

Paper No.

Is a Sustainable Urbanism Possible In 21 Century Egypt?

A Future Direction for Walkable Settlements

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ABSTRACT

Looking for the typical Egyptian urban form reveals that the compaction pattern with high density, high diversity of activities and mixed uses is the common form for the majority of Egyptian cities. (Acioly, 2000; Ibrahim, 2008). In contrast, new cities have not only been built on a different pattern but also this pattern has no design references to the Egyptian context (Shalaby, 2003). This paper, therefore, questions whether the new strange pattern is more sustainable than the existing one which suffers from deferent problems. The layout of these settlements ignores the traditional planning principles for the desert environment. That is why it is widely agreed that the spatial strategies adopted by the Egyptian government for the settlements are not socially or economically sustainable (Gabr,1990; Ibrahim,2008) and will not be sustainable in the future (El-Zamly,1994).

There is widespread faith in the compact city model's ability to promote urban sustainability (Burton, 2000; M.Jank, &Williams, 1996), high densities and mixed uses are the two key concepts formulating the overall sustainable patterns of cities and creating sustainable urban form. .

Methodology

As a consequence, in order to answer the main question of this paper, the study will needs to identify the sustainability of the current or future urban form in the new Egyptian cities and indicate the role of compaction on their sustainability are not covered in academia. Hence, a focus group was conducted, as a semi- structured discussion by a small group of knowledgeable academic professionals and experts to answer these misunderstanding issues. A poll survey was done with the aim of testing the questions and their logical flow and obtains some preliminary outcomes.

Conference Topic: New Approaches in Urbanization.

Keywords: compaction, density, Egyptian cities, walking/cycling, connectivity.

1. INTRODUCTION

The current settlement strategy in Egypt is relatively new and seemingly borrowed from the West, consulting offices from Western countries, were invited through the NUCA (New Urban Communities Authority) to plan and develop the first generation of new cities in accordance with governmental regulations (Salem, 2007; Shalaby, 2003) and therefore would most likely have negative impacts on developing these cities (Hegab, 1985). Therefore, critics questioned whether criteria and standards had been established for the creation of these cities. Indeed, development criteria and standards had been established that emerged from Law 49 (1979) but there is no indication of the efficiency of these criteria (Hegab, 1985). The law is "blind" in not determining the principles of the low and medium-income neighborhood of the high-income (Focus Group, 2009).

In view of the scale of prospective development, it is vital that we mobilize the knowledge which now exists to build communities in which people can lead happy, successful and sustainable lives, and which add to rather than detract from our civic and cultural heritage. Many of the development models used in the second half of the twentieth century failed to achieve these outcomes, and the theme of this paper is that the principles of sustainable development must be observed in future if similar urban disasters are to be avoided in the coming decades. With the aim of testing the questions of this paper, and obtains some preliminary outcomes, this was achieved through sending an invitation emails to 40 members who were selected as experts in research and practice field. The email had a one-page survey questionnaires as an attachment that generally measured their thoughts about the factors affecting the formulation of new settlements and cities in Grater Cairo Region, as well as their rational opinions towards intensifying these cities. A pilot test was designed to assist the researcher to examine the forming of the groups, and help in moderating the session which held at the Society of Egyptian Architects on November 2009.

2. URBAN FORM

A number of elements conspire to produce this outcome. One is a view on the part of some developers that sustainable developments are more complex and are therefore likely to be less commercially attractive than simply rolling out conventional layouts. Another is that maximizing the value which sustainable developments are capable of creating may require a longer-term commitment on the part of landowners, investors and developers than many are comfortable about making, subject to current business conventions and practices. Indeed, the very limited involvement of the investment sector within this area of the market is perhaps a symptom of the problem.

If there is a good commercial case for sustainable urbanism, of which landowners and developers need to be aware, it is equally true that many social benefits are associated with good urban design (Prince's Foundation, 2007) which governments and planning authorities need to take note of when issuing guidelines for urban developments in the coming years.

