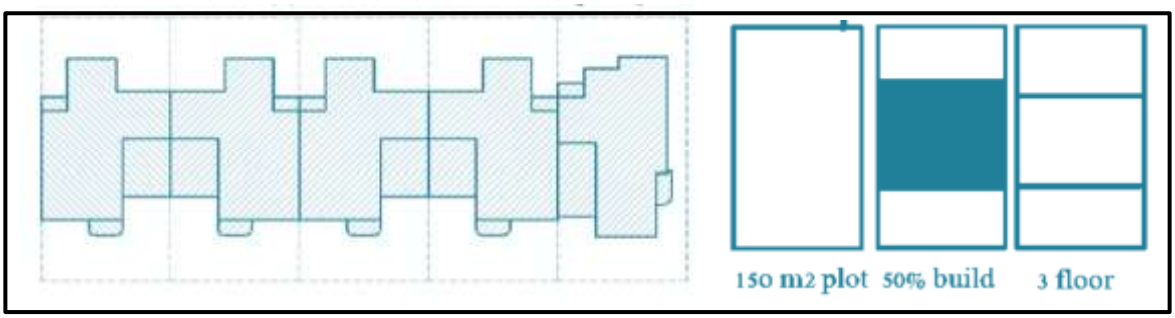
While Building your house project (the second type of projects) is considered one of the most important projects which are carried out in the frame of solving part of the problem of limited in come people. It is considered one of the giant projects which the government adopted it regardless the problem or economy of citizen, the aiming class of the project as following table.

Table (2) The Aiming Class of the National Housing Project (NHP) [6]

Age	From 21 to 40 year
Income	Not more 1000 L.E. for single and for the family 1500.
Living place	According to the zone of the project
Reservation	The applicant doesn't benefit before from the supporting of government.
Specialization:	For himself not behalf.

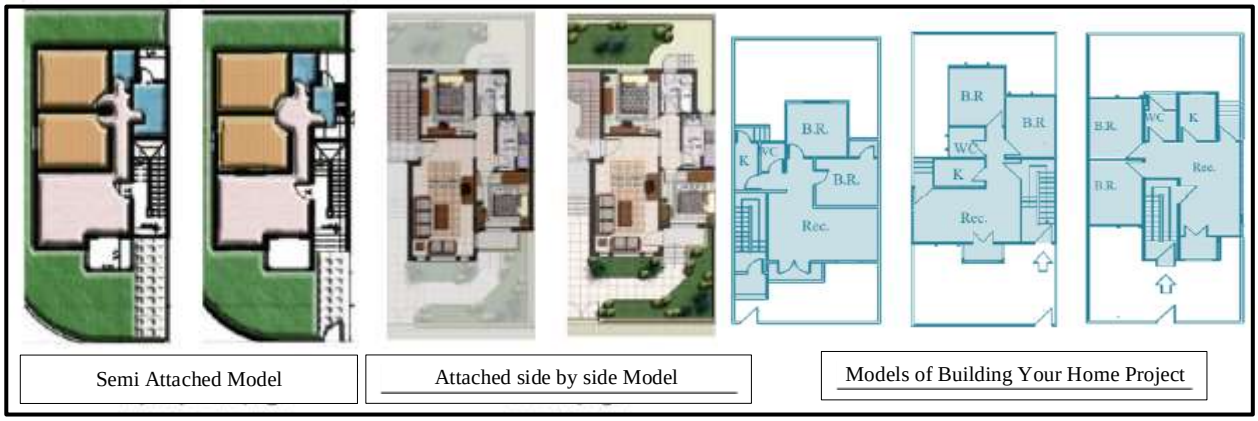
Planning of the project is contracted with ministries for planning, preparing drawings, and making urbanely models; where the project adapted the concept of the stage building as the benefit builds his house on stages according to his needs to take the support of money on stages with the developing of building and finishing work. Besides exemption the benefits of the project from paying the rest of credits from the price of the plot, according to building of three floors and indoor / outdoor finish [7]. The aiming of the project is reducing cost of housing unit on the state and gives the chances for limited income people for participation of housing through bearing the responsibility of building from the drawings and the conditions which the state put them. Housing style main concept is based on specialized plot of housing in different new cities its area 150m^2 and saving all facilities, permitted construction rate is 50 %. Land plots have been divided into (8.60 x 17.5m.) and the majority of the models are connected from both sides with no side-impact, with the semi-attached model used in the terminal as shown in fig (3).Blocks consist of plots arranged back to back were homes are attached side by side. Each home has a front and back yard. Each of the back and front yards ranges between 3.5 to 4.0 meters. [3]

Figure (3) Housing Style of Building Your Home Project in the New Cities



House consists of a ground floor and two upper floors built with governmental financial support depending on the construction stages. The plots are with on front side and three neighbors. Citizen doesn't choose where his plot is or what is the model of housing, but this is done by lottery. The flat consists of only two rooms, hall and facilities that not exceed the total of building area more than 63m^2; it is also worth mentioning the incomplete stairs to reduce the costing although they need to use the roof as shown in [Figure 4]. More than 90,000 plots of land were distributed in 34 new cities in 13 cities as following: 6th of October, 10th of Ramadan, New Salhiya, Nubaria, Sadat, Badr, New Burj Al Arab, New Fayoum, New Beni Suef, New Minia, New Assiut, Sohag and New Aswan. [5]

Figure (4) Program Models of Building Your Home Project (Ground Floors)



The planning process and the architectural procedures are both based on the socio-economic aspects involving community participation. This means that community participation is an important part in both the planning and architectural process. On the other hand, community participation in improving the existing housing stock or in the building of new dwellings requires special consideration which eventually affects the building industry including building materials and methods of construction. This is the base for the use of the appropriate technology which is appropriate for community participation. The factors influencing the economics of residential unit design are noteworthy on (blocks form, units' area, height surveys, number of floors, spaces distribution, circulation elements, implementation stages, construction system, building materials and finishes.

3. THE PROBLEM OF HOUSING IN EGYPT

Housing in Egypt is not isolated from the problems facing the social and economic development and technical aspects, where the most visible symptom of Egypt's urbanization problem has been the lack of low-income and social housing available across the country. The country suffers from a fundamental mismatch represented in the gap between supply and demand. More than 11 million people live in informal slum settlements, besides 90% of Egypt's housing is built informally and 10% is built by professional companies. Unfortunately, construction companies are building new homes primarily for the high-income market for the sake of profitability. In the experience of building your home project, the population role is limited to build for the government its project -which is rubber stamped in all of its details- even the

extension of core house should be according to a pre-determined plan. Community participation may be a way of making a project acceptable to the local population, as it will be cheaper and smoother to implement. From the residents point of view it means a role in the development of their environment where they can choose the improvement option, and reduce the project costs. Questionnaire [Table3] was designed to evaluate the Housing Situation comfortable for low-income citizen.

