AIN SHAMS UNIVERSITY,
Egypt

Impacts of Heliopolis road network development on the daily life activities

A Thesis submitted in the Partial Fulfillment
for the Requirement of the Degree of Master of Science
in Integrated Urbanism and Sustainable Design

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Acknowledgements

First and foremost, I would like to express my gratitude to my supervisor professors, Professor Abeer ElShater and Dr. Abdulmoneim Alfiky for their continuous comprehensive guidance, feedback and enthusiasm along my thesis writing process. Second, I would like to show my full appreciation to the professors and staff of the IUSD department for their solid support, patience and immense knowledge throughout my journey in this program that helped me reach to where I am standing right now.

To my friends and colleagues, I can't express enough my gratitude for your constant care and backing. You have been my fuel at lots of times and I will never forget your tremendous help and assistance at many occasions. I hereby especially mention Alaa, Soha, Joseph, Dina, Sandy, Sherry and Sara for their generous aid and support along my two-years masters' journey. I would also like to extend my thanks and gratitude to all the people who contributed in the questionnaire and interviews to complete the process of this research.

Last but not least, coming to the people who were my full support system, thank you to my family, my mother, father and sister, you are the wall I lean on and the main reason I kept on going in this thesis. Thank you for being very understanding and patient with my hectic academic schedule and priorities. Your push and belief in me were always there in all the times I got stumbled. I totally dedicate this research to you.

Abstract

Currently, mobility strategies in Egypt focuses on the expansion of road network infrastructure within and between cities. With the rapid population growth and consequently the increasing urban expansion that greater Cairo region is witnessing, it became a priority to invest in building new corridors, as well as increasing the capacity of existing ones, to connect the heart of Cairo with the new satellite cities emerging to accommodate the growing population. Accordingly, a significant wave of building a series of highways and flyovers is taking place across Egypt, especially in Cairo districts. These transportation infrastructures are believed to be the easiest and quickest tools for resolving traffic challenges to ensure faster and more enhanced vehicular mobility and reduced travel time. However, despite the substantial benefits of these structures but having them carving through the urban fabric of districts and neighborhoods highly affects the daily life activities of the local communities they are penetrating.

The aim of this research is to investigate both positive and negative impacts of the transportation infrastructures on the local community of Heliopolis district in Cairo focusing on the change that has occurred to their subjective sense of place, perceptions to their city and eventually their daily life practices. Thus, the study brings clarity to the issue of how people perceive, feel, sense and interact with their surrounding environments to understand the specified people-place relationships. This is obtained through first, reviewing through literature the urban theories and previous international practices to reach a deeper understanding on the relation between the change in the city tangible physical form and its intangible reflection on the users' and inhabitants' activities and perceptions. And secondly, through conducting qualitative and quantitative methods tracing the human behavior of the daily users and residents of Heliopolis and comparing their daily routine before and after the road developments to scope the change and the

different dynamics affecting it. Primary data of this research is collected through multiple tools such as behavioral and spatial mapping, online questionnaire as well as in-depth interviews with the local users of the district.

The findings of the research generally showed that the lack of effective planning that prioritizes the vehicular mobility over the human factor has substantial impacts on th e perception and behavior of the local communities. The results demonstrate that the majority of the local community of Heliopolis do agree on the importance of such road development projects that facilitated their travel experience within the district, yet they have many concerns on the methods and approaches of applying these projects that resulted in substantial negative impacts on their daily lives. This research also proposes recommendations for future urban planning activities of megaprojects that should be taken into consideration by urban practitioners and decision makers.

Keywords:

Road network development, Highways, Flyovers, Sense of place, Perception, Daily life activities, Human behavior, Heliopolis

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Chapter 1

Introduction

1.1 Background

Urban mobility has been a focal point for city managers and urban planners in metropolitan regions, and is commonly considered as one of the greatest issues cities confront (Aoun, 2014). It is integrally linked to urban growth, with each fostering the other. The vast majority of cities, particularly those in developing countries, have experienced quick and intensive, frequently disorderly growth, which influences the structure of roads and the nature of traffic. As a response for the expanding population, tangled growth has caused the emergence of peripheries, which increases the distance to metropolitan centers. In this setting, cities are typically reliant on road transport, primarily on private cars, which has made the development of road corridors one of the most essential infrastructure projects (Gomes et al., 2020).

Most governments use these projects to interconnect cities through an integrative road network, as well as to increase the competitiveness of their cities, demanding the structuring and re-structuring of their road systems, in order to attract investments (Khanani et al., 2021). Nonetheless, infrastructural development does not always take into account the demands of the impacted population when the city is expanded. While the construction of new roads or the upgrading of existing ones may be a good solution for moving large volumes of people over long distances, it is undeniable that they have an impact on the local community, both positively and negatively, as they disrupt the street grid of neighborhoods and affect their urban quality of life, including economic, social, and environmental factors. Urban planners and politicians in many cities face the challenge of balancing the need for growing personal mobility and economic expansion with the requirement to

protect the environment and offer an acceptable quality of life for all inhabitants (Khanani et al., 2021).

In the past three years, there has been significant development in the streets of Heliopolis district as part of a larger effort to improve the road network infrastructure of the Greater Cairo Region. The primary objective of these projects is to connect the cores of Cairo's districts to the New Administrative Capital through the use of new corridors carved through Heliopolis and numerous other districts in an effort to provide more space for traffic flow by widening the streets, constructing flyovers, and eliminating the tram lane. This research is aiming at scoping the impacts of the road network development that occurred to Heliopolis on the subjective perceptions and behavior of the local community which will be elaborated later in fuller details.

1.2 Problem statement

The dominance of motorised transport, particularly private cars, significantly contributes to air, noise, and heat pollution as well as place detachment, which prevents individuals from engaging in outdoor activities (De Nazelle, 2011). Currently, Egypt's mobility strategies rely on the construction of new road networks and the implementation of public transit initiatives. With the notion that elevated urban highways are the simplest, cheapest, quickest, and most effective solution to traffic problems, urban planners in Egypt implemented highways and flyovers that cut through the dense urban fabric. The roads infrastructure development plans adopted by the Egyptian government in the majority of the GCR cities were solely focused on regionally enhancing the transportation experience, with no consideration of the influence of these structures on the community level of the affected neighborhoods that they cut through, as well as ignoring the distinctive

character of Heliopolis and the human factor accommodating this district and how he perceives and is attached to its physical surrounding.

Despite the fact that these highways and flyovers appear to alleviate Cairo's traffic congestion, they have emphasised the centrality of automobiles with little regard for the negative effects on those who rely on other modes of transportation, such as active travel (walking and cycling), particularly in a pedestrian-friendly district like Heliopolis. This research is primarily concerned with the fact that these projects do not take into account social scenarios, habits, daily activities, or pedestrian or residential movement. Instead, the primary objective is to create a shortcut through the urban fabric of Cairo in order to connect the new developments of the New Administrative Capital to the urban core. Unfortunately, the lack of local literature analysing the varied implications of these transportation infrastructures on Egyptian communities contributes to the ongoing construction of these structures without assessment or consideration of prior initiatives. Consequently, it became necessary to rethink and reassess these gigantic constructions.

1.3 Research focus

Those transportation infrastructures are affecting the urban environment in all its dimensions, environmental, social and physical, including mobility and transportation. However, the purpose of this research is to examine these effects subjectively, focusing on the community’s perception to their city, the impacts and changes occurred to the daily life activities, human behavior of the local community towards their district and how those structures affected the vitality and attractiveness of the neighborhood and eventually the urban quality of life of its society.

1.4 Research objectives

As a result of the high density in Greater Cairo Region and the new urban transformation projects specifically in the transportation infrastructure

section taking place all over its cities, the users' satisfaction, their connection to the place, communication and daily activities, all of them cause the reduction in their overall urban quality of life. Hereby, it is important to understand the city as being perceived by its users and not just the city as a thing on its own. Accordingly, the aim of this research is to understand the phenomenon of the urban transformation in Heliopolis having highways and flyovers cutting into its neighborhoods fabric and its impact on the local community of different gender and ages. Besides, evaluating the current situation both objectively through mapping the reality by tracing the changed built environment and subjectively through mapping the perceptions, feelings, emotions and perspectives of the people using these spaces through their daily life. However, the research primarily focuses on the **subjective approach** as it's mainly concerned with the affected personal experiences of the daily users and eventually the direct or indirect impact on their daily life activities. In particular,

- Investigate the change in daily life activities and human behavior of local community and their interaction with the urban environment before and after the intervention.
- Understand the relation between physical dimensions (tangible) & non-physical dimensions (intangible) of cities to perceive urban spaces.
- Understand the different positive and negative dynamics and consequences resulting from this road network development on the perception and sense of place of the daily users.
- Build on recommendations for more enhanced future urban megaproject development process on the local level.

1.5 Research questions

The main research question is

What is **the impact** of road network interventions on the **daily life** of the local community of Heliopolis district?

However, several research questions along with secondary questions are asked to help achieve the objective of the research:

1-What are **the reasons behind** the road network development and upgrade in Heliopolis?

2- How did this development affect the **human behavior** of local community on daily basis?

3-How has the rehabilitation of road networks affected residents' neighborhood **urban image?**

4- How local community including residents, business owners and daily users **perceive and adapt** to such structures?

5- What are both the **potentials and challenges** resulting from the upgrade of road network on such an old and rich neighborhood with unique identity like Heliopolis?

1.6 Methodology

The methodology of this research follows both theoretical and analytical approaches. The theoretical approach is summed up in reviewing urban theories related to environmental psychology to understand the connection between human life and the built environment as well as reviewing international literature of the transportation infrastructures to comprehend the reason behind their construction and the substantial impacts on the local community and the urban environment to formulate a whole picture on the issue from past experiences. Analytically, in order to understand the phenomenon of the urban transformation in Heliopolis with highways and

flyovers slicing through its neighborhoods and its effect on the local community, quantitative and qualitative methods were conducted to evaluate the current situation both objectively by mapping the reality through tracing the changed built environment (spatial mapping tool) and subjectively by mapping perceptions by evaluating the feelings, emotions, and perspectives of the people who are in direct contact with the district using a tool box of questionnaires and interviews.