2.1 Changing Planning process

Thus, development of the new cities in Egypt was determined as a result of political decisions rather than "rigorous planning" (Remali, 1985). Elsadik (1992) argues that reading about the factor affecting existing urban communities was the guide for the

spatial segregation between uses in the new cities. The new- cities policy was, therefore, initially based on the separation the uses and principally the segregation between residential uses and administrative or sometimes, commercial uses (Barada, 1992), and this led to a greater insight how planning process affects the formulation of urban form. As a result, many argue that this new products is not compatible with local citizen needs or environmental challenges, and therefore fundamental changes have recently taken place for the new Egyptian cities, particularly those whining the greater Cairo region (GCR).

2.2 Changing of the role of the developer

The urban form is affected not only by non- appropriate planning standards, but also by the transformation of planning process and the role of developer. The new town programme was originally designated to be carried out and financed by public governmental funds and this led to some ramifications of planning process. Recently, in the late nineteen hundreds, the planning process witnessed considerable changes in their framework (Salem, 2007). Egypt has been pushed into transforming its economy to a free market economy because of huge pressure from outside forces (Bayomi, 2009; Stewart, 1999). The government sold large portions of un-reclaimed public desert land to real estate developers to finance housing development with the support of major public and banks (Fahmi & Sutton, 2008). Most GCR new towns assets are sold to the private sector, leaving the arena of developing these towns in the hands of private developers, the new satellite cities around Greater Cairo, are now home to a growing number of resorts ,golf courses, theme pars and amusement parks that offer tremendous entertainment facilities (Saoud,2002)

2.3 Changing the urban form

As discussed above, the urban form of the new Egyptian cities has been influenced by various dimensions that ultimately produce a very low density pattern. None of these dimensions are aimed to producing a future sustainable community, but rather a modern (Focus Group, 2009), and profitable community (Bayoumi, 2009). Consequently, it is remarkable that most of these dimensions affecting the urban form led to a very low density and a non- mixed-use pattern, in strong contrast with the concept of Egyptian traditional cities or the requirements of the desert communities. Due to the shortage of recent data, the study depends on measuring gross, urban and residential densities to describe what the current urban form of these new cities looks like. Yet, residential density is the best indicator describing the urban form because the other two are affected by factors such as the city role or function. As seen in figure (1), 10th of Ramadan, for example, is a very low – density city in terms of gross density (3P/F); however New-Cairo city is a very relatively high- density city (NUCA,2008). This is because 10th of Ramadan city is designed as an industry centre and hence large areas are dedicated to non- residential uses, in contrast with the residential New- Cairo city (NUCA, 1989). Moreover, regarding the up- to-date states, 15th of May has the highest current urban density (52P/F) but this density does not reflect the real urban form of other cities because they include large areas for non- residential uses. Considering the residential density of Cairo districts that are similar the new cities, their density varies between 250 and 350 person per fedan (Nippon Koei Co& International, 2006), and this is far from the target density of most of the

new cities. Therefore, these facts point out how differently the new cities have been developed – it means, low density is a general feature of these cities.

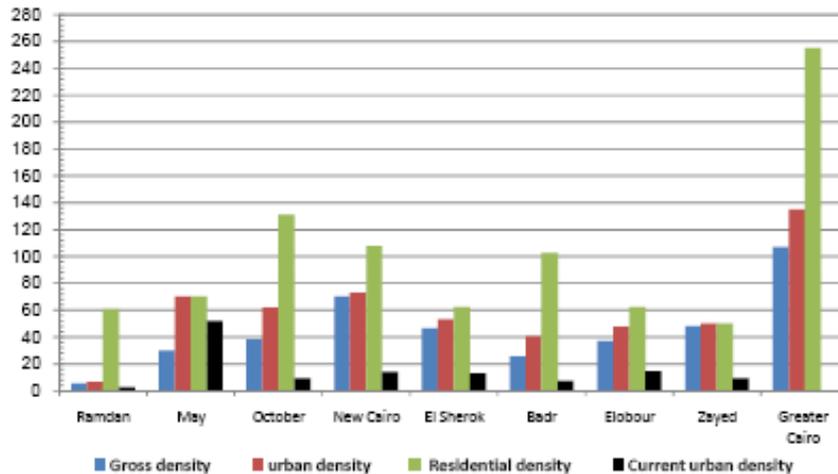


Figure .1Gross, urban and residential densities for the GCR, s new cities

Source; Based on (Nippon Koei Co& International, 2006; NUCA 1989, 2008)