Table (3) An Assessment of the Housing Situation comfortable For Low-Income People

	Project Evaluation						Discussion
	Advantages			Disadvantages			
	Max.	Avg.	Min.	Max.	Avg.	Min.	
Design Concept		■					Offers a new type of housing
Site Location				■			On the borders of the city
Community Participation				■			Citizen doesn't choose area, design & finishing
Occupancy Rate				■			Weakness , does not exceed 5%
Housing Program				■			Units are connected from both sides
Unit Area					■		The total of building area more than 63m^2
Socially Problems					■		Cross-circulation and lack of privacy
Functional Comfort					■		Not acceptable: small area & bad orientation
Structural Problems					■		Structural problems may occur on foundations
Finishing Quality				■			Unfinished exteriors send negative image
Environmental Comfort				■			Poor natural lighting & ventilations/discomfort
Energy Efficiency				■			Not energy efficient
Cost Economics					■		Not suitable for low-income /Uneconomical
Safety Health Regulations					■		Disregard the safety and health regulations
Supply the facilities					■		lack of services in the place
Future Extension					■		In the narrowest limits

Accordantly, the main concept of project is to make the effective role of housing participation; definitely citizen are hoped and considered the best future and life about the idea of building house for each youths and family, the government paved the hopes for the citizens but they got into a lot of problems and troubles, which can be summarized in the following: **Administratively** (unstructured management, lack of communication between different departments, Absence of censorship putting complex conditions for getting license and there are more expenses). **Socially** (the project became Typical away from identity & cultural society, project doesn't represent certain community class). **Community participation** (Citizen doesn't choose area, design & finishing). **Environmentally** (No consideration to choosing sites, orientation, climate and topography, poor natural lighting & ventilations, feeling discomfort, absence guidance signs). **Design Concept (**The same models in all cities without considering climate & topography, design don't represent identity and culture benefits, bad planning. No green areas or other community facilities, few rooms, narrow spaces, incomplete stairs, fixed paints color and material, absence of

security, privacy & flexibility and lack of beautiful features). **Executional disadvantages** (Serves aren't available; lack of infrastructure a lot of sites need soil replacement, absence of transportation means). **Economically (**mismatches between demand & supply**,** raises of prices, increase in burden on the owner, loans aren't suitable). According to the New Urban Communities Authority (NUCA) and the ministry of housing [8], the project aimed at enhancing the participatory role of the users. Therefore, it is necessary changing the policies should start from the level of urban planning of new cities, by first studying the social norms and the people's needs before deciding on the land areas and height restrictions. Increasing the area of building to reach 60% instead of 40% to reach 90 m2 at least and the rest is the green area as it is planned for it. Giving the citizen the freedom to choose his elevation which would suit the general taste and specialized fixed colors light beige or grey. Residential energy efficiency offers untold potential for savings, job creation, improvements in health and safety, and community reinvestment. But often, the people who would benefit most from energy upgrades are least able to afford them.

4. THE EGYPTIAN RESIDENTIAL BUILDINGS ENERGY CODE (ERBEC)

Energy Codes as Strategy for Energy Efficiency in Buildings became the more important in residential efficiency policies for controlling architecture design and providing energy efficiency; form the architectural design base to evaluate the building energy performance and develop energy efficiency programs. There are three approaches of building energy codes [9]: **Prescriptive Approach;** prescribes the minimum requirements for achieving thermal comfort and energy efficiency. ERBEC contributes lists the required minimum R-value or maximum U-factor for the building envelope elements (windows, walls and roof). Also building lighting systems prescriptive approach lists for different building type the allowable watts for each metric square. For mechanical equipment and systems prescriptive approach lists the minimum required equipment efficient. Therefore, prescriptive approach considered the simplest, quick and easy to use, but it may be restrictive for several limitations and constrains. However, this approach applied in the countries which have no experience in thermal regulation. Then **Adjustment Approach:** allows to increasing energy efficiency rates in one element of the main building systems (building envelope, lighting system and mechanical systems) against decreasing it in another. For example, in some cases it's necessary to decrease wall efficiency (low R-value) for increased window efficiency (low U-factor), as well increasing roof insulation for decrease or remove slap-edge insulation. For lighting systems, it depends on the trade-off between wattages of proposed lighting in different spaces. While the only tool allowed for mechanical equipment and systems, is toward choosing higher cooling equipment efficiency for achieving economized requirement. Adjustment approach is less restrictive than prescriptive approach because it describes the actual building design and it could adjust each building element individually. This approach allows for designer to reduce energy efficiency in an element as long as the energy efficiency of other elements is increased to compensate the reduction. **Performance Approach**: compares the proposed design with the reference design and demonstrates that the proposed design efficiency is at least as the reference design in the annual energy use. It allows the maximum

flexibility but it may require more effort. Performance approach is the only approach that can be used to show energy compliance when using nontraditional and unusual building elements and features. It is the most in time consuming in the three approaches. It also allows the most flexibility because it evaluates the whole building not only its elements. And takes in consideration many more variables (windows, orientation and shading), which affect energy efficiency by using acceptable simulation tools such as: DOE-2 and Energy Plus.

5. LOW-INCOME HOUSING DESIGN WITH COMFORT AND ENERGY EFFICIENCY

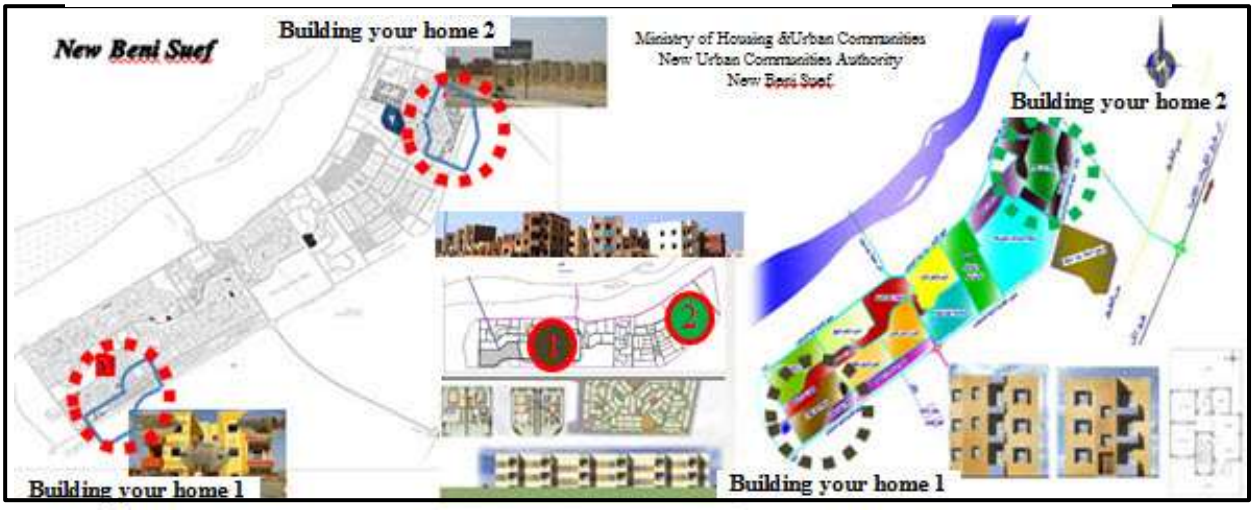
Architectural design for low-income housing is not energy efficient although, social housing is one of the more housing sectors that need to raise energy efficiency, reach thermal comfort and reduce costs. Low-income households typically face the greatest energy burden Where Families in these communities often live in older homes that lack adequate insulation and energy-efficient appliances. It is worth mentioning that low-income families spend more than 17 percent of their incomes on household energy; while other households spend on average just 4 percent [10]. Most energy efficiency benefits do not reach this population, and more attention must be given to support the energy needs of distressed communities. Energy-efficient social housing benefits low-income households by reducing energy bills and the environment by reducing causes of energy consumption - It creates a thread through general issues of energy conservation and affordable housing - so that those households can better afford the necessities of life. Designing energy efficient affordable housing is especially complex because of the limited budget available for "special" features, the tight timelines. To be affordable housing must be designed and constructed to last and not require expensive maintenance; energy efficient construction improves building durability by reducing moisture related problems; when families spend less on energy bills; they can afford a better budget for maintenance and repairs [11]. While architectural consideration for affordable and energy efficient housing depends on planning efficient land use, achieving design standards, considering building orientation, using passive ventilation techniques, designing appropriate window sizing and placement. Besides encouraging the use of energy saving technologies via using light-emitting diodes (LED), air conditioning exchangers (HVAC) and biogas in the proposed affordable energy efficient housing for low income community [12]. Low-income housing design with comfort and energy efficiency requires selecting the most cost-effective and energy efficient package of measures which means choosing measures that are not “best” in their category. So it is worth mentioning that Factors affecting on architectural concepts can be divided into physical and unphysical factors. Physical factors refer to building elements. Building shape (form, area and height), Skyline: (straight or complicate), Landline: (straight, inclined, regular, irregular, or reflected), Visual features: (unity, proportions, balance, harmony, texture and color), Natural Elements: (topography, slopes, trees, plantations, water sources, stones and climate factors). Urban Characteristics :(site organizing, type of urban space, streets, relation between blocks and connecting spaces). User’s Needs (shelter, security, protection, activities, privacy, and comfort), Indoor Environmental Quality: (Thermal, Lighting, Ventilation, Acoustics, Humidity, Vibration, and Odor).Environmental