“We have not totally identified the place till we acknowledge a) what behavior is associated with it, b) what the physical parameters of that setting are, and c) the conception or meaning which people hold of that physical environment.” (Canter, 1977)

The fusion that Canter (1976) puts forward regarding the sense of place theory is going to be taken into consideration as a basis in representing the formation of the assessment criteria of this research. Therefore, three basic elements of sense of place as the physical setting (form), activities (function), and image and meanings (conceptions) are going to be adjusted along with other variables extracted from the international overview of transportation infrastructures literature to constitute the framework of this study. The methodological approach described above makes explicit the spatial dynamics of human environmental interactions and ties them to psychological and behavioural variables of interest in the literature of sense of place. In that regard, the research has defined the spatial changes of Heliopolis district in order to generate and analyze the local community individuals' own descriptions and perceptions of subjective space and observe variability in individual levels of attachment and how this consequently affected the different scenarios of their daily activities and routines.

Case study analysis and evaluations are going to be made within this framework by considering the determinants about the elements of sense of place that are going to be fully elaborated in the following chapter (See figure 01).

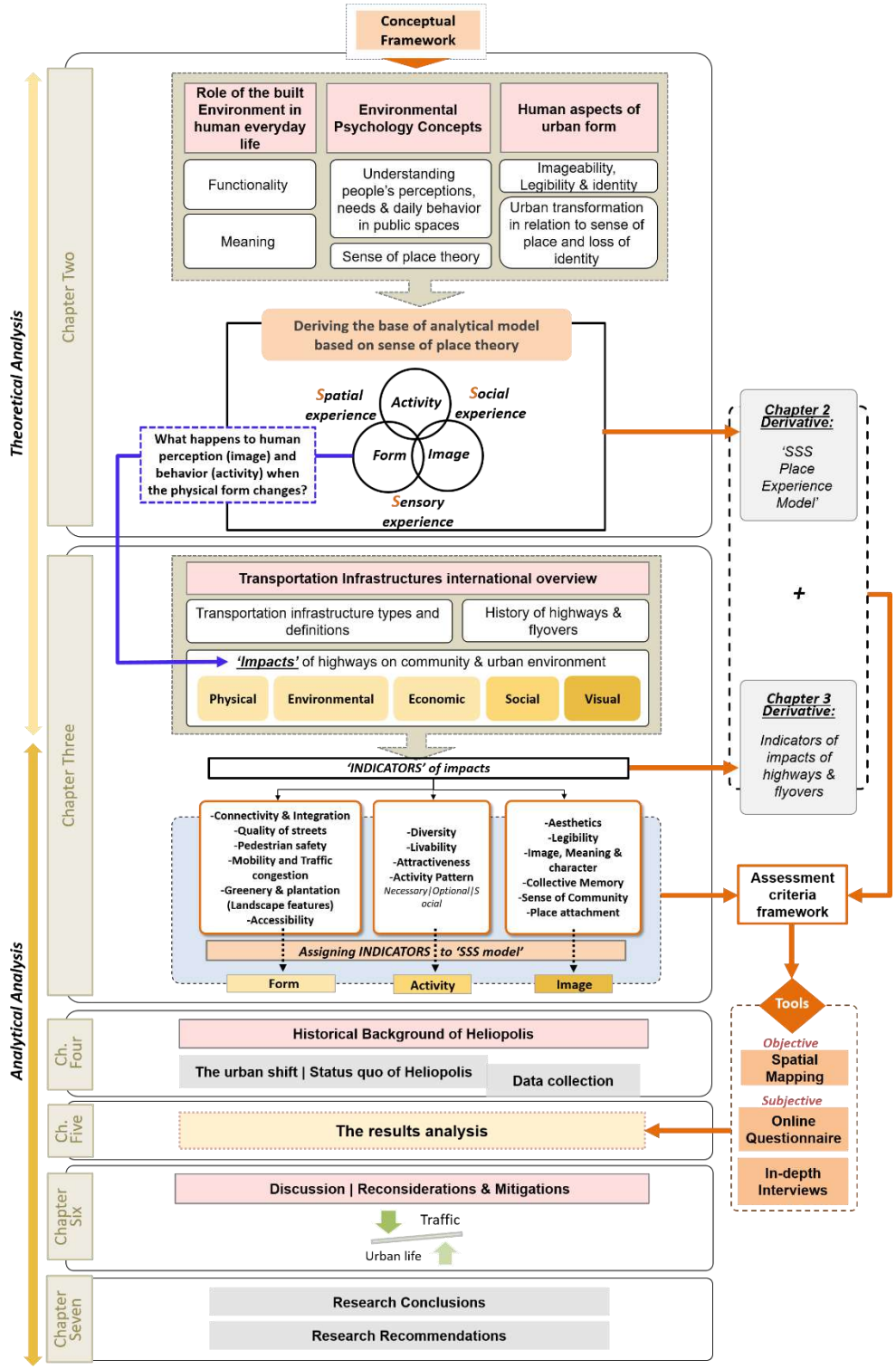

Figure 1: Conceptual framework diagram - Source: Author

1.7 Research structure

This research is classified as an exploratory research that is deductive using the mixed approach between qualitative and quantitative methods and tools. To achieve the main objectives of this research, a structure is conducted which is divided into five main sections:

1. Initially, **Section one** includes the introductory chapter explaining the background for the research area, as well as the research problem statement, focus, objectives, questions, methodology and structure.

2. **Section two** overviews a desktop literature review that includes two

chapters depending on secondary data collection from the different fields of interest:

- **The first chapter** mainly tries to understand the nature of the interactive relationship between human behavior and the built environment with the focus of public spaces through environmental psychology standpoint. It also discusses related urban theories such as sense of place, place attachment, urban identity and its relation to urban transformation in effort to elaborate how those factors are crucial in formulating the perceptions and feeling of the inhabitants of the users towards their city which eventually impact their human behavior and daily life activities held in the outdoors.
- However, **the second chapter** overviews the different types of transportation infrastructures as well as discussing the history of emerging the planning of highways and flyovers internationally and their evolution throughout the history followed by the different impacts of those structures on the built environment and the local community. Finally, reaching an assessment criteria based on the literature discussed through the two chapters.

3. Moving to **Section three**, focusing on studying the history of Heliopolis district and its initial planning and evolution till the road interventions took

place and understanding the reasons behind this development. As well as discussing the primary data collection methodology and tools used.

4. **Section four** includes the data analysis and findings from the empirical field work and data collection.

5**.** Finally, **Section Five**, reviewing the output from the previous chapters and the holistic conclusion, in addition to a discussion and recommendations for improved and enhanced performance of future mega projects.

Chapter 2:

The interrelationship between human life and built environment

In fact, built environments are involved in almost all human activities, and as a result, they unquestionably play a significant role in people's lives. People spend the majority of their time interacting with built environments, from the places where they live and work to the places where they relax and socialize. Perception and experience are at the heart of this relationship between humans and the environment. The process of perception is what provides people with their immediate awareness of their surroundings and helps them to translate, understand and draw relationships and ties with their surrounding environments (Norberg-Schulz, Intentions in architecture, 1965). According to many environmental psychologists, such as Brebner, Viljoen and Rapoport, the built environment has the power to evoke thoughts, emotions and feelings within its users which makes people get affected continually both physically and psychologically by the surrounding built environments (Reeves, 2012). This chapter will discuss multiple definitions related to place and good city form as well as understanding the interactive mutual relationship between human and the built environment with the focus on the public spaces as a primary element in the built environment building up on the concept of how the radical and sudden change in the public realm features of a city could potentially affect the humans' perception and attachment to this place and eventually influence their daily life pattern.

2.1 The role of the built environment in human everyday life

People, in contemporary society, spend most of their time in interaction with man-made environments in a way or another (Whyte, 1988). This starts from people's homes to places where they work, play, and socialize and if one takes into consideration semi-architectural elements such as gardens, roads, and squares, one arrives at a "network" of interrelated elements that are basically linked to all human daily life activities (Norberg-Schulz, Intentions in architecture, 1965). In that sense, people are continuously surrounded by man-made environments which indicates the crucial role of the built environment and how it affects people's lives, therefore, it is key to have a deeper understanding of this relationship so that public spaces design can adapt to human aspects more effectively (Reeves, 2012). According to Pearson and Richards (1994), the core of the mankind environment relationship is rooted in experiences and perceptions, that are linked to both the symbolic and functional parts of the built environment (Whyte, 1988).

2.1.1 Functionality

Because of the modern functionalist movement, the role of function in the built environment is a debatable topic. This movement stated that any designed form, whether a building, a chair, or a public space should be defined only by its function, and that anything designed with the same manner would be naturally beautiful (Porter T. , 2004). The functional design approach is described by Louis Sullivan's statement 'form follows function' and Le Corbusier's definition of a house as a 'machine for living in'. However, this functional tradition has been strongly criticized for its mechanical, programmatic processes and attention disregard for the human experiences of the created spaces (Relph, 1976). The strictly functional approach meets the basic practical needs of a space to function efficiently, but it ignores the emotional connection that people grow with the built environment (Reeves, 2012). At the end of the day, architecture and urban design are intended to house and ease mankind’s functions. Thus, functional needs are vital role in

the design of any environment; nevertheless, it is important to note that functionality is not the only design consideration (Reeves, 2012).

2.1.2 Meaning

Places simply gain meaning as people live in and interact with them (Relph, 1976), their individual experiences, memories, and intentions automatically form meanings and meaningful ties with their surroundings. This, in return, arouses a various of emotions, actions, and behaviors (Hesselgren, 1975). In addition to the functional tasks outlined in the preceding part, built environment should be designed to enrich these meanings, making human life more meaningful (Norberg-Schulz, 1974). These built environment elements enable people to link symbolic meanings to places and spaces (Rapoport, 1995). People are able to move, function, and behave efficiently and appropriately within the environment by linking meanings with all aspects of the environment. Because the attribution of meaning to things and environments is one of the most fundamental processes of the human mind, designers must recognise that the ultimate meaning of any building goes beyond architecture and responds to people's sense of self and being rather than creating objects and environments of absolute visual attraction that leave people's lives devoid of meaning and coherence (Pallasmaa, 2005). Environments are not experienced as independent, clearly defined entities which can be described simply in terms of their location or appearance in the daily lives of people (Relph, 1976). These built environments, which are present in all human activities, are linked to basic everyday human needs and experiences (Reeves, 2012).