There is no correlation between street pattern type and residential density although density has a strong impact on land usage, and is also related to the presence of amenities within a district. The strongest predictor of residential density is land price, with higher densities occurring where land prices are high. Household affluence is the primary indicator of land consumption, followed by a household's stage in the life cycle. The higher the income of a household, the higher the likelihood that it occupies a single-family detached house. Similarly, the presence of children is closely linked with the consumption of a detached house. Street patterns have never been associated with a specific residential density

3. SUSTAINABLE COMMUNITIES

A general assessment of the new Egyptian cities are seen as environmentally or socially sustainable, notably the new gated communities offer similar promises such as "healthy environment, comfort, convenience, various community services, peace and quiet" (Kuppinger & Collage, 2004) and a "prestigious suburban lifestyle attained by common features such as a lush manicured, architecture character, security, and distinctive amenities, and service facilities (Yousry ,2009). The pace of upsurge of these luxury gated communities produces other new pattern that are not likely to be found in the rest of the Egyptian cities, therefore, the new communities around Greater Cairo that have witnessed "an unprecedented boom in new desert development schemes of gated luxury communities"(Beards ,1995) are evidently not the traditional model, and perhaps not sustainable.

Of course, some of these communities may succeed in attracting residents but they are still "a city within a city"(Yousry, 2009) which definitely creates shorter commuting on local scale but also leads to "Longer commuter journeys and congestion"(Landman, 2000) on the city scale. Thus huge daily and weekly trips are generated between these communities and GC, and also whining the new city itself.

For example, in 6th October city, which includes a high number of gated communities, car ownership is relatively high(about 130 per 1000 capita) , while in other cities such as 15th May it does not exceed 42 per 1000 capita (Shourbagy2009). The problem has become more complicated since it is coupled with the high rate of car ownership.

The poor level of purchasing for certain types of shops and commodities, the long distances between housing and services in the light of non- compactable public transportation system are reasons for creating new unplanned patterns of mixed use (Focus Group, 2009) .The new pattern is achieved by the distribution of commercial uses on scattered sites whining the neighborhood , and it usually conforms to the vertical mixed-use prototype "living above shops", furthermore, a walkable mixed-use area or street is another pattern that is recently found in the new-city centre and some gated communities in the south-east of October city (NUCA, 2008). In practice, gated compound projects all have the creation of community through architecture and design as one of their lead themes in advertising and promotion.

Factors that influence the choice to use motorized or non motorized transport are based primarily on two fundamental aspects of the way land is used: (a) proximity distance and (b) connectivity- directness of travel. Other factors, such as travel cost, environmental quality, and aspects of convenience and access are also likely influential. Figure (2) illustrates two distinct community designs. The top portion, above the large street that horizontally bisects the figure, depicts a traditional layout. The community of the top requires one to traverse large distances within the given street network to achieve actually relatively short straight- line distances (low connectivity). In contrast, the community on the bottom provides an interconnected street network and more direct and shorter pathways between where trips would start and end (high connectivity). The top community also possess lower density of land use per unit area and poor land use mix , whereas the bottom community integrates , within small areas, more and different types of land uses.

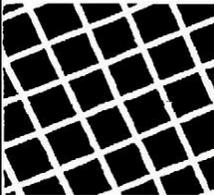
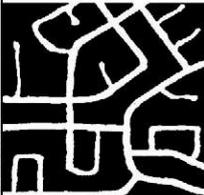
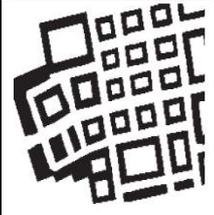


Figure .2 two distinct community designs Spielberg. (1989)