Control: (architectural identity, solar radiation, thermal mass, heating and cooling, insulation, natural lighting, natural ventilation, HVAC, and climate control tools) besides, Energy Performance: (Consumption, Saving, producing, and recycling)].While Non-physical factors, refer to cultural background, aesthetic values, social values, personality, public taste, spiritual interests, environmental identity and users comfort[13]. Accordantly, low-income housing design with comfort and energy efficiency principles based on achieving the highest performance of the residential unit while respecting economical aspects, contributes equally between comfort, cost and time . Functional performance is not intended only but the overall of (environmental- technical and economical); so as to get the best performance and that is not suitable at a higher cost, but at the lowest cost in accordance with the appropriate period of time. Transform Housing & Support helps citizen to reach their goals and live independent and fulfilling lives.

6. AN OUTLINE OF THE FIELD INVESTIGATION

New Urban Communities Authority (NUCA) was established according to law 59/1979 aiming to: creating new civilized centers for achieving community stability and economic prosperity, redistribution of inhabitants far from the Nile valley, developing new attraction areas beyond the existing cities and villages, and extend the urban axis to the desert and remote areas to decrease the Urban extension on the agricultural lands. NUCA assures on the availability of housing units for the low Incomes, aiming to raise the standard of living for this level. it has launched several effective housing projects that suits the different levels and with many facilities, and to continue the strategic plan of the New Urban Communities, the most appropriate sites have been chosen for the new cities with different economical basis such as New Beni Suef City where was established by Cabinet decree (643/1986). As a part of the Social Housing Project in New Beni Suef city on December of 2015; the total number of housing is 16.599 units distributed as follows: 5848 unit implemented by (NUCA), 4080 social housing units by NUCA and 1224 housing units which are being implemented by New Urban Communities Authority within Social Housing Project. Referring to build your own house project, the total number of plots in the city is 5975 plots (3298 plots in the first district and 2677 plots in the second)as shown in [Figure 5] [14].

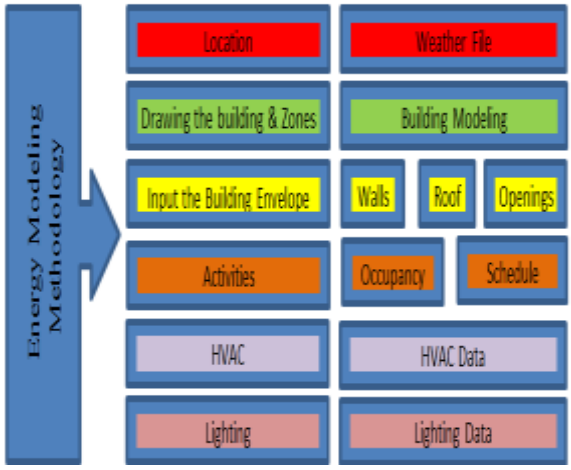
Figure (5) Location of build your own house project in New Beni Suef City



The Location Land uses display the complete separation between uses which in turn led to an absence of mixed uses; therefor citizens transformed some of residential units use to mixed use for providing the lost services. As for, the monolithic residential land Characterized in harmony with the surrounding urban tissue despite the lack of green areas and facilities. Analysis of whole uses segregation requires long walking distances to daily needs, which is not consistent with the nature of the region community. It can be observed that many of the plots have at least 1 floor which means that the project policy succeeded, when it stated that the land will be taken from the household if he/she doesn't complete the first floor within the first year. Few blocks finished construction and completed the three floors so as to be exempted from the rest of the premiums. Blocks consist of plots arranged back to back were homes are attached side

by side. Each home has a front and back yard. Each of the back and front yards ranges between 3.5 to 4.0 meters. This means that a total setback between buildings from their back sides ranges between 7.0 to 8.0 meters, while on their completion; they will be about 12.5 meters high. These long narrow double backyards actually will not provide enough privacy, thermal comfort, natural lighting and ventilation. Research study on low-income housing experiment in New Beni-Suef City for enhancing the efficiency of architectural saving energy design while respecting economical, social, and environmental costs using Design Builder simulation software to transforming low-income housing by achieving the citizen's comfort and improving energy efficiency, simulation tool for checking building energy, carbon, lighting and comfort performance. Developed to simplify the process of building simulation as shown in [Figure 6], it allows a rapid comparison between function and performance of building designs in order to deliver results on time and on budget. [15]

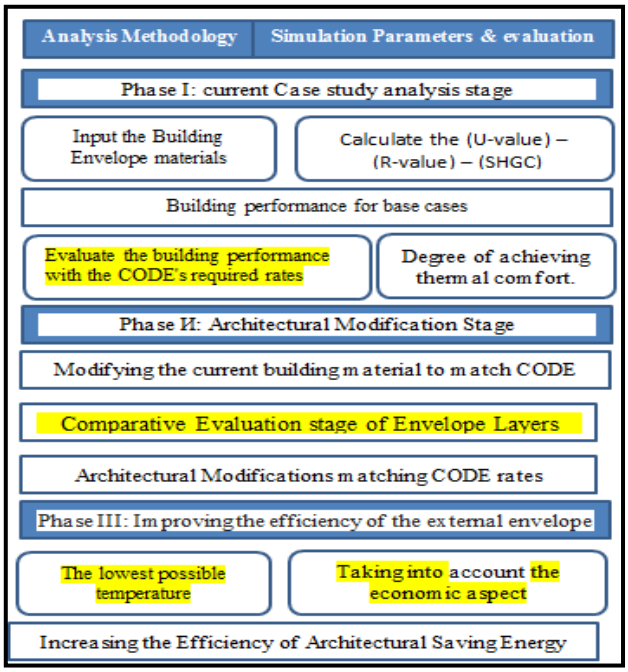
Figure (6) Energy Modeling Methodology



7- STAGES OF INCREASING ARCHITECTURAL DESIGN TO PROVIDE ENERGY EFFICIENCY:

Building design tools are performed to analyze the energy performance of a building and to understand the relationships between the design parameters and climatic characteristic of the site, and energy use characteristics of the building. The effects of all kinds of changes can be simulated in a fraction of time and with a fraction of cost it would take to be studied in real life. In practice, simulation tools can be utilized for the following functions: evaluate design options and investigate design optimization, facilitate the investigation of new ideas, check compliance with building energy codes, and determine the impact of energy conservation measures.

Figure (7) Stages of Increasing Architectural Design & Energy Efficiency



The methodology implemented in this paper was divided into three stages shown in [Figure 7]. First: Analysis of Energy Performance for Base Case (inputs building envelope materials for walls, roof and openings), then calculate U&R Values for the envelope, and Solar Heat Gain Coefficient (SHGC) for openings. Result of this stage indicates the building performance of base case. Second: Architectural Modification Stage (envelope layers modifications with economic aspect), then the comparative evaluation stage of envelope layers modifications. Results of this stage indicate the architectural modifications matching CODE rates. Third: improving the efficiency of the external envelope.

Phase I: current Case study analysis stage:

Program Inputs of the sample in the current situation: input the site weather file, drawing the building in the program (zone\s), and Input the Building Envelope materials, to calculate the (R-value, U-value, and SHGC) as shown in [Table 4]. Buildings specs are: without air conditioning - color of the facades is light yellow- % openings in all façades (10-20%).