According to Whittick (1960), the built environment best meets human needs when function and meaning are balanced. What is needed is not a precisely mathematical, programmatic procedure, as in functionalism, in which environments are regarded like some enormous machine that we do not quite understand (Relph, 1976). Rather, it is via carefully designed built

environments that address both the user's functional needs and their sense of self that moves designing into a more meaningful existence (Reeves, 2012). After all, the relationship between mankind and the environment is bidirectional, a two-way process, and numerous theorists define it as interactive and dynamic. According to Stokols (1974), the environments not only shape people, yet, it is also shaped by them. This vital interrelationship between mankind and the environment is inextricably tied to psychological experiences and human perceptions (Rapoport, 1995). The characteristics of the environment combine to generate the perceived environment, which influences the behaviour and responses of those who live in that environment (Reeves, 2012).

2.2. Environmental psychology concepts

This part of the literature discusses this interrelationship from the human standpoint through addressing and digging deeper in the approach of environmental psychology which is the study of the relationships between behaviors and experiences of a person towards his/her built environment. Considering its historical context, this subject comprises perception theory, social psychology, cognitive science, the study of social interactions, and the study of culture (Lang, 1987).

2.2.1 Human Perception to the built environment

The goal of perceptual theory is to comprehend people's perceptions and reactions to the environment (Hochberg, 1964) as well as their complete experiences. Walter Gropius argued (quoted in (Barr, 1970)) that by studying the nature of what individuals' experience and how they perceive it, it is possible to better comprehend the potential influence of man-made design on human emotions and thoughts. Philosopher Taylor Carmen (2008) asserts that one can differentiate between two elements of perception: the sensory dimension, which is concerned with passive sensory experiences, and the active motor dimension, which is concerned with physical movements. In

everyday experiences, however, these sensory and motor dimensions are never distinct; rather, they integrate effortlessly so that awareness and movement emerge as a continuous, integrated experience (Seamon, 2010).

Perception has been characterised as the manner in which individuals experience and connect to their surrounding environments, which influences their emotions and behaviours. We do not perceive space solely through our senses; we inhabit it, project our personalities into it, and are emotionally bound to it; space is not merely perceived; it is lived (Merleau-Ponty, 1962). Thus, each individual is the centre of his or her own experienced universe, which is shaped by their subjective experiences. All places and landscapes are perceived individually; each person views them through the prism of his or her own attitudes, experiences, goals, and circumstances (Lowenthal, 1961 cited in (Pile, 1996)). Therefore, it is impossible to construct a special environment for an individual who is not fully comprehended. Their backgrounds, needs, experiencing worlds, biological requirements, and behavioural patterns must be thoroughly examined in order to develop an environment that meets their specific needs and experiential worlds (Reeves, 2012).

Strong ties exist between human perceptions and the built environment, which are affected by a combination of structural and visual variables and impacts. Some of which are objective such as space connectedness, space integration and configuration, natural edges, transportation and routes, and city design and structure. However, other variables are completely subjective such as culture, society, politics, history, lifestyles and types of activities, all influence how individuals see their built environment. All of these characteristics influence how places are perceived and the extent to which they are perceived whether positively or negatively (Agael & Özer, 2017).

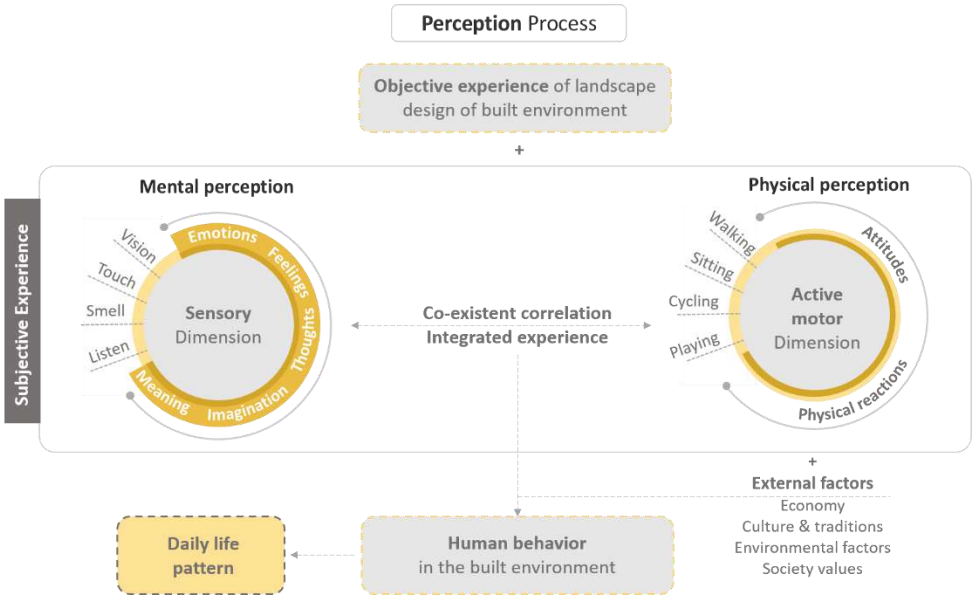

Figure 2: The relation between human perceptions to the built environment and the pattern of their daily life activities - Source: Author

2.2.2 Understanding people's daily behavior in public spaces

Human behaviour and the built environment are strongly interconnected, nearly to the point of inseparability (Reeves, 2012). This relates back to the bidirectional link between humans and the environment, where the concept "environment affects behaviour" does not sufficiently define the relationship (Barker, 1986). Barker (1986) also shows that the fundamental notion of behaviour must take into account the surrounding environment. Therefore, it is necessary to analyse the effects of the physical environment's attributes on human behaviour. Elements of the urban environment, such as visual character, spatial quality, colour, texture, and geometry, that influence people's moods and behaviours, must be treated with greater sensitivity (Reeves, 2012). By considering these factors, the built environment produces places that are more encouraging to productivity, comfort, and efficiency (Mostafa, 2008). According to Rapoport (1995), "the design of any environment must take into account the psychological impact on people, their moods, behaviour, and social interaction". In other words, he urges designers

to prioritise human factors. Social models of behaviour implicitly highlight the difference between the built environment as objectively measured and as perceived by individuals. Based on these models, the built environment may influence behaviour, but most likely by influencing individuals' perceptions. Individuals' interactions with the actual environment are reflected in their perceptions of the environment, which involve an awareness and perception of the outside world through their main receptive senses (Golledge & Stimson, 1997). All of these sensory inputs are then combined to generate a spatial cognitive representation of the environment, which geographers refer to as a mental map of the environment (Sherrington, 1961). Individual and cultural elements, such as gender, socioeconomic status, personal beliefs, place attachment, local culture, social conventions, past experiences, physical capacity, and individual personal qualities may also influence an individual's impression of the built environments. Therefore, different individuals may develop various mental maps of the same built environment and behave differently as a result (Ewing & Handy, 2009).

2.2.3 Human needs in public spaces in relation to place attachment

The purpose of public open spaces is to facilitate and satisfy the human needs especially social interaction (Cacioppo & Patrick, 2008). Activities in outdoor spaces should be considerate of the need for people to move around easily and comfortably from one place to another (Ujang, Kozlowski, & Maulan, 2018). These include possibilities for walking, standing, sitting outdoors, staying, chatting and listening, playing and exercising (Gehl, Cities for People, 2010). Other than the functional needs, individuals and groups must have opportunities to engage in meaningful activities that contribute to their sense of identity in order to develop a sense of place (Ujang, Kozlowski, & Maulan, 2018). (Hernández et al. 2007) defined place attachment as the emotional attachments and bonds that people form with specific locations where they choose to remain and feel secure. The longer a person is attached to a location or a place, the stronger the attachment (Moulay, Ujang, & Said, 2017). The

strength and magnitude of social and emotional attachment to a place is directly associated with length and frequency of engagement of the users with that place (Ujang & Zakariya, 2015). There are multiple layers of activity and visuals in public areas. Consequently, local circumstances necessitate a comprehension of the particularities of places and their character based on the experience and the dynamic activities of the individuals who use them (Perera & Tang, 2013). Therefore, it is vital to analyse social interaction in the context of place attachment, as well as how urban public spaces facilitate social connections among a variety of people and activities (Ujang, Kozlowski, & Maulan, 2018). If a place fits people's needs and helps them achieve their objectives, it will be rated more favourably than other places (Ujang, Kozlowski, & Maulan, 2018). Depending on its use, when a place meets the demands and needs of its users, it may also impact their connections to these places. This, in turn, highlights the significance of a place providing the essential amenities necessary for their preferred activities (Williams & Roggenbuck, 1989). Thus, a person's level of attachment to or dependence on a place is relative to the positive experiences they have in that location and his/her desire to spend longer time in this place.

2.2.4 Theory of Place 'Sense of place'

Sense of place is one of the numerous notions that explains the concept of place. A concept that turns an ordinary space into a unique place with special sensory and behavioural features of people inhabiting it. This indicates that humans connect to a place through comprehending the daily activities and symbols connected with it (Ramadhani, Faqih, & Hayati, 2018). Sense of place promotes not just a harmonious connection between people and the built environment, but also a sense of safety, happiness, and emotional awareness within the individual. Sense of place also contributes to community identity and impacts the extent of community involvement in its development (Canter, The Psychology of Place, 1977). Sense of place is a relationship that is grounded in the subjective experience of a society (values, memory, history

and tradition, in society) and is also influenced by objective experiences and external factors (landscape) that lead to association with place (Ramadhani, Faqih, & Hayati, 2018).

The concept of sense of place is closely related to Edward Relph's proposal of the concept of place. According to Relph (1976), each location has a "unique address"; he believes that "physical setting," "activities," and "meanings" are the three fundamental components of a place. Canter (1977) then referred to the meanings of place as conceptions, focusing on how much experience and decision or choice play a part in the place identity (Milad, 2021). Canter (1977), based his theory on answering two main questions; what are the main elements that combine to identify a place? And what processes exist for recognising places and their characteristics? Therefore, following on Relph's work, Canter (1977) developed a sense of place model that introduced places as a function of "physical attributes" (physical character), "activities" (human activities that take place there) and "conceptions" (meanings and perceptions) (See figure 03). This model implies that the potential relations between actions, conceptions and physical attributes will result in in the formation of a place. Therefore, to fully identify a place, it is important to find out:

a) What nature of activities are likely to occur in that place and what behaviours are accompanied with it.
b) What the physical attributes of that setting are.
c) What conceptions and perceptions people hold of that place (Fahmy, 2018).