3.1 Street Pattern

Loop and cul-de-sac street patterns have evolved from 1900 to the present (see Table 1). Their geometry is adapted to the automobile excluding traffic at the local street level and permitting good flow at the collector and arterial levels. By contrast, the grid patterns that predate the automobile have required major adaptations such as one-way streets and traffic lights in order to achieve good automobile traffic flow. Contrary to the focuses group, opinion, the curvilinear streets that are typical of conventional suburban subdivisions are not inefficient; they reflect an aesthetic preference and have little impact on land consumption. While irregular lot shapes do not pack efficiently, this is of relatively little consequence at low densities. In fact, for comparable residential densities, loop and cul-de-sac street patterns are more efficient than gridiron geometry pattern (which is why they are preferred by most developers). According to the technical literature on street planning, conventional suburban street layouts consume 16-25 per cent less land than the grids advocated by new urbanism (see table 1.)

Table 1 Comparison of area used for streets, among four typical patterns

| | | | | |
|--------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Street Patterns |  |  |  |  |
| Street patterns | Traditional (before 1900) | Gridiron (c. 1900) | Warped parallel (c. 1970) | Loops and Lollypops (c. 1980) |
| Street formations |  |  |  |  |
| Percentage of buildable area | 65.0% | 68.6% | 72.6% | 76.3% |
| Percentage of area for streets | 36.0% | 35.0% | 27.4% | 23.7% |

On the other hand, when congestion occurs on arterial roads in a loop and cul-de-sac

system, it is generally caused not by the street network but by the segregation and concentration of homogenous land uses such as regional shopping malls or office parks. However, street patterns like the loop and cul-de-sac, which are designed for the automobile, are poorly adapted to pedestrian traffic. Indeed, their discontinuity inhibits pedestrian access to facilities and amenities, while their curvilinear aspects lengthen and confuse walking trips. (CMHC, 2007).

4. SURVAYING ANALYSIS

Accordingly, the focuses group concluded that there are two burning contractions in the context of intensifying the new cities. The majority support intensification in terms of a better social environmental and economic viability but there are a few against this dogma. The poll survey simply asked professionals on their views towards intensifying new cities through three processes: infill development by mixed use, infill development by increasing density and outskirts development on higher density.(see figure 3).

Most of these opinions support intensification by mixed- use development (90% of the total response) and building the new development on a higher density (85% of the total response). A small proportion holds with the third process, identification through increasing the density of the built – area (35%of the total response).

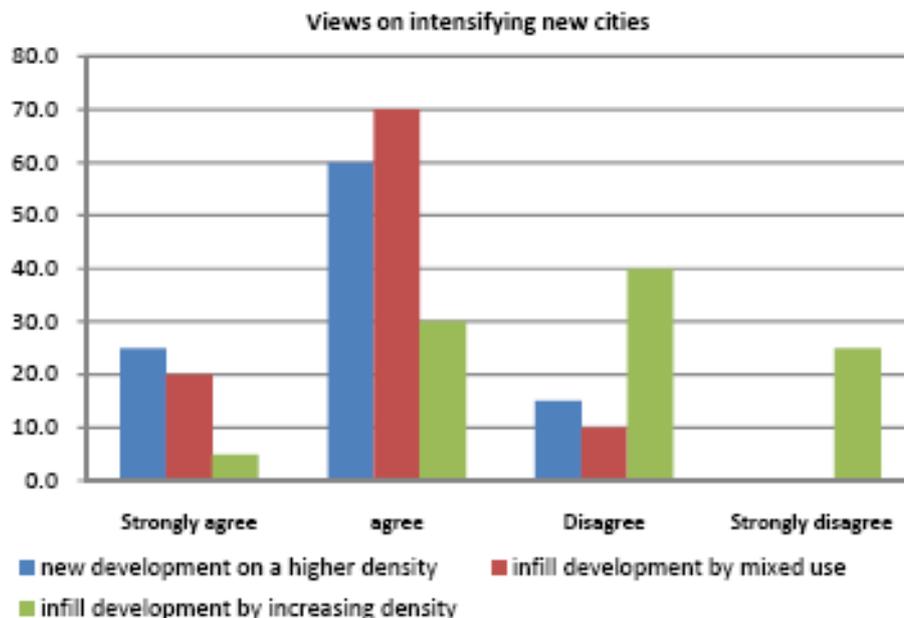


Figure .3 Different views on intensifying new cities

4.1 Future Direction for Walkable Settlements

Settlement environment characteristics were related to walking and cycling for transport is virtually all of the studies reviewed. The strength of the associations varied but was usually substantial. Virtually every study demonstrated associations between environmental variables such as density, connectivity, and land use mix and

walking/ cycling. Residents from communities deemed high walkable according to environmental characteristics had higher rate of walking/ cycling in comparison to residents from low- walkable communities.