Table (4) Phase I: Current Case study analysis stage

Phase I: current Case study analysis stage			
Building Envelope	External Walls	Roof	Openings
Material Layers	2cm Cement Plaster 12cmRed Brick – 2cm Cement Plaster	2cm cement plaster-15cm R.C. - 2 cm bitumen insulating two layers- 5cm Plain /tendencies Concrete - 5cm sand -2cm cement mortar- 2cm cement tiles	Painted wooden window frame - 6mm Single Clear Glass
R-Value	0.339	0.421	0.175
U-Value	2.944	2.373	5.714
SHGC	-------	------	0.820
Compare results of the building envelope simulation with Code values to evaluate the current design			

Evaluate Building Performance with the CODE's Required Rates by comparing results of the building envelope simulation with Code values to evaluate the current design as shown [Table 5]

Table (5) Compare the Results with the Values of the Egyptian Code and the SHGC

Compare the results with the values of the Egyptian code and the SHGC								
Location 1 R-Value	Model (North/ South)				Model (East / West)			
	Walls		Roof	Openings	Walls		Roof	Openings
Egyptian code	N 0.69	S 0.70	2.80	10 < O < 20%	E 0.90	W 0.90	2.80	10 < O < 20%

Base Case	0.339		0.421	0.820		0.339		0.421	0.820	
SHGC	-----		-------	N Not required	S Not required	------		-------	E 0.7	W 0.7
Compare Values	The values of thermal resistance are lower than the values of the code. SHGC is not required as Code rates					The values of thermal resistance are lower than the values of the code. SHGC is larger than the required values				
Location 2 R-Value	Model(North/East) & Model(North/West)					Model(South/East) & (South/West)				
	Walls		Roof	Openings		Walls		Roof	Openings	
Egyptian code	NE 0.80	NW 0.80	2.80	10 < O < 20%		SE 0.80	SW 0.80	2.80	10 < O < 20%	
Base Case	0.339		0.421	0.820		0.339		0.421	0.820	
SHGC	-----		------	NE Not required	NW Not required	------		-------	SE Not required	SW Not required
Compare Values	The values of thermal resistance are lower than the values of the code. SHGC is not required as Code rates					The values of thermal resistance are lower than the values of the code. SHGC is not required as Code rates				
Analysis: Values of Thermal Resistance & SHGC which the program given are Not **within** CODE rates, that's mean the building envelope layers needed modifications with regard to the economic aspect.										

Analysis of The Simulation Outputs: Outputs of simulation analysis of current cases evaluate temperature and Heat Gain/Loss analysis for each zone inside the building, in order to reach thermal comfort guided through the average value of the Predicted Mean Vote (PMV). This refers as a thermal scale according to ASHRAE specifications. As most residential units are oriented to (North/ South) and Model (East / West), an analysis of these models was carried out.

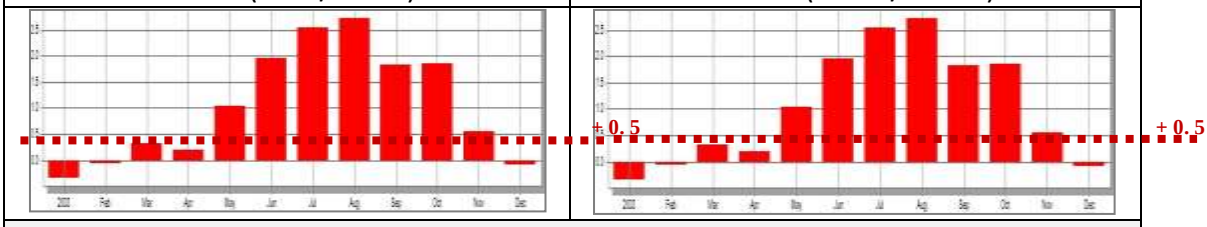
Model (East / West): Through studying the lowest and highest Zone's temperatures in the hottest and coldest days, it was found that, living room at the second floor Western façade reached its highest temperature of 36.5˚C because of the western orientation of the external wall and having openings in the west, while other zones reached temperatures range from 33-34.5˚C ,while the bed rooms at second floor reached its lowest temperature of 8˚C although there are eastern openings because of external wall face more than one orientation (north, east, and south) which had the greatest impact, while other zones reached temperatures range from 12-21˚C. And by comparing these results as recommended with the Egyptian code to achieve thermal comfort in the space, temperature must range between 21.8-30˚C. this confirms that this space is a bit far of thermal comfort and it needs treatments in winter, and the need for some minor changes in summer. While average value of PMV throughout the day reached ranges from 2.25-2.7 at summer, take into consideration living room at the second floor facing higher temperature than other zones(sensation scale very hot), then the bed rooms in the same floor. At winter, it was shown that most of zones located in the comfort zone, the evaluation indicator ranges between 0.7-0.16 (sensation scale Neutral and slightly cool). Bed rooms are considered the coldest zone reached 0.7(sensation scale slightly cool).

Model (North/ South): Through studying the lowest and highest Zone's temperatures in the hottest and coldest days, it was also found that, bed rooms at the second floor reached its highest temperature of 34.5˚C although facing the northern orientation because of the multi orientations of the external wall (north-east and west), then the living room at the same floor for the south orientation

reached 34˚C. while other zones reached temperatures that range from 31-33˚C .Also bed rooms at second floor reached its lowest temperature of 16˚C, while other zones reached temperatures range from 17-21˚C. And by comparing these results as recommended with the Egyptian Energy Code to achieve thermal comfort in the space, temperature should range between 21.8-30˚C. This confirms that this space is a bit far of thermal comfort and it needs treatments in winter and some minor changes in the summer. While average value of PMV throughout the day reached ranges from 2.0-2.75 at summer, take into consideration bed rooms at the second floor facing higher temperature than other zones(sensation scale very hot), then living room in the same floor. At winter, it was shown that most of zones located are in comfort zone the evaluation indicator ranges around 1.0-0.7 (sensation scale slightly cool). Bed rooms are considered the coldest zone that reached 0.8(sensation scale slightly cool).

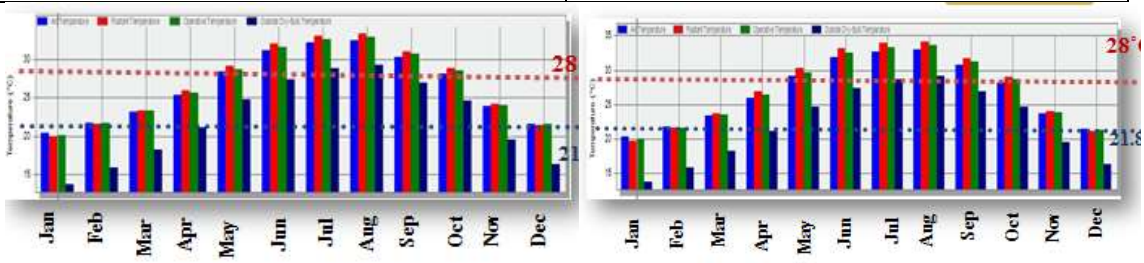
Analysis of PMV for Two Models throughout the Year: Models values of feeling comfortable are not compatible with recommended indicators of PMV, especially from May to October where the highest value in July and August, while throughout the year it is located in comfort zone. Where all zones are located in neutral sensation, Bed rooms are considered the coldest zone reached 0.7(sensation scale slightly cool), as shown in [Table 6].