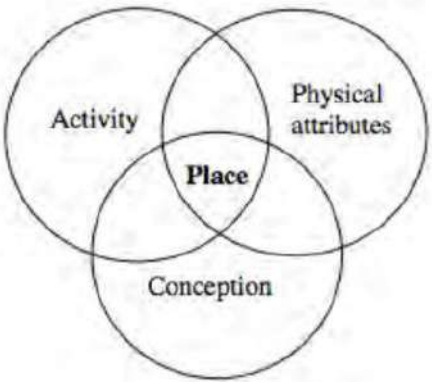

Figure 3: A conceptual diagram of the components of place by Canter, 1977

Numerous scientists in the field of urban design have created numerous sub-models in response to the effectiveness of the component model of Canter. Building on the theories of Relph and Canter, Phunter's (1991) work provides greater detail on a place's components and links them to urban planning concepts (See figure 04).

Soon after, Montgomery (1998) argues that there are a number of components that might strengthen a sense of place (See figure 05). This model is regarded as the most current reinterpretation of place's components and specifies their relationships (Montgomery, 1998).

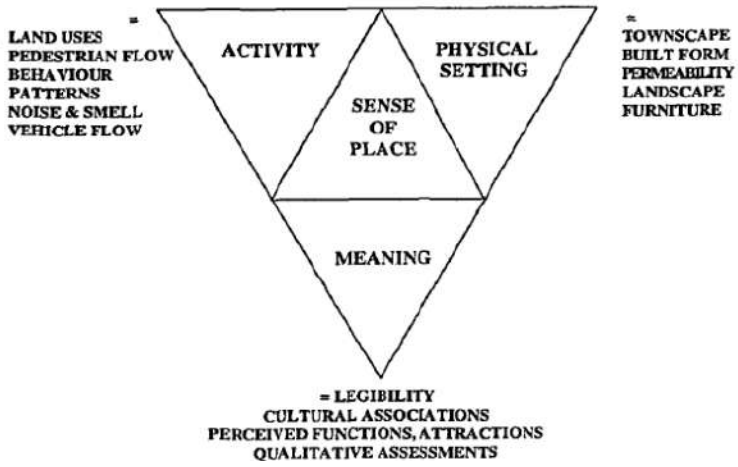

Figure 4: Sense of place components, Phunter 1991

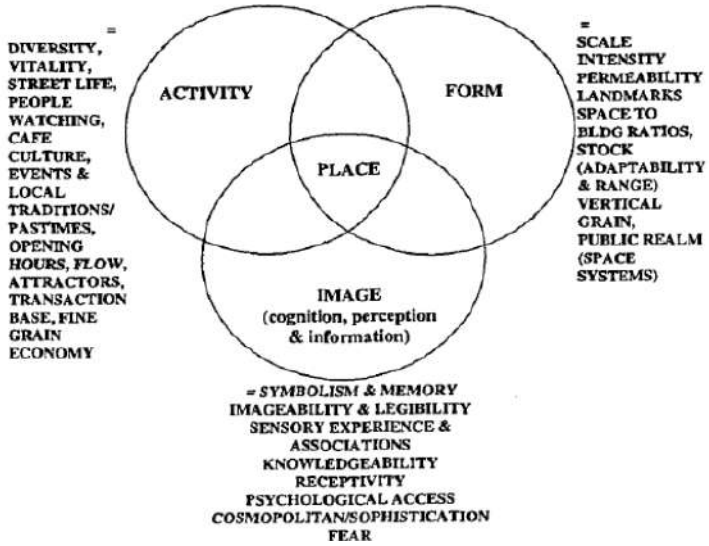

Figure 5: Sense of place components, Montgomery, 1998

2.2.4.1 Activity Patterns

A lot of places have clearly defined activity patterns linked with them. Some activities are suitable to specific places, and some places may be distinguished with certain activities (Canter, 1977). People activity is one of the most significant characteristics of public spaces, according to Jan Gehl (1987). His guiding principle in designing public spaces is that people are attracted to one another; if given the choice between walking on a deserted street or a lively street, the majority of people will probably choose the lively street; people like to choose where there is more to see (Gehl, Life between buildings: using public space., 1987). In terms of the typology of activities, he distinguishes between three primary types: necessary activities, optional/recreational activities, and social activities that occur based on the quality of public space. His final argument, based on his research findings and activity typologies, is that it is possible to influence certain aspects of activities, such as the duration of individual activities, the types of activities that can develop, and the number of people who use public spaces, through the design of the physical settings. Furthermore, Gehl (1987) argues that spaces get meaningful and appealing when all forms of activity occur together.

Activities that are more or less obligatory, such as going to school or work, shopping, waiting for a person or a bus, doing errands, and delivering mail, fall under the category of necessary activities. This category contains the vast majority of activities associated to walking. Because the tasks in this category are essential, the physical structure has a little effect on their frequency. These events will occur throughout the year, under all weather conditions, and are mostly independent of the exterior urban environment. Participants are without options. People are present regardless of whether or not quality is offered because they are required to be there (Gehl & Gemzøe, 2001).

Optional activities are an entirely different matter. This category includes activities such as going for a walk for some fresh air, standing around and appreciating life, and sitting and sunbathing. These activities occur only when the weather and location are favourable, when the outside conditions are perfect (Gehl & Gemzøe, 2001). When outdoor spaces are of poor quality, only essential activities take place. When outdoor places are of high quality, necessary activities occur with nearly the same frequency, however they tend to take longer because the physical conditions are superior (Hanafi et al 2013). In addition, a variety of optional activities will also occur because the setting and circumstances attract people to stop, sit, eat, play, etc. In low-quality streets and urban areas, only the bare minimum of activity occurs. People hurry to get home. In a positive environment, a vast array of diverse human activities are available (Gehl & Gemzøe, 2001).

Social activities include children playing, greetings and chats, communal activities of many types, and passive connections, or just seeing and hearing other people (Gehl, 2010). These activities may also be referred to as "resultant" activities due to the fact that social activities arise spontaneously as a direct result of individuals moving around and occupying the same places (Hanafi et al 2013).

However, worldwide research indicates that if the quality is there – if the public areas are well-located, well-designed, and attractive – people will

utilise them. Therefore, if vibrant, attractive, and secure cities with bustling streets, squares, and parks are to be realised in the 21st century, it is essential that pedestrian activities be of high quality. If quality is lacking, spaces will not be utilized (Hanafi et al 2013). When the quality of the external environment is high, the frequency of optional activities rises. Moreover, when the amount of optional activity grows, the number of social activities typically increases significantly (Hanafi et al 2013)

	Physical environment quality	
	High	Poor
Necessary Activities		
Optional Activities		
Social Activities		

Figure 6: Diagram explaining the relation between Quality of Physical Environment and type of activities - Source: Author, after Hanafi et al based on Gehl and Gemzøe 2001

2.2.4.2 Images and Meanings of the Street

Movements in the urban environment are the main focus according to Cullen as to him a city and its components are best perceived from the street level (Cullen, 1961). Similarly, Jane Jacobs observed cities from the street level. She emphasised on the vibrancy and safety of urban streets in addition to the imaginative aspects of cities. She implies that the street's image represents the city's image (Jacobs J. , 1961). The street is the most diverse space within the city. There are as many images and interpretations of the street as there are purposes and functions. A city's urban fabric comprises of buildings and open spaces, with streets forming the majority of these spaces. Thus, the streets and their sidewalks are regarded as the city's most precious assets where all activities, movements, and interactions between citizens occur

(Mehta, 2013). It was evident from the preceding discussion that people and their activities are just as important as the city's fixed physical features. The streets of a city are an important physical element since they house a variety of activities and functions. Lynch (1960) has recognised paths (and their uses) as one of the key physical aspects that contribute to the creation of the city's image. When new activities are introduced and new boundaries are established during the use of a street, the meanings and images of the street change accordingly (Mehta, 2013)

2.3 Human aspects of Urban form: Good city form

There are various perspectives that determine how humans experience and perceive cities. The most notable contribution was made by Kevin Lynch, a city planner with a background in architecture who was attracted by both the physical structure of space organisation and urban experience. According to him, the city is not only a physical space that planners create, but also a social context that must be considered. Within this framework, he hopes to develop a new way of considering environment and urban form. Lynch (1991) asserts that the cities in which we reside offer plenty of chances. However, cities have physical and visual issues as well. There are four primary causes for this controversial scenario: the burden of perceptual stress, the lack of visible identity, illegibility, and the lack of openness. In addition to creating an uncomfortable and constrained atmosphere, they also result in a visually chaotic space organisation. According to him, an active relationship between humans and the environment, as well as learning and experiencing the city, are the most effective solutions to these issues. Lynch is also interested in the way humans perceive their surroundings. In his books, he investigated how humans and the general public understand and experience their everyday environment and how they shape and arrange it. These questions allowed him to focus on two primary issues: urban quality and good city form, some of their components are explored below (Eraydin, 2007).

2.3.1 Imageability and legibility: aspects of urban image

Urban images, which are shaped by the combination of numerous different elements, play a crucial role in human-environment connections (Eraydin, 2007). Many theorists assert that images are mental representations of physical parts (Eraydin, 2007). Lynch (1960) identified five urban characteristics that contribute to the formation of urban images. These well-known five elements must be arranged to create a legible and aesthetically pleasing environment. A legible setting must have distinguishable and recognisable characteristics. The structure of an environmental setting is based on the interrelationships of its physical components and the recognition of their distinct parts and wholes (Lynch, 1960). A legible setting must also have "emotional or practical" significance for its users (Lynch, 1960). In his image studies, Kevin Lynch (1960 and 1981) determined that a good urban shape must evoke a sensory image. Sense consists primarily of the ease with which one perceives physical elements and their structured wholes. It depends on the spatial quality, form, and perception. Because "perception" differs from observer to observer in the dimension of sensation, one may conclude that it is changeable. Nonetheless, there are major unchanging commonalities, including shared experiences and cultural values (Lynch, 1960).

