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## **A New Vision for the Design Process of Sustainable Urban Transportation**

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### **Abstract**

Nowadays, several new global trends have emerged, empathizing urban design dimension in the planning of transportation networks and keeping pace with urban, environmental and social development. These trends emerged into practice in many developed countries, aiming at achieving sustainability, improving the built environment, reducing and addressing the environmental impacts resulted from the misuse of local resources of the environment, improving public health and providing better quality of life. The patterns of these trends varied in both urban design and urban transportation. The frameworks of both urban design and urban transportation are closely linked to these modern trends, each of which relies on its own practical framework and is adapted to the local conditions according to the type and pattern of urbanization in which these trends originated. It is worth mentioning that the crosscutting points and the linkages between the two areas, urban design and urban transportation, clearly exist in a global methodological frameworks covering the design process in both fields. Hence, the research gap to be covered in this paper is creating a global framework that covers the design process in both fields.

The objectives of urban design are closely related to the objectives of urban transportation. This makes it necessary to integrate these two fields in a clear and systematic framework that suits and meets the needs of the urban content of the Egyptian society. Taking into consideration the pace of development taking place in both areas at the global level, and the emergence of many attempts integrating both the theoretical and the operational level. The Egyptian society faces a large gap between the current situation of the Egyptian urbanization and the extent of the application of these modern global trends due to the absence of the importance of integrating urban design dimension in planning urban transportation in existing urban cities.

In this context, the paper seeks to reach a comprehensive vision that combines the two fields in order to improve the urban built environment and reduce the problems associated with the urban transportation sector in Egypt with aid of many of the modern global trends that dealt with this subject and reached many solutions that can be adopted in Egypt. The paper adopted the formulation of a generalized framework that includes the dimension of urban design in the planning and design of urban transport networks and included two pillars. (a) Proposing an ideological framework elaborating the integrated design process, which includes the use of the global modern trends in urban design and urban transportation at the functional urban, social, environmental and economic level; (b) Proposing a theoretical phased design process in line with the local Egyptian reality, which includes different application levels for planning, design, management, development and operation.

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**Keywords**

Sustainability; Urban Transportation; Urban Design; Planning process; Design process; Sustainable Transportation Strategies.

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**1. Introduction**

Many authors differed in the literature of urban design on a uniform or consistent definition of urban design. The definition of urban design is divided into five divisions that are integrated with each other to form a broadest framework of the definition (Schurch, 1999). Some definitions are basic and simple definitions; some are qualitative and qualitative definitions, while other definitions are proprietary and historical. Finally, the process of urban design as an applied context requires a set of practical frameworks and sequential procedures to be implemented. Ultimately, it concludes with a general nature of urban design and its relation to all other disciplines, which may be included in urban design by virtue of its unique nature. (Carmona, 2014), (Moughtin, 2003), and (Moughtin, 1999) see the urban design process as a cyclical, analytical, creative and structural process in any self-conscious design which can be used as a tool for shaping the future of places. Skilled specialized urban designers visualize and design solutions for specific locations or projects usually implement this process. (Rowley, 1994) defines the urban design process as an important and vital part of urban design and believes that the design process can be seen as part of the ongoing urban development process, or can be seen as the process by which the functional and visual components of buildings, spaces and public life are formed and controlled.

Many of the literature of urban design have introduced the term "design process" as a major component in the definition of urban design. (Associates, 1991) considers, in general, urban design as a practical framework that provides urban design a direction for growth, preservation and urban change. The definition as referred to (Pamaby, 1993) is to give the public spaces in the city the characterization of live organism in terms of development and maintenance through a practical framework of urban design. The definition of (Partnership, 1991) involves understanding people, places, and fulfilling their needs in urban content through urban design as a framework or process leading to policies to improve urbanization and the urban environment in three dimensions. (Rowley, 1994) notes that Christopher Alexander has gone with the definition of urban design much further. The overall development function of the city can be treated as a framework and cannot be dealt only by design, but by implementing a practical framework, that radically changes the shape of the city.