Table (6) Analysis of PMV for two models throughout the year

Model (East / West)	Model (North/ South)
	
Models values of feeling comfortable are not compatible with recommended indicators of PMV	

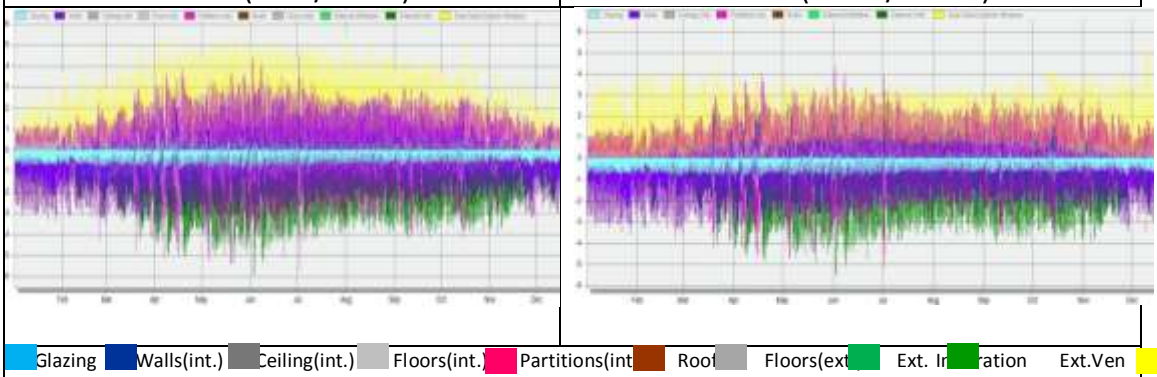
Temperature Analysis throughout the Year: It is worth mentioning that the maximum temperature values have exceeded thermal comfort standards from May to reach the highest temperature values in July and August and then gradually decreasing on October throughout the year for the two models, as shown in [Table 7]

Table (7) Temperature Analysis throughout the Year

Model (East / West)	Model (North/ South)
	
Air Temperature Radiant Temperature Operative Temperature Outdoor Dry Bulb Temperature	
Maximum temperature values have exceeded thermal comfort standards from May to reach the highest temperature values in July and August and then gradually decrease on October throughout the year	

Heat Loss and Gain Analysis: Regards to [Table 8], Heat Gains (above zero level) its highest cause is Direct Solar (Yellow color) with percentage of 62.3% due to facing east and west orientation, Followed by 27% from Internal Heat Transfer (Blue color) this is due to thermal infiltration of the increased openings proportion, and 7% of air movement (Sol Air) (Dark Green color), this is due to the building's longest side orientation to the east-west axis. And for Hourly Heat Losses (under zero level) its highest cause is due to building envelope Conduction (Red color) equals 61%, and Inter-Zonal (Light Blue color) causes 32% this is due to the pressure difference on the façade.

Table (8) Heat Loss and Gain Analysis

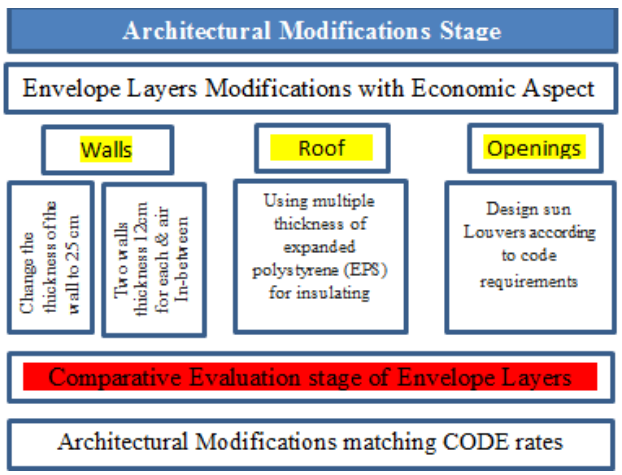
Model (East / West)	Model (North/ South)
	
Glazing Walls(int.) Ceiling(int.) Floors(int.) Partitions(int Roof Floors(ext Ext. Ir ration Ext.Ven Solar Gain	
Direct Solar is one of the most important elements of thermal gain, followed by Roof and then Walls	
There is a large similarity between the factors affecting on heat loss and gain , while its effect on the first model more than the other due to different orientation	

Adaptive comfort standard in order to evaluate the measurement data with comfort temperature. Also, ASHRAE standards to understand the maximum and acceptable humidity values in an indoor environment. The northern direction has the lowest values for indoor temperatures in summer, while for winter; the southern direction indicates the highest temperature values. It was found that the southern orientation recorded the highest thermal comfort because of the high temperature in winter and lowest in summer.

Phase И: Architectural Modifications Stage:

In this stage architects can make architectural modifications in their design in a Current Building case. These modifications can be followed by the same steps of the analytical work stage (based on building envelope layers modifications with regards to the economical aspect). Then a comparative evaluation stage can be done at the end to compare the results obtained to evaluate the degree of the success, and define if

Figure (8) Architectural Modifications Stage



it still needs some more modifications for matching the Energy Code rates. As shown with [Figure 8], there are many building envelop treatments selected based on surfaces most exposed to the sun's radiations which are inferred from the analysis of the solar Radiation on the surfaces. Such as: changing the thickness of the wall to 25 cm, two wall skins of thickness 12cm for each & an air gab in-between, and using multiple thickness of expanded polystyrene (EPS) for the roof insulating. The U-values which the program calculated for the current case are all out of the codes rates in the total building envelope elements (walls, roof and windows), that requires a change in the building envelope layers to achieve the values stated in the CODE.

Architectural Modifications of Walls: By comparing the R-values of the building envelope with the Energy CODE rates, the exterior wall sections must be from a material that losses heat slowly in order to treat the rates of thermal conductivity to the outside at night. And the building external walls will be modified as follows:

Table (9) Architectural Modifications Stage

Architectural Modifications Stage				
Architecture Modifications of **Walls**	Wall thickness 25 cm	Wall thickness 12 cm.+ 5 cm air + Wall thickness 12 cm	2 cm extruded polystyrene (density 10 kg / m^3) Wall thickness 12 cm	Wall thickness 12 cm. + 2 cm Expanded polystyrene (density 10 kg / m^3) + Wall thickness 12 cm.
R-value	0.633	0.738	0.82	0.987
For the northern walls, the second modification t is considered the most appropriate while **R- value = 0.738. The value required in the code R- value = 0.69**				
For the eastern and western walls the fourth modification is the most suitable for cost and Code requirements where **R-value = 0.987 and the value required in the code R- value = 0.90**				
For the southern walls the second modification is the appropriate where **R-value = 0.738 and the value required in the code R- value = 0.70**				
For Northeast & Northwest walls and Southeast & Southwest walls, the third modification is considered the most appropriate while **R- value = 0.82 and the value required in the code R- value = 0.90**				

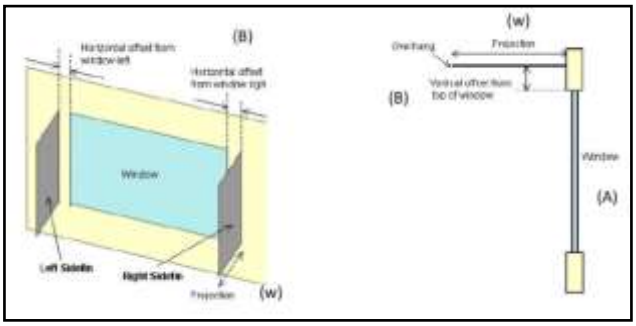
Architectural Modifications of Roof: In terms of modifications with economical aspects and the Egyptian Energy code requirements for the roof, many trials have been tested in according to the thickness of the insulating layer of the roof by increasing the thickness gradually from 2cm. to 20 cm. And, it is worth mentioning that when increasing the thickness up to be 8cm. The R-value = 2.675 m^2 ^oC / W (Shown in the shaded part of table10), the increasing of thickness from 12cm. to 20cm. The increase in resistance (R-value) has become slight and unnoticeable. So, it is recommended that the insulation layer to be ten centimeter polystyrene (density 15 kg / m^3), Where R-value = 3.24 m^2 ^oC / W and the value required in the code R-value = 2.80 m^2 ^oC / W for the two models.