It is commonly believed that a nice image meets the sensual demands of humans. Consequently, physical organisation should be based on environmental quality, the ideal image, and a good atmosphere that supports a greater quality of life. Image formation and environment perception are psychological processes. According to Rapoport (1995), the environmental impression of a city is significant because the physical setting has significance for observers and influences the human perception of quality and the quality of life. First, humans acquire and collect environmental data, then they organise it in their minds, and finally, they analyse the data and act according to their preferences. Therefore, there are three steps in Rapoport's

environmental interaction process: perception, cognition, and assessment (Eraydin, 2007).

2.3.2 Urban Identity and Urban Transformation definitions

Urban identity, a cultural phenomenon rooted in the past, is the sum of qualities that identify one city from another (Sirel, 2005). Urban identity is ever-changing. Each city's social structure has reflected its physical form throughout history (Nalkaya, 2006). The house we were born in, the street we've lived on, the neighborhood, and the city we've given significance to via our knowledge and experiences include most of our images and comments on history, culture, and identity. Cities' enduring surviving spatial traces are important indicators of urban identity. A particular urban character evolves over time, interacting with residents' lifestyle, cultural identity, traditions, and religion (Arbak, 2005). A city's natural and artificial features, sociocultural qualities, local customs, and life styles constitute its urban identity. Geographical factors, vegetation, climate, topography, and built environment components like buildings, monuments, urban regions, squares, paths, and urban furniture help define urban identity (Hacıhasanoğlu, 1996).

Urban transformation encompasses all efforts and approaches taken to enhance the physical, social, and environmental elements of degraded urban areas (Esentürk, 2009). Implementations of urban transformation include designing a development model to improve quality of life, meeting the development demands of the urban fabric, managing urban expansion, and engaging individuals from diverse social groups in planning urban policies (Karadağ, 2008). Birsel et al. say that implementing urban transformation requires identifying the city's urban character and maintaining sustainability while preserving it (Birsel, Polat, & Yılmaz, 2003). Implementations in historic urban districts must retain spatial meaning, develop the interaction between urban space and people, and enhance urban life and culture (Demirsoy, 2006).

The evolution of cities is a natural consequence of time, as their size, layout, function, and significance are constantly evolving. Economic, political, and social forces play significant roles during the time of urban area development and in determining its identity. In addition, turning events in the history of cities, such as wars or natural catastrophes, shifting urban politics, and plan decisions and processes, affect not only the physical and economic structure of cities, but also the social, cultural, and traditional values of the region. These changes extend over lengthy time periods and threaten the spatial and perceptual characteristics of cities gradually (Gurkan & Beyhan, 2015).

2.3.3 Urban transformation, sense of place and loss of identity

The relationship between healing environment, well-being, and sense of place plays a crucial role in preserving and fostering neighbourhood identification, and is one of the primary objectives of urban transformation efforts. In this approach, architectural landmarks and streets are significant visible indicators that serve to strengthen a community's feeling of identity, awareness, and loyalty (Ultav, Demirli, & Demirtas-Milz, 2015). Since cities evaluate physical, social, economic, and cultural processes, each district's identity is shaped by a variety of elements. Urban transformation projects alter the district's character through transforming the physical and socioeconomic structure of a neighborhood. According to these modifications, the settlers' sense of belonging to place connection may diminish, and they may lose vitality, livability, and a sense of place (GÜR & HEİDARİ, 2019). Additionally, it can enhance their sense of displacement. Physical environment, population, social system, and premium services have an effect on the identity, attachment, and contentment of residents. High-quality settings are characterised by residents' ability to connect, feel attached, remember, and miss them. As a result of new urban transformation projects and the high population density in cities, user happiness, connection to place, and communication all contribute to a decline in quality of life. The

urban change process has influenced the notion of a sense of place. It is a comprehensive combination of physical forms, behaviors, and meanings. Public memorials are tangible symbols that bring memories to life in public spaces (Ujang & Zakariya, 2015).

Memory sites are connected to their surroundings, multi-user, and constantly active. They are not isolated from urban life and daily activities; they provide background information about a district. They have considerable potential to positively alter social memory and urban identity (Maree, Gurler, & Ozer, 2013). They are sites of cultural production and interchange, of issue and subject negotiation, and of societal and value formation. (Hernández-Garcia, 2012). The majority of the development of these public open spaces was accomplished by locals. Place identity has an inherent relationship with place attachment. According to some scholars, place attachment is an element of place identity (GÜR & HEİDARİ, 2019). Others view both as aspects of a larger concept, such as a sense of place. Some argue that place attachment is a complicated form generated by combining components such as identity, social bonds, and place dependence. (Hernández, Carmen Hidalgo, Salazar-Laplace, & Hess, 2007). Changes in inhabitants' senses of place connection, satisfaction, quality of life, and affordability are the consequent consequences of identity loss in the urban transformation process (GÜR & HEİDARİ, 2019).

2.3.4 Place attachment in relation to changes

Place attachment is what Hummon (1992) refers to as the emotional connection between a person and his or her life's region. It induces feelings of security and comfort and tends to remain in that place. Place attachment is a complicated phenomenon that combines multiple aspects, including identity, dependence on the place, and social connections. It comprises the relationships between effect and emotion, knowledge and acceptance, and behaviour and activities in relation to a place. It plays a supporting role in the formation, preservation, and protection of group identity or culture. (Altman, 1992). The degree of place attachment of various sociocultural traits is

influenced by the characteristics of user groups in terms of their role, culture, and social level. Long-term residence, life-cycle stage, location of birth, and participation in social events and celebrations with locals all contribute significantly to a resident's sense of belonging (Altman, 1992). Consequently, the length of residence and property ownership have an unavoidable effect on the relationship between a person and a place, as exposure to an area increases place attachment (GÜR & HEİDARİ, 2019). Residents can interact and communicate with their social network when they spend more time in a location. Any changes to the urban physical setting affects the physical and social structure as well as the user's sense of place (Altman, 1992; Hummon, 1992).

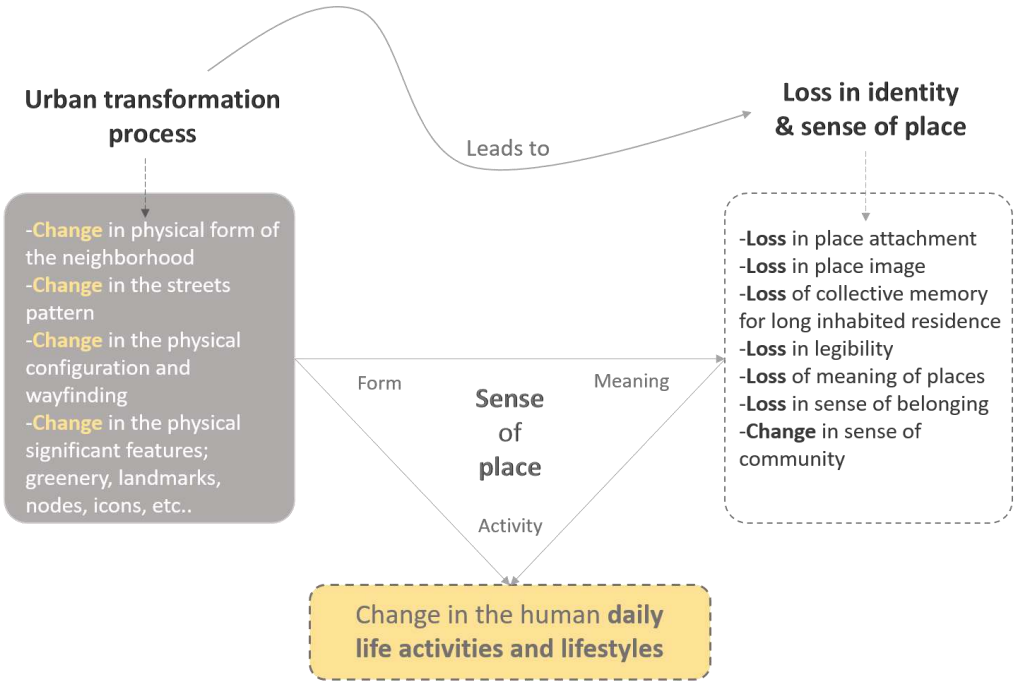

Figure 7: Diagram explaining the relation between urban transformation process, sense of place, loss of place identity and daily life activities - Source: Author

Summary

To sum it up, a city should be planned with regard to the everyday life that takes place in its spaces. To create a more equitable and sustainable urban development, it is crucial that cities connect us to our individual and social identities. Good connections improve choice, promote social cohesiveness, revitalise and preserve places, and facilitate human engagement. A high-quality urban design takes into account how transport infrastructure and services may connect and promote the sustainability of neighborhoods and cities. Places with efficient connections between activities and strategic placement of amenities enjoy shorter travel times and less environmental impact. In a city where physical layouts and activity patterns are simply understood, residents and visitors can navigate with ease (Ahlgren, Robson, & Houthaeve, n.d.). Not only does the built environment hold its functions, but it also participates in human activities and affects their feelings and perceptions (Reeves, 2012). Individuals' satisfaction, mood, self-esteem, and personal development are influenced by the quality of their environments, which has a direct correlation with their functioning (Stokols, 1974). The physical environment affects a person's capacity to concentrate, and in general, the happier individuals are, the better they perform and behave (Beaver, 2010).

This chapter discussed the urban spaces in the built environment from the human perspective, the two-way influence between the physical environment and human perception, impressions and behavior as well as approaching the concepts of urban transformation in relation to place attachment, sense of place and loss of urban identity. Moreover, this chapter contributes in building the assessment criteria framework of this study that is anchored at the sense of place model which explains the relation between the tangible and intangible aspects forming a city settling. Those aspects are the physical setting, the activities and the image or meaning of places. This study will adopt those three categories in its analytical evaluation in an attempt to

examine the extent of influence of the change in the physical form of a high class heritage district like Heliopolis on the subjective perceptions and experiences of its local communities that are mostly neglected by the majority of urban planners in Egypt who mostly focus on the functional and economical dimensions in the development projects with no regard to the psychological or social aspect of the people who use and experiment these projects eventually.

In that sense, the researcher developed a model called the 'SSS place experience model' incorporating all the discussed people-places related concepts in this chapter. It mainly depends on the sense of place model basic elements as seen in figure (08). The 'SSS model' refers to the spatial experience that explains the relation between the form and the activity, the sensory experience that result from the link between the psychology of human and the physical form and finally the social experience that describes the connection between the human perception and behavior.