It has been agreed that how urban designers work is determined by reflecting their positions within the larger framework of change in urbanization, acting according to the general economic, political and institutional content and responding to customer demands as well as location content. Therefore, there is no specific definition of "urban design process" however; there are series of procedures and methodologies that determines the nature of design process in each content. The framework and the product in urban design intersect more than any other area of design. The practical frameworks of urban design, development, and management may play key roles in understanding the quality of the final product cautioned against the interest in the design process at the expense of urban form. The criterion here is the quality of change, not the urban form alone or the design process alone. Both the urban form and the design process usually work together (Langdon, 1990), (Carmona, 2014), and (Lynch, 1981). (Carmona, 2014) reviews the urban design process as part of a new theory that considers the urban design as a synonymous with the space shaping of places and introduces a new theory for the components of the urban design process for public spaces in London in this concept. (Rowley, 1994), (STEINO, 2003) and (Lang J. , 2005) addressed the methodological framework of urban design, through a general design ideas that could be applied and transformed into urban products in order to improve the current urban environment. Elements of the methodological framework consist of the following; Design process; Design approaches; Design objectives; Design principles; Design guidelines and Design products.

## **2. Nature and Content of Urban Design Process**

(Moughtin, 2003) and (Moughtin, 1999) define the nature of the urban design process as a natural process and not a linear one between the problem and the solution, but is essentially dialectic relationship. Therefore, urban design neither is a physical interference of several narrow outputs in some projects, nor is it a specific result of design objectives. The urban design is a continuous journey that forms places and is renovated continuously, socially, economically through periodic planned interventions, as well as recommendations from the long term planning of the place. Thus, the design processes in all its forms and differences, which form the urban places, constitute the essence of the unique urban design. (Carmona, 2014). (Rowley, 1994) defines the design process as an important and vital part of urban design. They consider that the design process can be part of the continuous urbanization process and a change of the poor content of urban design. They also empathize that the design process can be expressed as the process by which it can control the functional and visual components and for buildings, spaces and public life.

## **3. Urban Transport Planning Process**

The urban transportation planning process is defined as a participatory process designed to involve all parties in the transportation system, such as the business community, civil society, environmental bodies and freight and public transportation operators, through an interactive participatory process by the following entities: Metropolitan Planning Organization "MPO", State Department of Transportation "State DOT" (Transportation, 2014). Transportation planning should be included within a larger range of "process of decision-making" transportation solutions. In the past, transportation solutions alone were considered to be sufficient to solve the problems of transport, however, in fact the transportation planning process must be integrated with land use planning and development processes, which requires an integrated approach, analyses and a clear vision of the city type and the society we wish to live in. (Meyer, 2001).

Transportation planning is also defined as the process leading to decisions, policies and programs to improve transportation system. In this process, planners develop information on the impact of the applying transportation services alternatives. These processes should operate within a general framework for the objectives of the study area concerned, including a good understanding of the needs of the population and all stakeholders. (transport, 2014), (civil.iitb.ac.in, 2014). It is worth mentioning that the urban transportation planning process is mainly related to the urban planning process of cities and large urban areas in terms of size, population and area. The issue of the misuse of the human scale in planning has often emerged due to the nature and size of the planning process as a most important defects and challenges of this type of planning. Therefore, attempts have recently been made to include the human scale and the consequent response to societal, recreational and basic needs in the design of urban transport systems in order to improve the quality of the urban environment. The following is a brief review of the nature and the peculiarity of the urban transportation design process.

## **4. Design Process of Urban Transportation Networks**

Most of the US pilot attempts have emerged in the design process of urban transport networks. The US State Transportation Administrations are the first to interpret transportation problems. The US case studies were focused on one item in the design process. The design principles are based on a specific approach that has been adopted individually and in an isolated trial for each state. Often, a design process for urban transportation has two basic functions; development of existing areas processes, including redesigning the existing traffic network to improve efficiency; the process of designing new traffic networks "Street Design Process." Among the common goals that are almost constant among all these Case studies:

- Establishing and activating the principle of "Walkable communities" to reduce the reliability of cars by providing a good design for the network

- Ensure the integration of all types of urban transportation by providing a good design for a high-traffic network that accommodates all types, thus increasing the opportunities of the society to choose the appropriate transportation means, as well as providing an integrated mass transport network that provides the highest connectivity and accessibility to work, places, accommodation and entertainment

## 5. Research Methodology

This research aims to develop a proposed theoretical framework for activating the role of urban design in the planning and design of urban transportation networks, which covers the current gap in the relationship between urban design and urban transportation in the Egyptian case with the application on Al Rehab and Madinaty cities. Therefore, the research gap is: *There is no intersection between urban design and urban transportation in the Egyptian institutional system, in terms of the Ideological Framework, consisting; approaches; design process and design products as well as policies, plans, design principles and programs.*

Taking into consideration that urban design as the basic umbrella under which urban transportation works within the broader framework, which includes transportation design. The main research question is: *What is the applied theoretical framework that includes the appropriate design process for urban transportation planning aiming at achieving the objectives and principles of urban design in urban areas of Egypt?*

The research proposed a new theoretical framework in which the role of urban design in the planning and design of urban transport networks can be activated through the methodology of (Mohammed, 2016) consisting of three main stages as follows:

### 5.1. Phase I: Theoretical and Analytical Framework of the Research:

Analytical study of all the global trends and different design approaches in the field of urban design and urban transportation, and analysis of the global experiences associated with the research problem, which can be applied in the Egyptian case, using the descriptive and the comparative approaches.