Correlation analysis and regression models that provide continuous measures of settlements characteristics can quantify the relation between settlement environment characteristics and nonmotorized transport while controlling for either or both individual and settlement sociodemographic variables (e.g., age, income, car ownership) known to be associated with walking and cycling.

Population density is among the most consistent positive correlates of walking trips, and employment density were independent positive correlates of walking rates for commuting and shopping purposes. An examination of 32 cities around the world revealed a positive association between city population density and the percentage of workers walking or cycling to work (Newman& Kenworthy, 1991)). Land use mix, especially the close proximity of shopping, work, and other nonresidential land use of housing, appears related to greater walking/cycling among residents. In contrast, long trip distances are negatively related to the likelihood of walking/cycling.

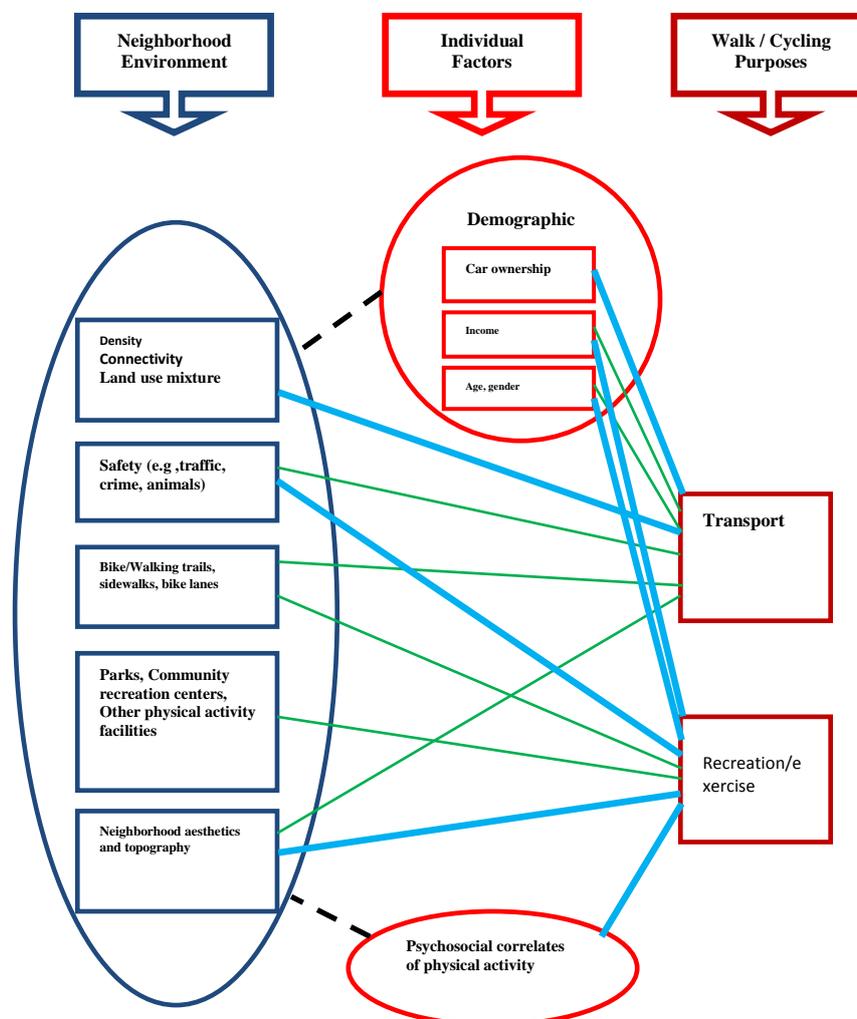


Figure .4 proposed ecological model of new settlement environment influence on walking and cycling