Table (10) Architectural Modifications Stage of Roof

Thickness of the insulating material	R-value (m^2.°C/W)	Thermal loads (KWH)	Energy required for cooling (KWH)	Energy reduction (%)	Conclusion
Without Insulating	0.321	1701	2069	non	The increasing of thickness from 12cm. to 20cm. has become slight & unnoticeable on the R-values
2 cm Expanded polystyrene	0.829	937	1286	35	
4 cm Expanded polystyrene	1.53	666	1040	52	
6 cm Expanded polystyrene	2.13	521	914	55	
8 cm Expanded polystyrene	2.70	424	846	58	
10 cm Expanded polystyrene	3.35	362	791	62	
12 cm Expanded polystyrene	3.94	309	775	64	
14 cm Expanded polystyrene	4.20	280	738	65	
16 cm Expanded polystyrene	5.12	258	730	65	
18 cm Expanded polystyrene	5.66	232	721	66	
10 cm Expanded polystyrene	6.25	215	700	67	

Architectural Modifications of Openings: design of the openings depends on direction, proportion, ratio, material, and glazing. However, it is necessary to take into account the need for economy at the total cost, because the study is specific to the low-income sector. Therefore, the study is limited to openings design and solar Louvers for Minimizing solar radiation penetration by using architectural treatments fitted to the different building's facades and identify the required shading devices. A change in the type of glass and materials will not be addressed for cost savings- Hence; the openings were tested according to the code requirements. And it is worth mentioning the proportion of openings in the walls (WWR %) of the sample study did not exceed 10%. Simulation was carried out to increase the openings ratio to 30% (WWR %), to illustrate the effect of the openings and their modifications on the thermal loads and the required energy for cooling, so as to be in parallel with the Egyptian Energy Code for residential buildings recommendations, which is provided for not to design openings ratio more than 30% for eastern, southern and western façades. By achieving a minimum shading ratio of 90%. Shading can reduce solar gains on the building facade, so effective shading strategies should aim at virtually preventing any direct solar radiation from entering the building, especially during the summer months. Shading reduces the effective solar heat gain coefficient (SHGC) of the glazing. This means that a cheaper glass with high SHGC can be used instead of high cost and lower SHGC of glass; as well shading also helps in reducing glare through the windows. Users tend to pull down interior shade if there is direct solar radiation on the glass; this negates all the benefits of day lighting, so Shading helps to ensure glare-free day lighting in the buildings. Note that the opening in the northern direction is the least influential; on the contrary opening in the western direction is most influential. Therefore, it is recommended to direct residential building spaces as living, reception and bed rooms to the northern direction, and service elements in south or west. Results of base case simulations indicate solar radiation on openings is the most important reason behind thermal gain, which requires design solar louvers according to the Code rates, based on the determination of PF = W/ (A+B) values [Figure 9].

Figure (9) How to Design Solar Louvers



Architectural modifications of openings including openings ratio and shading devices of all kinds (horizontal, vertical, combination of both, and architectural blinds/shish), taking into account the characteristics of openings orientation, as following [Table 11].

Table (11) Architectural Modifications Stage of Openings

Opening In The Eastern Facade					
Openings Ratio (10%)	**Without**	**Horizontal Louvers**	**Vertical Louvers**	**Combination of Both**	**Architectural Blinds (Shish)**
Thermal Loads	445	328	412	279	118
Energy of Cooling	1262	1218	1229	1148	1074
Energy required for cooling decreases with using architectural treatments, but rates are not high because the proportion of the openings is10 %. The Code provides design openings ratio not more than 30% in eastern façades except by achieving a minimum shading ratio of 90%.					
Openings Ratio (30%)	**Without**	**Horizontal Louvers**	**Vertical Louvers**	**Combination of Both**	**Architectural Blinds (Shish)**
Thermal Loads	1089	828	910	592	257
Energy of Cooling	1710	1490	1558	1420	1125
Based on the solar thermal gain coefficient calculated by the program and according to code requirements. **Vertical Devices (50cm depth)**: Primarily useful for east exposures to improve glass insulation value in winter by acting as a windbreak.					
Opening In The Southern Facade					
Openings Ratio (10%)	**Without**	**Horizontal Louvers**	**Vertical Louvers**	**Combination of Both**	**Architectural Blinds (Shish)**
Thermal Loads	766	732	669	512	175
Energy of Cooling	1491	1450	1412	1323	1110
Energy required for cooling decreases with using architectural treatments, but rates are not high because the proportion of the openings is 10 %. The Code provides design openings ratio not more than 30% in southern façades except by achieving a minimum shading ratio of 90%.					
Openings Ratio (30%)	**Without**	**Horizontal Louvers**	**Vertical Louvers**	**Combination of Both**	**Architectural Blinds (Shish)**
Thermal Loads	1889	1459	1450	1315	1106
Energy of Cooling	2283	1929	510	505	164
Based on the solar thermal gain coefficient calculated by the program and according to code requirements. **Horizontal Devices (35 cm depth)** to shade a window during summer, and allow sunlight to shine through a window in winter to help warm the inside of a building.					
Opening In The Western Facade					
Openings Ratio (10%)	**Without**	**Horizontal Louvers**	**Vertical Louvers**	**Combination of Both**	**Architectural Blinds (Shish)**
Thermal Loads	999	834	917	1265	289
Energy of Cooling	1804	1638	1721	1536	1298
Energy required for cooling decreases with using architectural treatments, but rates are not high because the proportion of the openings 10 %. The Code provides design openings ratio not more than 30% in western façades except by achieving a minimum shading ratio of 90%.					
Openings Ratio (30%)	**Without**	**Horizontal Louvers**	**Vertical Louvers**	**Combination of Both**	**Architectural Blinds (Shish)**
Thermal Loads	2280	1852	1394	1068	398
Energy of Cooling	2881	2476	2408	1820	1377
Based on the solar thermal gain coefficient calculated by the program and according to code requirements. **Vertical Devices (83 cm depth)**: Primarily useful for east exposures to improve glass insulation value in winter by acting as a windbreak.					
Architectural Modifications Stage of Openings Results					
Vertical shading devices Protect from sun at the sides of the elevation for the east and western facades .Horizontal shading protects from sun at high vertical angles and directly opposite to the wall to be shaded such as north and south sides. Combination of horizontal & vertical devices protect from sun in all orientations.					
A combination of vertical and horizontal shading elements commonly used in hot climate regions because of their high shading efficiencies and because horizontal elements control ground glare from reflected solar rays.					
While the best shading type for optimum cooling energy savings is Shish, egg-crate, then vertical & horizontal shading. For NE and NW are need adjustable shading, but for SE and SW, planting is the best solution.					
Architectural Blinds (Shish) is considered to be one of the best treatments for window openings for the western, eastern and southern facades, because it has a significant impact to reduce thermal loads resulting from solar radiation on the openings.					
Code Specifications for louvers design is not enough to achieve the requirements of shading and reduce thermal loads, which requires design using sun geometry method (HSA and VSA)					

Analysis of the Simulation Outputs: Outputs of simulation analysis of the architectural modifications stage evaluate temperature and Heat Gain/Loss analysis for each zone inside the building, and in order to reach thermal comfort guided through the average value of the Predicted mean vote (PMV). Architectural modification stages including double skin wall thickness 12 cm for each, and 5 cm air cavity in between, using 8 cm expanded polystyrene for roof insulating, and design shading devices as the Energy Code requirements.