- Analytical study of the urban design process and the urban transportation design process for some international experiments that dealt with the integration of the design processes using the comparative approach
- Analytical study of the nature of the urban design problem and the urban transportation to achieve the criteria for selecting and determining the most appropriate process that suits the Egyptian case using the descriptive historical approach

### 5.2. Phase II: Formulation of the Proposed Theoretical Framework Consists of Three Steps:

- Step 1: the formulation of theoretical ideological framework consisting of the general framework of the design process
- Step 2: Drafting the proposed framework for global trends of sustainable urban transportation
- Step 3: Integrating design processes and formulating the final and integrated theoretical framework between urban design and urban transport

These steps include the integration of design processes derived from both the theoretical background of urban design and sustainable urban transportation through the comparative approach, in accordance with Egyptian reality.

### 5.3. Phase III: Testing the Proposed Method on the Egyptian Reality by:

- Testing the theoretical approach by experts views through semi-structured interviews using “Delphi method”.

- Application of the theoretical approach to the study area in which the conditions covered in the theoretical framework are available.

The testing process also deals with testing the theoretical framework drawn and applied to the Egyptian case studies. It includes the theoretical framework and then reaches to general recommendations resulted from this comparison, which contribute to the development and revision of the framework and its finalization in the final form. Fig. (1), shows the derived framework of the urban design that was tested in the first phase (Mohammed, 2016).

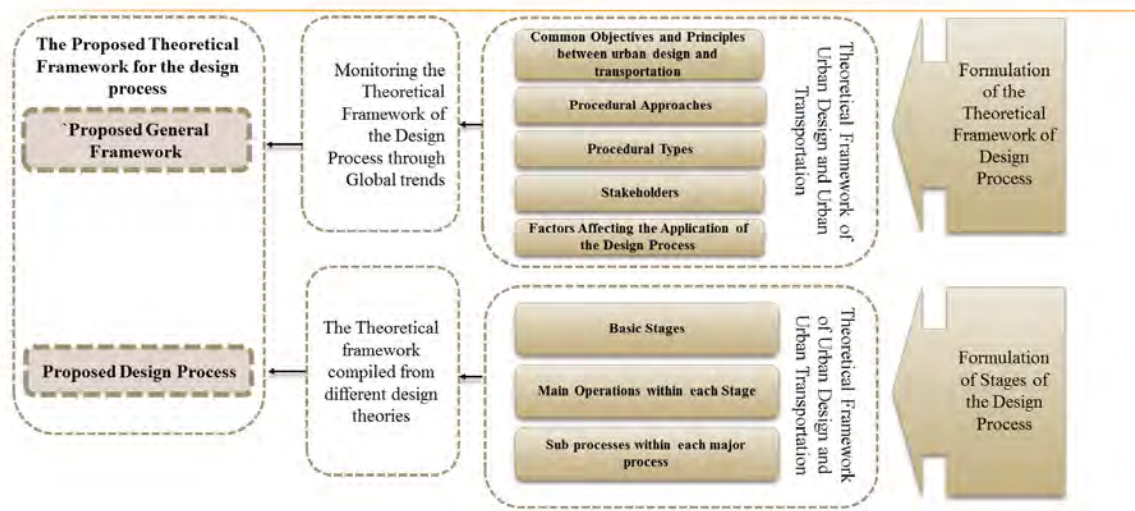


Figure 1. The frame derived from the urban design used in the first and second phases of the questionnaire. Source: (Mohammed, 2016, p. 132)

#### 5.4. Research Testing Method

Therefore, this research is a process of conducting a new phase of an expert questionnaire using the Delphi method and conducting semi-structured interviews in 2018, which include:

- Identifying expert groups divided into three main sections and selecting the expert sample in each group focusing on the experts of city authorities to find out the current practice in the planning and design of Egyptian cities. The research focuses on the new cities of Al-Rehab and Madinaty cities
- Design questionnaire and interviews
- Processing and revision of the framework in accordance with expert recommendations