The walking and cycling infrastructure has been evaluated infrequently in relation to transport choice. Some empirical evidence suggests that sidewalks and bicycle paths increase the number of walking/cycling trips (Kitamura& laidet, 1997)) .when sidewalk continuity is used as one of the criteria for determining settlement walkability It may also fruitful to examine interactions of environmental and psychosocial variable as well, in addition to the interaction environmental and sociodemographic variables known to influence physical activity. Figure 4, seen a proposed ecological model of new settlement environment influence on walking and cycling. Double lines denote stronger relations; single lines denote weaker relations; dashed lines denote mediated relations.

4.2 Walkability

Satisfaction surveys of suburban residents often mention walkability; Walkability implies comfortable access to amenities such as schools, recreation areas, retail stores and workplaces. The presence of these, amenities can be affected by a street pattern but clearly no determined by it alone. However, in many conventional suburbs discontinuous, indirect and confusing street patterns of loops and culs-de-sac compromise accessibility. In addition, collector and arterial streets are inhospitable and unsafe because of high traffic volume, thus discouraging pedestrian use. Recent new urbanism-type subdivisions that have adopted the grid pattern create clearer and more direct pedestrian routes. Yet the amenities in these communities are generally beyond the five-minute walking distance desired by today's consumers. Walkability demands both a conducive street pattern and equally important, a proximate arrangement of land uses.



Traditional Site

Cotemporary Site

Figure. 5 comparison between traditional and cotemporary Site Street

4.3 Street quality

The perceived quality of a street depends on both physical and operational attributes, some of which are incidental, while others are designed. Street life, visual complexity, social status and population density are incidental attributes dependent on culture and history. On the other hand, safety, security, comfort, and a sense of enclosure are functions of design. In addition, physical attributes, whether designed or incidental may be reinforced or undermined by operational attributes such as the level of maintenance and cleanliness. (Spielberg, 1989)Taken as a whole, these attributes

produce a memorable image and a pleasurable feeling in the user, expressed as sociability, walkability, and delight to the pedestrian and driving ease and safety to the driver. (See figures 5&6)

Sociability of a street is critical to its quality. Informal contacts that develop into social networks are at the root of feelings of belonging and security, which are prime factors in resident satisfaction. Street activity cannot be designed but it can be encouraged or inhibited by certain street characteristics. The most negative influence on sociability is heavy car traffic, whose negative effect is proportional to its volume. To the extent that a street pattern encourages speed as wide through street it will invite more traffic. To enhance sociability, particularly with regard to children's safety and play, most traffic experts recommend discontinuous street patterns of the kind found in conventional loop and cul-de-sac suburbs. Such street patterns consistently show a lower rate of accidents and a higher level of perceived security. (CMHC, 2007)



Figure .6 proposed sustainable street (CMHC, 2007)

4.4 Residential Street Pattern Design

A recent study by the IBI Group for Canada Mortgage and Housing Corporation (CMHC, 2007).concluded that the top three determinants of the amount of car use in the suburbs are: the number of people per household, the distance from the central business district and, above all, the number of cars per family. Car ownership is related to the number of persons per household, household income, and house size (an indicator of household wealth). Thus, car ownership, family size and household location have a far greater influence on auto travel than the type of street pattern, which ranked ninth in influence. While street patterns, ranked ninth in influence. (CMHC, 2007)

For users, the two predominant suburban street pattern alternatives loop and culs-de-sac, or grid have distinct advantages. Discontinuous streets with loops and culs-de-sac provide safety, sociability and efficiency; continuous grid patterns provide connectivity and easy orientation. To create streets that provide all these attributes requires combining the two patterns. Such a combination would have the following characteristics:

- It would return to orthogonal geometry for clarity of organization and directness of pedestrian access;
- It would provide loops and cul-de-sacs for local streets for It would provide

loops and cul-de-sacs for local streets for.