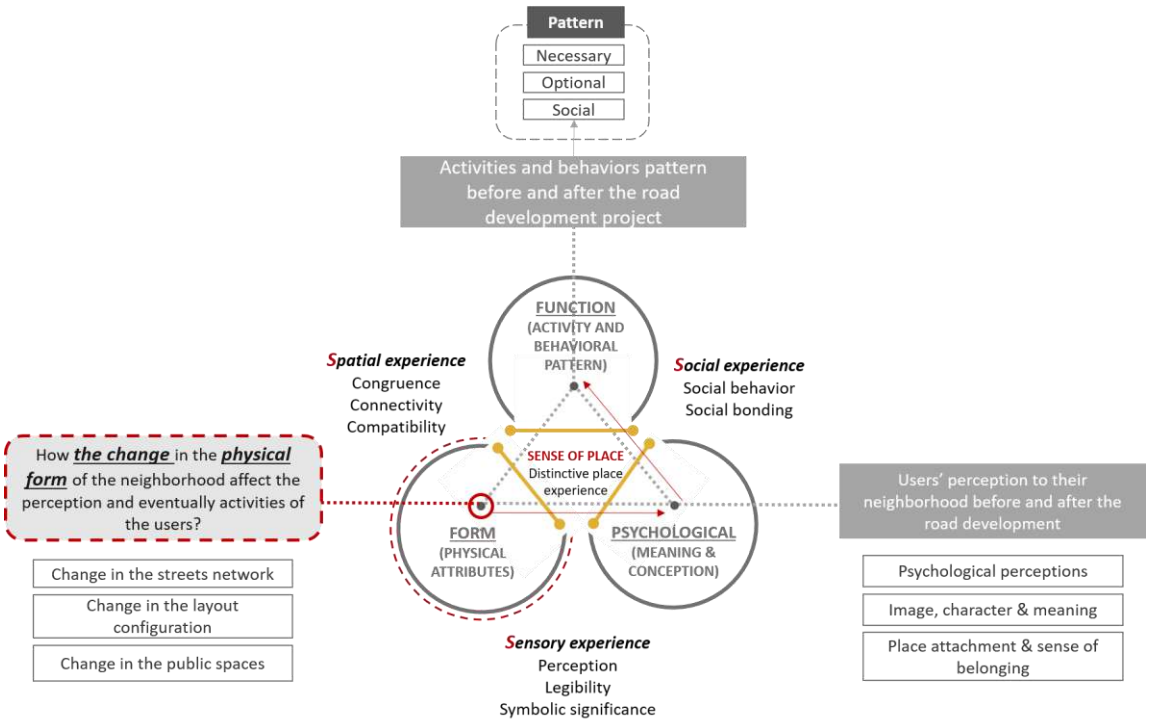

Figure 8: Diagram explaining the relation between urban transformation process, sense of place, loss of place identity and daily life activities -Source: Author

However, the following chapter focuses on the different impacts of transportation infrastructures on the local community level from the international past experiences to dig deeper in the spatial-psychological dimensions of these structures.

Chapter 3

Transportation infrastructure: An international overview

The previous chapter discussed the intellectual relationship between the physical and psychological aspects of places and how the built environment affects the human perception to the surroundings which eventually impacts how humans behave in their daily life activities in the urban commons. And since the focus of this research is the urban transformation that occurred to Heliopolis district in terms of constructing new transportation infrastructures, this chapter discusses the different terminologies and types of those structures as well as overviewing their evolution planning history in the international literature followed by tracing the perception journey of these structures by expert urban planners going from fully supporting to criticizing them throughout time and experience. This chapter also aims at scoping the different impacts of highways and flyovers on the built environment and local community in past international practices to help reflect on the local situation of Heliopolis. The outcome of this chapter will contribute to the analytical assessment criteria framework used to examine the effect of those structures on the local community level of Heliopolis.

However, while the concept of those gigantic structures was starting to diminish in the developed countries, it began emerging in the developing countries. In the same time that experts around the world were discussing the drawbacks of those infrastructures and were actually in the process of mitigating their negative impacts, many of the developing countries are still adopting them as primary solutions for vehicular mobility in urban centers.

3.1. Transportation infrastructures

Cities require roads, and sometimes even highways, but few cities have systematically considered when and where highways are needed. The role of highways in an overall transportation system is to transmit traffic over long distances at high speeds (LeCompte & Bocarejo, 2012). With the rise of automobile culture at the beginning of the 20th century, urban planning criteria and preferences changed drastically, and numerous new urban elements were launched so rapid adaptation to the culture of the automobile was necessary for cities (Dessouky, 2016). Therefore, expansive street and circulation network development was required to accommodate the growing automobile culture. As planners acknowledged that the crowded, narrow, and slow city streets were not the best option for fast automobiles, they introduced the concept of highways, then elevated urban highways and flyovers (Dessouky, 2016).

3.1.1 Transportation infrastructure types and definitions:

According to literature review, there is confusion surrounding the transportation infrastructure terms such as highway, elevated highway, flyover, bridge, and freeway due to the close similarities between them. Therefore, it is crucial to draw attention to the difference between these terms to clarify the distinct features of each structure.

Highways are defined as the main roads linking major cities and towns together (Oxford Dictionaries). They, unlike freeways, often have slower speed limits and may pass through neighborhoods with signals of traffic lights, pedestrians, or other slower vehicles (Diffen, 2022). On the other hand, the **elevated highways** refer to the high-speed roads that are elevated above the ground level connecting major cities (Dessouky, 2016).

Freeways are highways with controlled access and no intersections that can only be accessed through ramps. It is called a freeway because it lacks traffic lights, intersections, and at-grade crossings with higher speed limits than

highways which makes them quicker than regular highways (Hellinga & Van Aerde, 1994).

Expressways are controlled-access highways with signalised intersections at grade. Vehicles can only enter and exit through a limited number of entry and exit points, allowing vehicles to drive at a higher speed (Dietz, 2017).

A bridge is a generic term for the description of the structure itself which is constructed to connect two locations separated by natural obstacles, such as rivers, seas, valleys, etc. (Doc, 2014)

Flyovers or overpasses are structures that are constructed over man-made obstructions, such as other roads, intersections, etc., to bypass congestion and facilitate faster mobility (Doc, 2014).

All these structures are very similar in their impacts on the local community and the built environment, yet they are different in their physical characteristics but they are similarly treated when it comes to urban planning. However, in this research, the focus of the study will be mostly concerned with the terminologies of highways and flyovers that got implemented in the case study of Heliopolis.

3.1.2 Why urban highways and flyovers?

Before discussing the various impacts of highways on society and the built environment, it is important to understand and summarize how and why city planners have adopted highway planning for more than a century in the first place. Urban planners aimed for constructing elevated highways to provide a rapid circulation network connecting major urban centers. Elevated highways were introduced as major raised streets that are designed to cause minimal disruption to the surrounding communities "as it simply passes over them" and restrict its access to cars only resulting in faster movement and traffic flow avoiding intersections with pedestrians and vital life in the city's streets. Some elevated highways were constructed outside of major cities, while others, known as elevated urban highways, would pass over densely

populated urban cities (Mohl, The Interstates and the Cities: Highways, Housing, and the Freeway Revolt, 2002) .

As current urban planners advocate for the removal of elevated urban highways from the cities, urban planners from the past were the ones who supported and called for the construction of elevated urban highways as a mobility solution (Dessouky, 2016). MacKaye and Mumford in their article "The Townless Highway," explained the need for highways. MacKaye and Mumford observed that motorists navigating the cities through fast roads were obliged to slow down in the downtown area and interact with pedestrians, as well as pollute the environment. MacKaye and Mumford proposed that highways be elevated and removed from the city environment to eliminate distractions, conceal older neighborhoods, and reduce access to pedestrian and slower mobility options. MacKaye and Mumford saw in highways an opportunity for a safer environment, fewer accidents, and less pollution due to the separation between automobiles and pedestrians (Mackaye & Mumford, 1931).

In the time period from 1940s to the 1960s, policymakers followed Mumford, and other urban planners' proposals to elevate the highways, and as a result, highways were pushed into the heart of cities and neighborhoods (ITDP and EMBARQ, 2012). Bauman, while reviewing the initial period of highway planning, between the 1940s and 1950s, describes how city planners collaborated with civic leaders, downtown businessmen, and politicians under the term "pro-growth coalition" (Bauman, 1991). This alliance believed that the development of large structures, such as highway systems was going to be revolutionary and was necessary for the survival of urban cores. The alliance asserted that highway systems would contribute to the revitalization of urban cores by elevating the crowded street, resulting in a flourishing downtown business district, restoring back a healthy residential environment and refreshing the urban economy. In 1950, Paul Oppermann, the planning director of San Francisco city, stated in a public speech that highways will be

the urban backbone of the city because they will divide the city into logical areas and connect different sections of the city via easily accessible fast routes (Mohl, The Interstates and the Cities: Highways, Housing, and the Freeway Revolt, 2002). Before 1956, these beliefs influenced highway planning (Bauman, 1991). Any obstacles to the goal of connecting the cities with highways—such as parks, iconic canal structures, etc.—were given secondary consideration. Highways were viewed as the newest, most obvious symbol of urban growth at that time (Bauman, 1991).

Over the course of many years, highway engineers created their vision of technologically advanced freeways that speed vehicles to their destinations while overcoming the massive traffic jams that clog the roads of downtown. Instead of reviving central cities and downtowns, as anticipated by city planners, the new freeways accelerated process of urbanization. Resultantly, a process of decentralization of retail and manufacturing occurred, causing urban decline in the central cities (Mohl, The Interstates and the Cities: Highways, Housing, and the Freeway Revolt, 2002). It was believed that elevated urban highways were the optimal way to absorb the increase flux in automobiles and bypass congested neighborhoods. Moss explains that, between 1950 and 1960, highways totally transformed the urban landscape of cities around the world (Mohl, The Interstates and the Cities: Highways, Housing, and the Freeway Revolt, 2002). DiMento asserted that at the time, highways were viewed as a sign of modernism and development, policymakers related highways to urban economic success. Planners believed that elevated urban highways crossing cities would reduce traffic congestion and improve more downtown access, but the exact opposite occurred. As a prerequisite for future growth and development, the objective was to provide connectivity into and between all cities, penetrating the heart of metropolitan areas, and encircling large cities with inner and outer belts (Mohl, The Interstates and the Cities: Highways, Housing, and the Freeway Revolt, 2002).