Therefore, the research testing method in this research contains a set of stages that address specific points of the research problem, including:

- Completing and updating the theoretical framework by conducting further interviews and a questionnaire for a group of experts to be called (Phase III of Questionnaire 2018) during this research
- Modifying the theoretical framework based on updates from the new phase of the questionnaire

#### 5.4.1. Selection of Expert Sample

In the first phase of the questionnaire (Mohammed, 2016), there were about 42 experts, 10 experts in the second phase of the questionnaire, and 15 experts in the third phase: Experts in both urban design and urban transportation, urban planning experts, and experts working in the authorities of Egyptian cities. It is worth mentioning that the experts in each of the first, second and third phases of the questionnaire were interviewed individually and the interviews varied between the open discussion on the issue of research and how to find practical solutions to problems. It is to be noted that about 20% of the total samples did not complete the forms and therefore were deleted from the results. Table (1) shows the relative distribution of each category for forms and interviews in the first phase of the questionnaire in 2016 and second phase of the questionnaire in 2018.

Table 1. Expert Samples Distribution in Phases I, II and III of the Questionnaire. Source: Samples of Forms and Interviews 2016 and 2018.

| Questionnaire samples                      | Urban Design Experts | Urban Transportation Experts | Urban Planning Experts | Executives and Specialists working in the authorities of Egyptian cities |
|--|----------------------|------------------------------|------------------------|--|
| Actual Samples of Forms and Interviews     | 10                   | 6                            | 13                     | 23   |
| Samples for interviews only without a form | 2                    | 0                            | 2                      | 0  |
| Samples not completed                      | 3                    | 4                            | 2                      | 2  |
| Total                                      | 15                   | 10                           | 17                     | 25   |

#### 5.4.2. Design Questionnaire and Interviews

A questionnaire and semi-structured interviews were suggested for each sample selected separately to ensure the diversity and impartiality of the results. The questionnaire for Phase III includes the following sets of questions: Set of questions for urban design, questions on urban transportation, a set of questions for the design process, and a set of questions for the derived framework.

## 6. Final Theoretical Framework Discussion

After reviewing the theoretical background of the urban design, structural frameworks and its components, analyzing the main issues of the urban design process and its important factors and studying international studies and the theories of the design process (Mohammed, 2016). The design process was derived from the following:

### 6.1. Design Process Theoretical Framework

The design process theoretical framework consists of all factors that are considered the main determinants of the nature of the proposed design process. Fig. (2), shows the General combined framework of the urban design and urban transport design processes. Generally, the framework is subject to the degree of control available in the planning process and in the development process involving the urban design according to the following:

- A. Determination of procedural approaches (STEINO, 2003);
- B. Identification of procedural patterns Type (Lang J. , 1996), (Lang J. , 2005);
- C. Identification of the participating stakeholders, and;
- D. Identification of main factors influencing the application of the design process in the Egyptian case studies (Shirvani, 1985), (Moughtin, 2003), (Moughtin, 1999) and (Lang J. , 2005) which include:

- Legislative frameworks governing the relationship of urban design in the planning process in general and the planning and design of urban mobility in particular
- The entities responsible for the planning process to include the urban design dimension in the planning process
- Programs and policies that contribute to the application and motivation of the role of urban design in the planning and design of urban transport networks.

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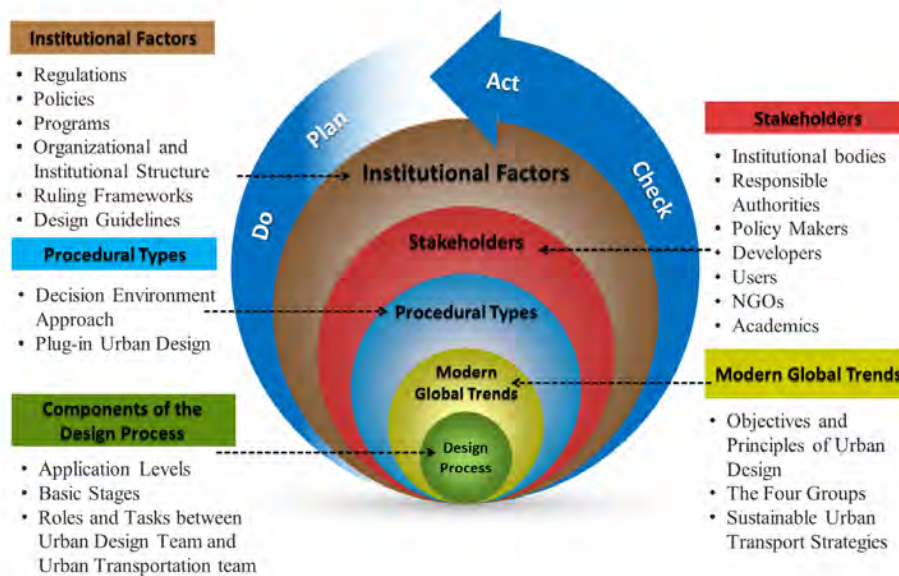