Model (East / West): Through study the lowest and highest Zone's temperatures in the hottest and coldest days, it was found that, the living room at the second floor reached its highest temperature of 31.5°C because of its western orientation of the external wall having window openings in west, while other zones temperatures ranged from 28-31.5°C. Bed rooms at second floor reached its lowest temperature of 12°C although there are eastern openings, while other zones reached temperatures that range from 12-23°C. And by comparing these results as recommended by the Egyptian Energy Code to achieve thermal comfort in the space, temperature must ranges between 21.8-30°C. this confirms that this space is a bit far of thermal comfort at summer. While average value of PMV throughout the day ranges from 1.85-2.1 at summer, take into consideration living room at the second floor still facing higher temperature than other zones(sensation scale very hot), then bed rooms in the same floor. At winter, it was shown that most of zones located in comfort zone (sensation scale Neutral).

Model (North/ South): Through studying the lowest and highest Zone's temperatures in the hottest and coldest days, it was found that, bed rooms at the second floor reached its highest temperature of 31°C although it has northern orientation. This is because of the multi orientations of the external wall (north-east and west), then living room at the same floor for the south orientation reached 31.5 C. while other zones reached temperatures from 26-30°C .Also bed rooms at second floor reached its lowest temperature of 18°C, while other zones reached temperatures range 18-23°C. And by comparing these results as recommended by the Egyptian code to achieve thermal comfort in the space, temperature must ranges between 21.8-30°C. this confirms that this space is a bit far of the thermal comfort at summer. While average value of PMV throughout the day reached ranges from 1.9-2.0 at summer, take into consideration bed rooms at the second floor facing higher temperature than other zones (sensation scale very hot), then living room in the same floor. At winter, it was shown that most of zones are located in comfort zone (sensation scale Neutral).

Analysis of PMV for Two Models throughout the Year: Models values of feeling comfortable are not compatible with recommended indicators of PMV, temperature of the spaces compared with base case decreases after adding the modifications. However, the buildings is still far from the recommended temperature values, some spaces within two models are still far from thermal comfort ranges (sensation scale hot & very hot); therefore PMV must be improved with next stage.

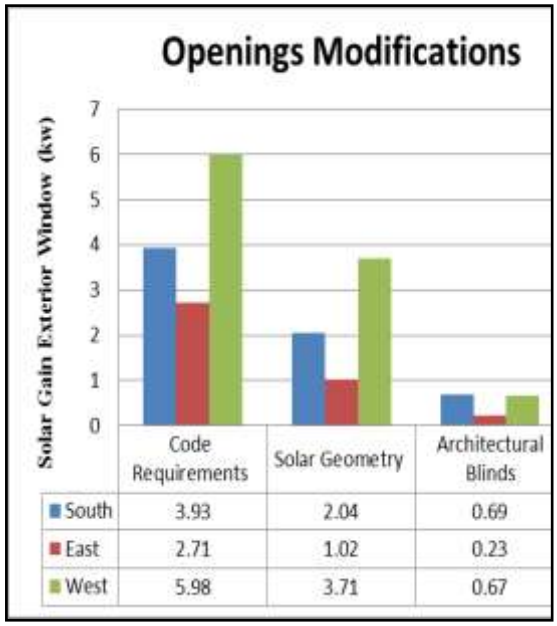
Phase Ш: Improving the Efficiency of the External Envelope:

In terms of modifications with economical aspect and Egyptian Energy Code requirements to reach thermal comfort values, it can be seen from the previous stage as an example, expanded polystyrene (EPS) for roof insulating is a difficult choice for thickness of insulating material and the lack of cost-saving. This requires alternative solutions for improving the efficiency of architectural energy saving as following architecture modification to walls, openings, and roof.

➢ **Architectural Modifications for improving the efficiency of walls:** double skin wall thickness 12cm each & 5cm air cavity in between for the northern façade, double skin wall thickness 12cm and 2cm expanded polystyrene (density10 kg/ m^3) for the eastern & western facades, shown in [Table 9].

➢ **Architectural Modifications for improving the efficiency of openings:** [Table11] indicates that Code Specifications for louvers design not enough to achieve the requirements of shading and reduce thermal loads, which requires design using sun geometry method (HSA & VSA).

Figure (10) Comparative Study of Openings Modifications

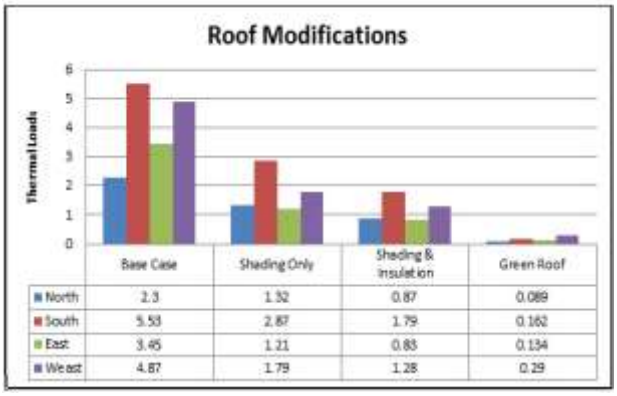


Analysis of the comparative study of louvers design modifications: Architectural Blinds (Shish) is the best treatment for openings at western, eastern and southern facades, because of its significant effect on reducing the thermal loads resulting from the solar radiation on the openings, then designing louvers using solar geometry and then applying the Energy Code requirements [Figure 10]. The research recommends making adjustments on Code, where solar gain values are significantly reduced after design louvers using solar geometry (the vertical and horizontal shadow angles), where the percentage decline to half compared with Code rates. A combination of vertical and horizontal shading elements commonly used in hot climate regions because of their high shading efficiencies and because horizontal elements control ground glare from reflected solar rays.

➢ **Architectural Modifications for improving the efficiency of roof:** There are many ways of roof treating with economical aspect in perspective including (Design wooden roofing shade as a Pergola supported by columns with attached structure for providing shade at 3m. height for reducing thermal loads and using the surface as a patio cover, design a shading system and 4 cm. polystyrene (density 15kg /m^3) for roof insulating, or designing rooftop farming with economical aspect, It should be noted that rooftop farming has an impact on increasing the economic return on the owner income. There are many systems that can be used to raise the roofs of houses, Soilless farming provide the best opportunity providing ideal conditions for low-income sectors. This requires a comparative study to choose the best alternative modification.

Analysis of the comparative study of roof modification: Thermal loads on the roof are clearly reduced; rooftop farming is the best modification for roof modifications

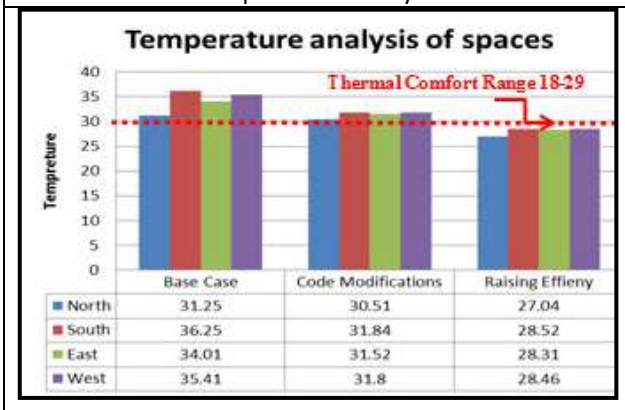
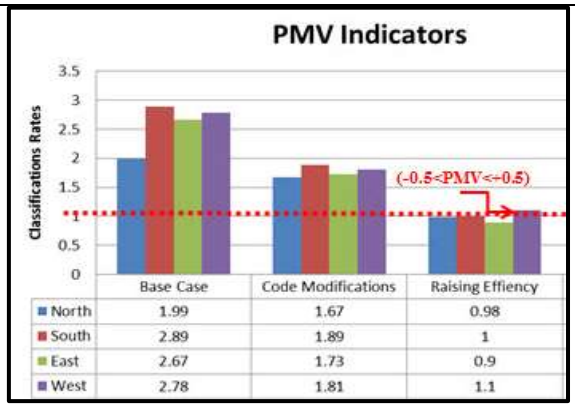
Figure (11) Comparative Study Roof Modifications for Case Studies



Compared with the code requirements, adding 8 cm polystyrene (15 kg / m3) as shown in [Figure 11]. There are many benefits of green roofs including: architecture benefits (urban agriculture, improve public relations; transform dead space into garden space, expand roof life 2x3 times (up to 60 years); improve aesthetics), environmental benefits (provide green space, decree thermal loads; storm water management tool, energy savings; decreased waste; improved air quality, reduce air-conditioning costs). It is worth mentioning; with rooftop gardens comes another environmentally friendly and booming initiative – urban agriculture. This involves using green roofs as miniature farms that actually produce a higher quality of food and lower grocery expenses.