Between the 1930s and the 1960s, Robert Moses, a prominent city planner who was responsible for many of New York City's major urban projects, saw highways as the ultimate solution to urban issues (Mohl, 2002). Moses saw that New York was an overpopulated area, therefore he had to clear the way for highways with "a meat axe" (Mohl, 2002). Mohl (2002) describes how the automobile industry collaborated with engineers to create a vision for technologically advanced highways that would accelerate private vehicles to their destination while bypassing congested cities. Mohl (2002) also stated how General Motors sponsored an exhibition titled "Futurama" in New York in 1939 to showcase their vision of cities of the future. The exhibition featured contemporary elevated highways that flew through high skyscrapers. General Motors developed a picture of a free-flowing national highway system connecting all major cities. General Motors promoted the growth of technology by tying the concept of national progress to automobiles and highways. The exhibition inspired popular support for the development of motorways by conveying the notion that the future of cities depends in the construction of roadways (Mohl, 2002).

However, following the United States' lead in early highway construction, cities around the world began promoting urban highways despite these negative effects. During the period of the 1960s and 1970s, a number of new urban highways were constructed in Brazil, including Rio de Janeiro's Reboucas Tunnel and the Freyssinet Viaduct, which provided a direct route between the downtown and the fashionable South Zone of Copacabana, Ipanema, and Leblon (ITDP and EMBARQ, 2012). Londoners became familiar with these infrastructures after 1960, when the Westway flyover was constructed, cutting a large swath through north Kensington, and passing very close to Acklam Road, overlooking the windows of many residents and the Hammersmith flyover. The partially finished Hammersmith flyover, which was designed to lessen traffic congestion from central London to the West, became an urban nightmare (Porter R. , 1998). In China, all urban land is owned by the government, which made it easy for the government to

construct highways. In India, the government developed and expanded flyovers into limited access motorways (ITDP & EMBARQ, 2012).

These flyovers, which were environmentally destructive and lacked any attempt at landscaping, turned locals against similar development. At some point in the 1960s, many Americans began to focus on the negative effects of freeway building, rather than the obvious benefits of modern, high-speed, express freeways serving a nation addicted to automobiles and mobility (Mohl, 2004) . In the late 1960s and early 1970s, a "freeway revolt" movement gained momentum because of the opposition to freeways. By the mid-1970s, the anti-freeway movement and the environmental movement, raise flexibility in federal transportation funding, and greater local and state control over this funding appeared to have effectively halted the development of a number of freeway projects across the country (Kabir, 2009).

By the beginning of the 1990s, the era of urban freeway construction expansion had ended. Numerous cities are reassessing past highway policies that pushed elevated highways through urban cores, resulting in severe damage to housing, businesses, and neighborhood. moved by the demolish movement of Congress for New Urbanism (CNU), now headed by John Norquist At least two dozen American cities have explained or planned removals or demolish of inner-city elevated expressways or at least parts of them and replacing it with at-grade boulevards to restore the resulting land for housing, recreational space, and commercial space, and to re-knit the urban fabric that was destructed (Mohl, 2012). Today, elevated roadways are being targeted for removal due to their stifling effect on urban development in an ever-densifying city and the threats they pose to urban air quality. Boston, New York, and Portland initiated these demolitions (Mohl, 2012). The Seoul Metropolitan Government (SMG) has recently considered removing a number of unnecessary overpasses that once played a vital role in maintaining continuous traffic flow but seem to have become an environmental burden. This year, Seoul will dismantle its first overpass,

Ahyeon Overpass, after demolishing 15 freeways over the past 12 years (McKeag, 2014).

3.1.3 Impacts of highways

With the conclusion of this "pioneering period" of highway construction, the focus shifted to the more complex issues resulting from the rapid increase in traffic and vehicle flow. Today, urban planners are advocating for the removal of highways and bridges from cities, whereas in the past they supported the construction of such infrastructures as a mobility solution. Approximately while the idea of elevated highways began to spread in developing countries, experts in developing nations began to recognize and discuss the impact of elevated urban highways on the built environment.

Influential urbanists such as Jane Jacobs, Lewis Mumford, Herbert Gans, and others criticized urban highways, freeways, expressways, and other similar developments to resist their growth, calling for an end to the construction of highways in inner cities (Dessouky, 2016). In the 1960s, Jane Jacobs and many other urban planners began to recognize the extensive negative impacts of introducing elevated urban highways to cities. Jacobs discussed these impacts in "The Death and Life of Great American Cities," highlighting the different impact on the society and the built environment. Jacobs emphasized the unintended effects of urban highways, such as environmental degradation, changes in land use, and pedestrian deaths. According to Jacobs, cities should promote social interaction at street level by favoring walking, bicycling, and public transportation to encourage people to communicate and interact. Jacobs viewed highways as giant creatures that would slash through residential neighborhoods, cast a shadow over them, devastate them, and endanger their pedestrian lives (Jacobs J. , 1961) .

Lewis Mumford, who wrote in the 1930s about the necessity of elevating and separating highways from cities, returned in the 1960s to warn about the damage caused by highways crossing cities (Mackaye & Mumford, 1931; Mumford, 1963). Mumford described how highways have relegated American

family lives to monotonous suburbs with minimal social interaction, no pedestrian life, and making the American citizens work as a full-time driver. Mumford criticized engineers for valuing their own work, "highways," above the human function they serve. Mumford explains how the highway engineers lack of social and historical knowledge, led them to repeatedly commit fatal errors. Mumford compared the elevated highway experiment to the elevated railroad experiment during the mid-19th century. As Mumford describes how the removal of elevated railroads (after realizing their negative effects) was seen as a positive development, around the same time elevated highways were planned. Mumford defended his ideas by emphasizing how the elevated structure decreased the value of nearby properties and how its supporting columns prevented the space beneath them from being utilized for surface transportation. Mumford stated that to make the most of the highway system, urban pedestrian circulation and the development of mass transit must be prioritized (Mumford, 1963).

Halprin, in 1966, discussed the various ways in which an elevated urban highway can harm the neighborhood it passes through. *"Elevated freeways have caused much more damage to the communities they pass through. They have obstructed light and air; by their large shadows on the ground and their traffic noise, they have brought blight to the city. Even worse, the surfaces beneath them are occupied by parking lots, automobile junkyards, and garbage. These characteristics have contributed more than the freeway itself to the ugliness of the cities it bypasses."* (Helprin, 1966)

Between the decades of the 1970s and the 1980s, such initiatives rekindled urban activism. The concept of urban highways began to transit from a positive annotation of development and success to a negative annotation of deterioration and repression. Kabir found that the urban planners discovered that the negative effects of urban highways outweighed their needs and how the elevated urban highways acted as a physical and social barrier between commuters and downtowns. He also describes how planners noticed that

automobile riders passing over elevated highways did not connect with the city centers (Kabir, 2009).

Saiz (2006) argued that highways are a sign of dictatorship because policymakers prioritize spending money on private transportation over public transit. Saiz emphasizes that highways were a major concern for two of the most powerful regimes in history, with Mussolini constructing 500 kilometers of the Italian Autostrada and Hitler constructing 2,100 kilometers of the German autobahn. Saiz (2006) identified four theories that link the absence of democracy to the development of highways. In the first theory, Saiz argues that urban elevated highways are a simple tool with high social returns that can be used to demonstrate a country's development; policymakers utilize urban elevated highways to enhance the regime's prestige in the eyes of the local citizens and international community. In his second theory, Saiz compares the decision-making processes of democratic and non-democratic nations regarding welfare-related consumption expenditures and public transportation as democratic countries choose to spend more money on welfare-related consumption expenditure issues and public transportation in comparison to less democratic countries. The third theory explains why maintaining a vast, high-quality road network is a priority for less democratic countries and military regimes to guarantee greater control, internal repression, and external military intervention. Fourth democratic governments choose not to invest in roads and infrastructure due to their high cost, which threatens the regime's economic stability, and instead delegate these responsibilities to future governments (Saiz, 2006).

The impact of elevated urban highways extended beyond disrupting urban communities and displacing individuals. The long-term social, visual, environmental, and economic effects have been extensively studied in the literature (Dessouky, 2016). The social effects of highways on the community ranged from congestion to the attraction of undesirable activities. The off-ramps of highways within cities frequently disrupt the capacity of city streets,

causing congestion underneath them (Ebeling, 2013). Frequently, the areas beneath elevated urban highways are shady and obscured, which attracts undesirable or dangerous activities that endanger the safety of the community. On the other hand, the impacts of highways touch on the issue of de-gentrification of cities where these infrastructures encourage wealthy people to flee to other prosperous suburbs leaving their original ones to be replaced by poorer population. Baum-Snow (2007) argued that elevated urban highways are associated with suburbanization. Baum-Snow claims that between the 1950s and the 1990s, the urban population in U.S. cities dropped by 17 percent despite a 72 percent increase in the population of the metropolitan area as a whole (Baum-Snow, 2007). Baum-Snow estimates that a new highway crossing through a key city will result in an 18 percent decline in its population. Baum-Snow reflected on Alonso's 1964 land use theory, noting that faster commute times enhance the demand for homes in the suburbs rather than in centre cities. Baum-Snow also related the dispersion of urban employment to the elevated urban highway systems that allowed large corporations to migrate to the suburbs. This study highlighted the significant changes in land use patterns in the United States and their relationship to the elevated highway system (Baum-Snow, 2007).

Properties located close to elevated urban highways are subject to relatively high levels of locally hazardous air pollutants, as well as high levels of greenhouse gas emissions and noise. Asthma cases tend to increase in areas surrounding elevated urban highways as a result of the elevated highways' high levels of pollution according to some studies (Ebeling, 2013). Levin (2012) conducted a five-year community evaluation of highway exposure and health. The purpose of the study was to determine how vehicular pollution from highways affects the health of people who live near highways. Levin discussed the health effects of fine and ultrafine air particles. The study found that the amount of air particles within 100 meters of highways was three times higher than in other areas far from highways (Levin, 2012). Levin notes that people who live and work near highways will be disproportionately affected

by their health impacts. He explains that even if the residents are aware of the health risks associated with living near highways, they are predominantly low-income communities that cannot afford to relocate to a healthier location (Levin, 2012).