Figure 2. General Combined Framework of the Urban Design and Urban Transportation Design Processes. Source: (Mohammed, 2016, p. 171)

## 6.2. Monitor the Overall Framework of the Design Process in Global Trends

Previous elements of urban design were compiled, evaluated in literature and theories from global trends and design guidelines to identify the extent and appropriateness of its application in Egyptian practice. It is mainly divided into three case studies in urban design, and eight case studies in urban transportation in USA, UK, Australia and India as well as Arab case study in UAE. (Engineers, 2010), (Health, 2011), (NCDOT, 2012), (Place, 2000), (Burton, 2006), (ITDP, 2011), (Wefering, 2014), (Sakamoto, 2012), (SSATP, 2015), (Steinberg, 2012), (Leather, 2009), (Hickman, 2011) (Sayeg, 2014), (Bos, 2014), (Ishii, 2013) (Dalkmann, 2010), and (Schulze, 2012).

The above case studies were included the methodology of proposing the design process theoretical framework. Design approaches differed from one case study to another, and the approaches to procedural patterns varied between urban design as a decision environment and urban design as a living environment, primarily the first type.

In general, all of the case studies coincided in the objectives and principles of the design and development of the existing areas. The outputs of urban design were all between the principles of design and the foundations of design,

while only two case studies dealt with urban design in abstract design as one of the outputs to be addressed. In terms of levels of application, they all contributed in the development and design levels. In terms of substantive differences, the level of planning, management and operation.

### 6.3. Main Components of Proposed Design Process Theoretical Framework

#### 6.3.1. Urban Design Inputs

A set of objectives and principles have been studied and concluded reflecting the general human needs in both urban design and urban transportation. They have been extracted from reviewing modern global trends in urban design, grouped into ten categories that combine objectives and principles of modern trends and sub categorized into four main groups. Literature such as: New Urbanism (new urbanism, 2010), Livable Communities (livable streets, 2012), Sustainable Urbanism (Wiryoartono, 2014), Green urbanism (Lehmann, 2015), New Pedestrianism, Place Making, Smart Growth (Anderson, 2015) and Eco City (REGISTER, 2015). The four main groups are:

- Group 1: objectives and principles aims to improve and develop the design process itself and include development of design process
- Group 2: objectives and principles aims to improve and develop urbanization, in the planning level, include mixed-Use & diversity, character of urban form, increased density
- Group 3: objectives and principles aims to develop and improve the surrounding environment, in the planning level, include sustainability, quality of life, environmental aspects
- Group 4: objectives and principles aims to improve and develop the design of transportation networks, at the level of design and include: walkability, connectivity, smart transportation

#### 6.3.2. Design Process Inputs

The conceptual perception of the phases of the urban design process framework was developed and divided into; the traditional phases of the design process and the stages of the design process according to the concept of sustainability. The design process has been divided into three main levels: The main stages, main processes within each stage, and sub processes within each major operation.

The stages of the main design processes in the various literature in the urban design appeared through a set of theories adopted for the design process, which consisted of four main theories categorized according to the author as follows:

- **The John Lang model:** which divided the design process into five main phases: creation, design, selection, implementation and post-operative evaluation (Lang J. , 1994) (Lang J. , 2005)
- **The Matthew Carmona model:** based on four main phases: design, development, management, and space use (Carmona, 2014)
- **Rachel Cooper's 1st model:** which adopted four main stages: formation of teamwork and goal setting, design and concept development, evaluation and creation of plans and ending with implementation. Followed by four transition phases between each of the above main stages: continued understanding of urban content, continued identification of design options and alternatives, continued development of the scheme and continuation of the design process and a return back to the first stage (Boyko, 2005)
- **Rachel Cooper 2nd model:** which transformed the design process into a continuous loop model of sub-processes that includes inclusion of the dimension of sustainability in the design process and processes that ensure its achievement (Cooper, 2010)

The research proposed design process theoretical framework was drawn from compiling the above theories. The main processes within each main stage and sub-processes were studied in all the different literature in the urban design, which differed between each model and another, thus formulating the framework.