- It would use open space as a structuring element of the layout for connectivity, relief, comfort, water retention, interaction and delight.
- It would adopt a road hierarchy of local, collector and arterial for distributing and moving car traffic effectively;
- It would transform arterial roads from mere traffic conveyors to activity generators. The aim of this new combined street layout is to prevent non-resident through traffic, to maximize the number of house on culs-de-sac and loops, to situate open space for maximum accessibility and to accommodate a range of housing types.

5. THE SOCIAL CASE OF SUSTAINABLE URBANISM

It is true that many social benefits , especially in the form of reduced carbon emissions; reductions in crime and the fear of crime; improvements in health and well- being; and the reductions in social exclusion and economic benefits associated with important features of sustainable urbanism such as mixed tenure and mixed use. The principles of sustainable urbanism are not yet being widely applied on the ground, the problem of delivery is multifaceted, however we would underline two key aspects: Property investors, developers and landowners suspect that sustainable communities , with their mixed use, mixed tenure layouts and precedence for pedestrians and public transport users over the car, are more costly to plan and develop; and planning authorities are not well enough informed about the social, environmental and economic benefits which are associated with sustainable development.

The focus groups believes that if we can understand and apply time- tested principles, building in a sustainable way, we will reap improvements in public health, in livelier and safer streets and in a more affordable lifestyle for families and individuals. They also believe that the communities exhibiting these sustainable characteristics will increase, rather than decrease, in value over time.

Pursuing sustainable development required; socially sustainable, economic sustainable, physically sustainable, can not be done in isolation. Where does it come from?

- High quality urban design.
- Sustainable architecture and planning.
- Safe walkable transport- served neighborhood design.
- Social mix through a wide range of housing types, tenures and prices.
- Value adding to subsidies low income housing.

6. Conclusion

The paper is hypothesized that the current urban form in the new Egyptian cities would make them less sustainable in terms of environmental and social aspects. In order to test this claim, a review of some present facts and features with the theoretical principles present a rational explanation of the sustainability of these cites. A focuses group was also conducted with the Egyptian professionals to provide a general assessment of the current pattern in the new Egyptian cities and define the process that could enhance their sustainability.

The non- efficient development standards produced for these cities and alternation of the planning process affect the coherence of the urban form. Obviously, neither the physical nor the social or environmental principles have been recognized in building these cities (Focus Group, 2009). Therefore, social and spatial exclusions, high commuting, high energy consumption, traffic congestion on the regional road linking with Cairo.

6.1 General Finding and Outcomes

That is why most Egyptian professionals support intensification of the new cities, nearly all the professionals agree with infill mixed use or with building the new development with higher density. Mixed use intensification can be controlled by allocating when and where the mixed use should take place.

Finally, for the new development, this involved setting out a list of reasonable standards which emerged from the coherency of the traditional form. These standards should support compaction, particularly in the local levels (Becard, 1985).

Building the new communities should do on a high density and mixed use concept and through infill mixed use for the existing development. Yet more research and tests are required to define the outcomes of increasing conventional density on the quality of life of the built environment.

The contribution to walking/cycling behavior of attitudes and values regarding physical activities needs to be investigated, as to do methodological design strategies that control for these variables.

This study draws lessons from recent subdivision street pattern designs and from street patterns of historic cities. It examines how they function, how they fulfill residents' needs and expectations, and how they accommodate environmental concerns. In developing an alternative pattern that integrates the most important and desirable attributes of each approach, the study concludes: first, that it is possible to maintain the efficiency and quality of the conventional suburb while adopting the geometry of the grid; and second, that it is feasible and desirable to combine the tradition of the main street and the convenience of the commercial strip in a zone of mixed land uses that both relies on and supports transportation. By fusing the street patterns of conventional suburbs with those of the traditional girded city, and by recasting the arterial street in the light of its activity generation potential, it is possible to create communities that are efficient, viable, livable, healthy and highly marketable.

6.2 Recommendations

"Simply put, we wish to improve our cities with design, plain old good design. We also believe that the physical structure of our environment can be managed and that controlling it is the key to solving numerous problems confronting government today-traffic congestion, pollution, financial depletion, social isolation, and, yes, even crime. We believe that design can solve a host of problems and that the design of the physical environment does influence behavior."

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