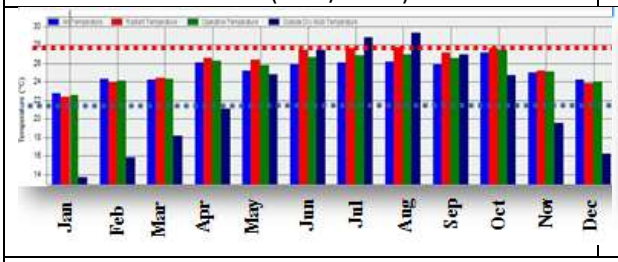
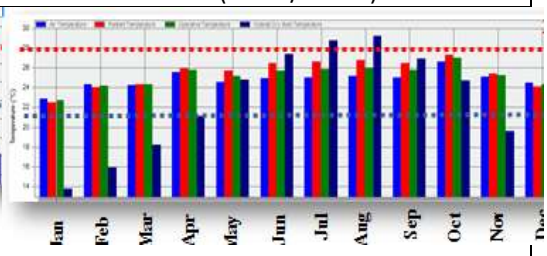
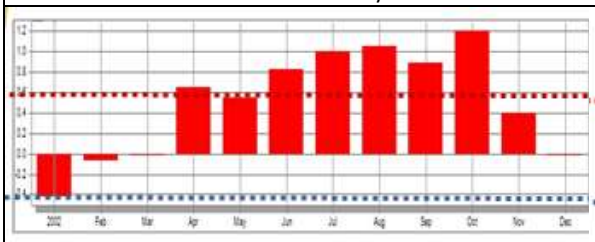
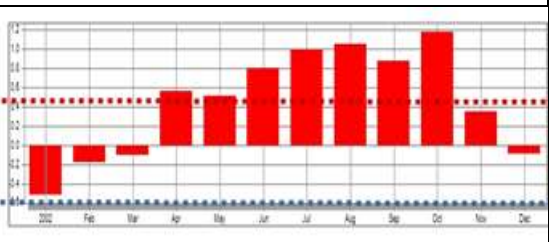
Analysis of the Temperature of the Spaces According to Improving the Efficiency of the External Envelope: architectural modifications for improving the efficiency including: walls (double skin wall thickness 12 cm each &5 cm air cavity in between for northern façade, double skin wall thickness 12cm and 2cm expanded polystyrene (density 10 kg / m 3) in-between for eastern & western facades). For openings (design using sun geometry method (HSA & VSA), and for roof (rooftop farming with economic aspect).Based on Stages of increasing architectural design & energy efficiency through walls, roof, and opening modifications, and the differentiation between the best treatments to reduce thermal loads on different elements. In an attempt to reach the goal of reducing the temperature within spaces according to the lowest cost [Table 12, 13].

Table (12) Analysis of Temperature & PMV According to Improving the Efficiency of the External Envelope

Temperatures Analysis	PMV Indicators
	

The temperature differed clearly in the three stages; The spaces are closer to the values of thermal comfort. ASHRAE 55 recommends that temperatures in range of 19–29 °C (66–84 °F). While the recommended acceptable PMV range for thermal comfort from ASHRAE 55 is between -0.5 and +0.5 for an interior space. Where Predicted Mean Vote sensation scale, value -3 (cold sensation)/ -2(cool)/-1(Slightly cool)/ 0 (Neutral) / 1 (Slightly warm)/ 2(Warm)/3(Hot).

Table (13) Temperature analysis for the two models throughout the year

Temperature Analysis for the Two Models Throughout the Year:	
Model (East / West)	Model (North/ South)
	
the average internal temperature of spaces are located in the comfort zone in all months of the year between 21.8 and 28 degrees, and there is a clear difference between internal and external temperatures, both in the most hot and coldest months of the year	
	
The values of PMV allthrough the year in the two models are matching PMV recommended rates, temperature-Neutral sensation from June to October, all of which are between (0.5-1) and 1, while the rest of the year between (0.5<PMV<-0.5	

8. RESULTS AND RECOMMENDATIONS

- Transforming Housing is about advocating for and supporting the development of solutions to solve this issue by: policy reform, development and advocacy, innovative project development, delivery support and evaluation, and research capacity building, embedded action research, research dissemination and influence.

- Transforming low-income housing for improving the efficiency of architectural energy saving design via improving the efficiency of the external envelope with economical aspect - for achieving a good environment respecting the social and cultural characteristics of the community- Towards advocate for housing that is affordable, well-located, diverse and well-designed.

- Accessible and affordable energy efficiency would be transformative for low-income families who too often must choose between paying this month's energy bill or paying for food or medicine. More energy-efficient housing would translate into real savings for families and would result in healthier, more decent places to live.

- The planning process and the architectural procedures are both based on the socio-economic aspects involving community participation; this means that community participation is an important part in both the planning and architectural process.

- The current state of high temperatures for indoor environments in building your home project in New Beni-Suef City indicated that serious problems of discomfort generally exist in new housing projects in Egypt. The project acknowledges the severe shortage of affordable and appropriate housing options available to households on very low to moderate incomes.

- Results associated stages of increasing architectural design to provide energy efficiency as a tool for design, analysis and evaluate energy consumption of low-income housing via three stages: evaluate affordable housing projects, architectural modification stage, and improving the efficiency of the external envelope.

- In terms of modifications with economical aspect and Egyptian Energy Code requirements reaching thermal comfort values, architectural modifications for improving the efficiency of the external envelope with economical aspect. Wall modifications: double skin wall thickness 12 cm each & 5cm air cavity in between for the northern façade, double skin wall thickness 12cm each and 2cm expanded polystyrene (density 10 kg / m 3) in-between for the eastern & western façades, openings modifications: Code Specifications for louvers design was not enough to achieve the requirements of shading and reduce thermal loads, which requires design using sun geometry method (HSA and VSA), roof modifications: rooftop farming with economic aspect. Architectural Blinds (Shish) is the best treatment for openings at the western, eastern and southern facades, because of its significant effect on reducing thermal loads resulting from the solar radiation on the openings to be followed by the design of louvers using solar geometry in accordance with the Energy Code requirements.

- It is recommended using fans to move air and reduce thermal comfort rates, when temperature is higher than 28 degrees to reach the required level of comfort and increase energy efficiency.

- Activation energy Code implementation in the field of construction, as well as restructure the code according to the latest energy efficiency criteria; update the code with materials, reformulate equations for calculating sun shading devices, and lovers design specifications. Study recommends reviewing Code specifications, for example: solar gain values are significantly reduced after design louvers using solar geometry (the vertical and horizontal shadow angles), where the percentage decline to half compare with Code rates.

- Housing is NOT just a programmatic goal to be attained in a certain time plan, where adequate housing must provide more than four walls and a roof; but adequate housing as a component of the right to an adequate standard of living. On the contrary, Architectural design for low-income housing is not energy efficient although social housing is one of the more housing sectors that need to raise energy efficiency, reach thermal comfort and reduce costs. Not just a dwelling is a message that low-income project citizen are always in need to improve quality and quantity of comfort levels. Accordingly, construction laws must be reviewed with taking into consideration the climatic aspects of each site to develop appropriate treatments for increasing the efficiency of architectural energy saving design.

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