#### 6.3.3. Urban Transportation Inputs from Global Trends at the Level of Sustainable Transport Strategies

These inputs include "Enable-Avoid-Shift-Improve (EASI) Strategies", which can be combined with urban design objectives and principles, which have been extracted from global trends on sustainable transport strategies (Steinberg, 2012) as follows:

- **ENABLE:** policies aimed at achieving the efficiency of institutional and governmental system, forecasting system needs and the formulation of procedures, ensuring integrated management and development of the urban transportation sector
- **AVOID:** policies aimed at reducing reliability of private cars through the integration of urban transportation planning and land use
- **SHIFT:** policies aimed at increasing reliability on sustainable means of transportation
- **IMPROVE:** policies aimed at improving transportation efficiency and improving safety and the quality of the urban environment

#### 6.3.4. Sustainable Urban Transportation Global Trends

Global Trends in sustainable urban transportation include two sets of trends, the first containing planning guidelines and the second are projects that have already been implemented and evaluated after a period of operation. The criteria for the selection of case studies and guidelines include the following:

- Must follow a modern approach of sustainable urban transportation
- Must include the principles and objectives of urban design that appear in network design
- Should contain some or all stages of the design process to be followed in the projects executed according to these design guidelines
- Must demonstrate how sustainability principles are addressed in the planning and network design, including fulfilling society social needs, economic and environmental aspects. In addition, the institutional dimension and ruling regimes dimension of sustainability that could emerge

### 6.4. Urban Design and Urban Transportation: Integration of Design Processes

The combination of the design process theoretical frameworks of urban design and sustainable urban transportation as shown in figure (3) depends on the comparison of their design processes at the level of main phases, main and sub-processes. In order to achieve this, this kind of integration has been studied at several levels as follows:

- Identifying the theoretical framework of urban design process through urban transportation tends with the aim to choosing the main phases and interpretation the compatibility of the sustainable urban transportation global trends with the urban design process in terms of major stages and major processes at least
- Comparison between both theoretical frameworks (urban design and Urban transportation) in order to identify the main stages of the integrated design process between them preparing for the formulation of the final integrated theoretical framework that combine both fields

Source: (Mohammed, 2016, p. 172)

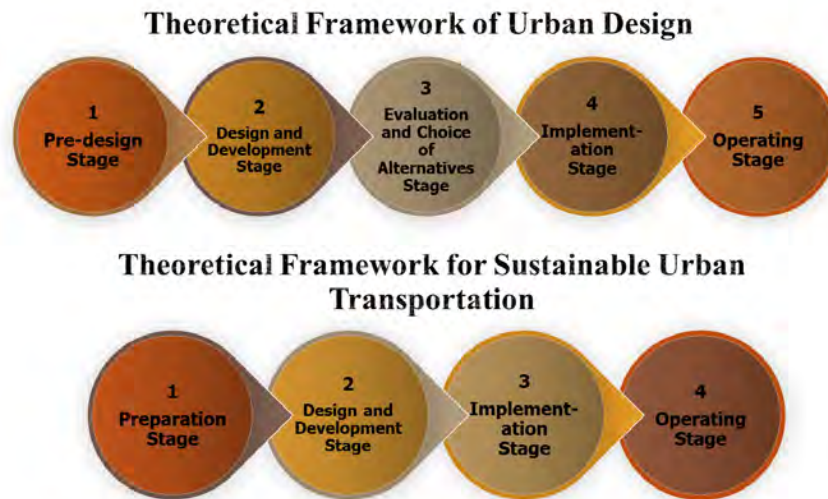


Figure 3. Theoretical Frameworks for the Urban Design and Urban Transportation Processes

### 6.5. Final Integrated Theoretical Framework for Urban Transportation Design Process

The final form of the integrated theoretical framework for urban transportation design process was derived from analyzing each of urban design and urban transportation separately. The framework of the proposed design process was analyzed by merging all the factors resulted from the study of each of the two fields. Finally, the analysis of the components and stages of the design process derived from the study of the joint design process. The final proposed integrated framework for the design process, which explains all the interrelations between urban design and urban transportation, is presented as follows:

- Defining the objectives and principles in common between urban design and urban transportation consistent with the needs of the community
- Identifying strategies that will be used between the two parties in an integrated manner
- Identifying the application tools and standards at each application level

The general idea was adopted as shown in Figure (4), which is based on the above detailed studies of urban design, urban transportation and the joint design process. The integrated theoretical framework for urban transportation design process was formulated based on several factors that helped shaping the current proposal:

- Taking into account the components of the methodological framework of urban design
- Inclusion of all main and sub-processes, which were included in theoretical frameworks and theories of urban design, which dealt with the design process in general
- Taking into account the inter-stages between each main stage of the design process, which works to achieve two objectives: (a) Continuation of the content of the previous phase in the design process in order to ensure that developments and continuous changes are taken into consideration, and (b) Preceding the next phase through administrative procedures and engaging the parties involved

Figure (5) illustrates final Integrated Conceptual Framework for Urban Transportation Design Process.



Figure 4. General Idea of the Integration of Urban Design with Urban Transportation. Source: (Mohammed, 2016, p. 113)

## 7. Results

The research results pivots around main parts as following:

A.General results of the study and analysis of the factors concerning the research problem, which directly and indirectly affect the composition of theoretical frameworks for both urban design and urban transportation. As well as the direct factors of the research problem that affect the formation of the final theoretical framework integrated between the two fields, such as:

- The extent to which the goals and principles of urban design influenced the design of the transport and mobility on networks. The impact of urban design goals and principles on the planning and design of urban transportation networks (through the four groups of objectives and principles mentioned in section 6.3.1) 86% of all experts agreed that there is a strong impact on these goals and principles
- The issue of the application of modern trends of sustainable urban transport in Egypt through the formulation of mechanisms to develop appropriate legislative frameworks
- A number of obstacles to the application of this trend was identified in the Egyptian case, which could cause the application of the final theoretical framework between urban design and urban transportation to be impeded, such as: (a) lack of sufficient funding for the Egyptian authorities and institutions to implement these policies, (b) current transport problems, (c) social constraints such as: culture change, community awareness and understanding of the transport system used, and the socio-economic characteristics of the population (by region), (d) legislative obstacles such as miss-application of regulations, law and code, and (e) the inefficiency of governing institutions and institutional systems, relying on established norms and fighting all new, traditional and routine

B.Results of the theoretical framework

- The validity of the use of the main stages of the design process in the planning and design of the urban transportation networks was studied through the first and third stages of the experts questionnaire, More than 64.5% of the experts approved the approval of most of the main and secondary stages
- The factors influencing the proposed design process were summarized in: (a) inefficient institutional systems, (b) inefficient legal and legislative frameworks, and (c) the economic dimension in the development of sustainable urban transport projects
- The framework for implementation in Egypt has been approved and the possibility of integrating the proposed framework into existing institutional systems has been approved

C.Some suggestions have been proposed from the expert interviews that contribute to the development of this framework, which was later used in the formulation of the final theoretical framework between urban design and

urban transportation. Expert proposals focused on: (a) raising the awareness of the parties involved in the planning and design process, (b) linking these strategies to the general policies of the country, (c) application in new cities of small density, (d) giving the private sector more allowance to participate and invest in the transportation sector, (e) identifying the roles of teams in different disciplines which interact directly and indirectly with the planning and design of urban transport networks such as urbanization, housing, economy, social, etc., and linking their roles to the main stages and sub-processes of the proposed framework, and (f) activating the social dimension and public participation.

Source: Authors.

## 8. Conclusions

To monitor the impact on the final integrated theoretical framework for Urban Transportation Design Process, some adjustments were made through practical application through the experts' questionnaire in phases I, II and III. Some results (within 15 to 20% disagree) in the questionnaire for the first, second and third phases, which measure the extent to which experts agree on the main stages of the theoretical framework, are due to several reasons, such as:

Some samples of interviewers, which focused on the group of executives and specialists working in the authorities of Egyptian cities, were primarily concerned not to change the style of design and planning adopted in these institutions. This was very clear in rejecting the amendments proposed by the researcher on the traditional process of planning and design such as the following:

- The exclusion of the main process (the beginning of the project) in the pre-design phase, as a result of relying on the political intervention in the current Egyptian situation
- The difficulty of achieving integration with other disciplines due to the deterioration of the institutional system and the weak inter-institutional relations in the current Egyptian situation
- The difficulty of implementing the sustainability agenda in the Egyptian cities as well as the deterioration of the current institutional systems and the absence of a real political desire for change
- The need to separate the two phases of planning and design in the second stage and to consider them as separate operations according to the current traditional system followed in these institutions

Some expert samples, especially road design engineers, were primarily concerned with the design of traditional road networks. Their answers were limited to the technical details of the traditional design stage, because of the lack of knowledge of both urban planning and urban design, as well as lack of familiarity with contemporary issues to achieve urban sustainability, as well as recent global trends in the planning and design of sustainable urban transport systems.

Most of the major processes that were finally approved in the final integrated theoretical framework ranging from 80% to 85% of the total samples of the interviewers in the first and second phases of the questionnaire. This ensures that such integrated theoretical framework could be applied in reality to the case studies (Al Rehab and Madinaty cities) as a comprehensive level and at the level of residential neighborhoods.

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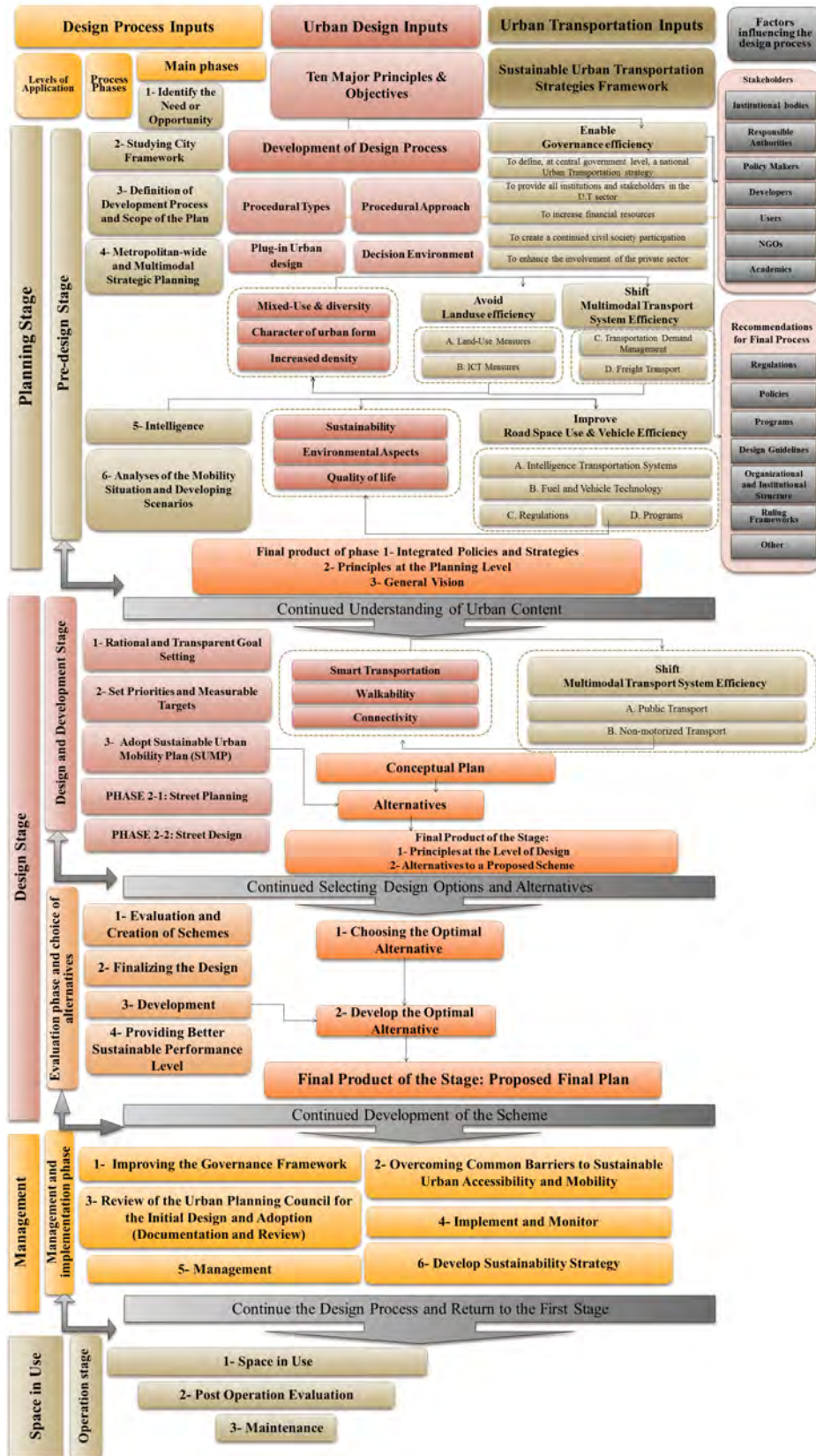


Figure 5. Final Integrated Theoretical Framework for Urban Transportation Design Process

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