The exposure of residents living near highways to diesel exhaust and air particles has numerous adverse effects on their health. Long-term effects include increasing the risk of cancer, while immediate effects include irritation of the eyes, nose, and lungs. Continual exposure to the exhaust can result in headaches, lung inflammation, asthma attacks, and an increase in the incidence of childhood illness (Office of Environmental Health Hazard Assessment (OEHHA), 2001). Other studies have linked living near highways to premature birth and babies suffer from low birth weight. A study found that mothers living within 220 yards of highways have a 58% increased risk of preterm birth and an 81% increased risk of low birth weight (Généreux, Auger, Goneau, & Daniel, 2008). The elevated urban highways also increase the heat island effect within cities, which decreases the surrounding quality of life and property values (Ebeling, 2013).

Literature demonstrates that the visual consistency of highways can act as physical and psychological barriers that create undesirable views (Elshater & Abusaada, 2020). In other words, highways serve as physical and mental obstructions that disrupt the pedestrian experience (Trancik, 1986). The most significant effect of highway systems is visual intervention, particularly in urban environments. When the majority of our knowledge is acquired visually, these structures majorly affect the human perception of the built environment and eventually human behavior.

Introducing elevated highways into the urban fabric can have an impact on the economy, not only the current local economic activities but also the neighborhood's economic potentials. As the traffic is elevated above the stores, the number of cars driving on the actual streets in front of the stores is reduced, consequently reducing the number of potential customers (Ebeling,

2013). The impact of highways on businesses, particularly those that rely on pedestrian traffic, is negative. According to studies, businesses alter their activities to accommodate the construction of elevated highways, consequently altering the entire economic profile of the area (Ebeling, 2013). Parolin (2011) emphasized in his research on the economic impacts of highways and the pre and post highway situations. According to Parolin's research, the passage of highways through small towns increases their negative economic risks. Parolin proposed the development of mitigation measures to lessen the negative economic effects of highways and promote of pre and post bypass cooperative planning arrangements (Parolin, 2011). It is common knowledge that highways increase the value of the areas to which they extend because they make new areas more accessible. This positive effect is diminished in areas directly adjacent to highways, as research indicates that residential property values tend to decrease in such areas (Carey, 2001). The impact of elevated highways is not limited to business and property values; it can also have a negative effect on municipal income because they can occupy valuable land in the middle of the community without paying taxes. Therefore, each meter occupied by an elevated urban highway passing through the city could have been a meter for commercial, residential or entertainment space, or even a tax-generating public space. For example, the removal of an urban freeway in Milwaukee, United States, made 26 acres of valuable urban land available for redevelopment (Ebeling, 2013).

The consistency of planning for new highways by policymakers contradicts a number of studies that have analyzed their diverse adverse effects. Other theories wonder whether elevated urban highways resolved the intended traffic congestion issues. Many authors, including Cavero (2009) see the elevated urban highways as an ineffective way to solve traffic congestion. Elevated urban highways have a short lifespan due to the rapid consumption of additional road capacities by generated traffic. Cavero discusses the theory of induced demand, explaining that the construction of more and wider

highways increases the demand for more and more highways, as new highways encourage more citizens to switch to private transportation modes and create new longer trips. Carvero observes that the failure to account for the theory of induced demand has led to an exaggeration of travel times, which makes the argument for expanding road capacity completely irrelevant (Cavero, 2009). Not only having elevated urban highways harmed the nearby neighborhoods, but they have also failed to solve the problem for which they were intended (Dessouky, 2016).

Through the review of international literature and effects related with the elevated structures' presence. In less than 30 years, it was evident that urban planners, city managers, and intellectuals switched from being pro-highways to anti-highways. The major impacts are summed up (see figure 09) and then classified into five categories, physical and spatial impacts, economic impacts, visual impacts, social impacts and environmental effects as shown in figure (10). The physical impacts can be concluded into the physical segregation, death of pedestrian life and threatened pedestrian safety, vehicular dominance, improving traffic congestion on the short term yet induced traffic on the long term, questioned accessibility to different places and neglected landscape features such as greenery and furniture. The social impacts are summed up in affecting the sense of community, possible de-gentrification of the original residents, attracting passer by strangers to the local premises, affecting the privacy of buildings overlooking the flyovers and attracting undesired activities below the flyovers. The visual impacts are imposing visual disturbance to the area, affecting the attractiveness of the area, changing the urban image of the urban environment as well as affecting the legibility of the space. The environmental impacts are mostly the noise pollution generated from the increased speedy cars and the air pollution resulting from the car exhaust as well as deficiency of greenery and plantation. Finally, the economic impacts are concerned with the change in land and property value as well as changing the accessibility to the local business that depend on pedestrian flow which eventually affect their economy.

Figure 9: Diagram scoping the different impacts of highways and flyovers on communities and urban environment from the international literature -Source: Author

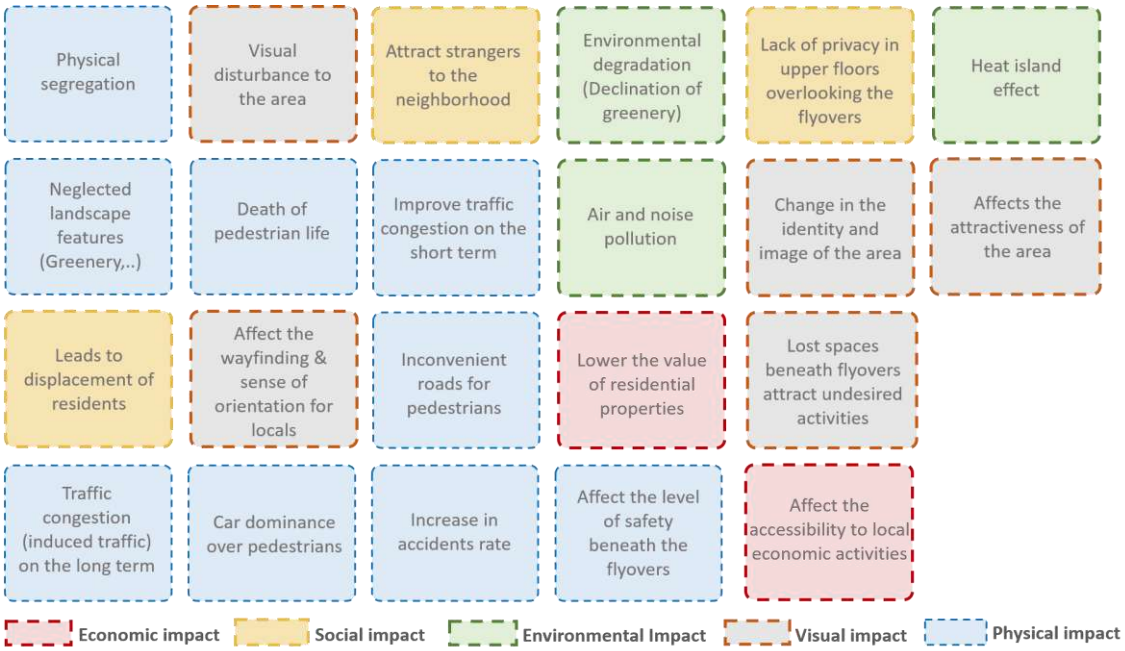

Figure 10: Diagram classifying the different impacts of highways and flyovers into categories -Source: Author

It is worth mentioning that these impacts are the most common in the past international experiences and it is very important to be taken into consideration by urban professionals as well as decision makers for a more enhanced and sustainable future urban planning so that adverse effects could be avoided and positive potentials could be stressed upon and magnified. For that reason, the assessment framework of this research will be guided by those impacts where defined indicators will be derived from them to be examined later in the analytical study. This will be more elaborated at the end of this chapter.

However, urban activism was reawakened between the 1970s and 1980s as a result of the extensive impacts of elevated urban highways recognized over time. The concept of urban highways shifted from conveying a positive tone of progress and success to a negative tone of deterioration and repression, and new urban solutions for elevated urban roads are being rethought using new metrics that build streets for people (Dessouky, 2016). This approach goes against the one-size-fits-all strategy that urban planners and decision makers adopted to push highways and flyovers in the cities' urban fabric between 1950s and 1960s . It was often believed that freeways would relieve congestion and increase city safety. Surprisingly, these two arguments are still frequently used to justify spending enormous quantities of public money on expanding existing highways or constructing new ones (ITDP and EMBARQ, 2012). Nonetheless, it is important to study the different urban solutions and approaches that can mitigate or remedy the impacts of those structures.

3.2 A way forward | Solutions and alternatives

The purpose of highways is to transport traffic over long distances at high speeds. To satisfy mobility requirements, investments in alternative modes of transportation are required. Congestion can be alleviated by constructing more roads, but the costs — financial, social, and environmental — can be high and the relief becomes temporary. More and more cities are adopting a strategy in which they collaborate with their citizens to ensure that they have

access to the goods and services they require without relying on automobiles (Dessouky, 2016). The majority of elevated urban highways constructed in the 1950s and 1960s are nearing the end of their lifetime span, making them unsafe but this also presents new opportunities for rethinking the function of existing elevated urban highways. Since maintaining elevated highways places a pressure on government budgets, many policymakers are reconsidering whether they are worthwhile or not (ITDP and EMBARQ, 2012). Urban planners found that the urge for efficient mobility systems that connect different areas, goods, and labor is at the expense of place making, visual blight, barriers, noise, vibrations, casting shadows, and the social and economic welfare of communities (Dessouky, 2016). However, the global shift in values and trending concepts of sustainable development, human scale and life quality, made rethinking the role of urban mobility is becoming increasingly valid. All of the aforementioned made the focus of cities shift from automobiles to livability as a result of a new paradigm shift. Due to the enormous cost of rehabilitating existing highways, new urban solutions are beginning to emerge in the west. The first and most drastic solution is to completely remove the elevated urban highway. The second solution entails reconfiguring the elevated urban highway by converting it into a tunnel, burying it as a sunken highway, or relocating it to a potentially less impacted area. The third solution entails retaining the existing highway but rehabilitating it and the surrounding urban environment while attempting to absorb or reduce negative urban impacts of this highway (Ebeling, 2013).

All three alternatives have been utilized in various cases around the world. Decisions vary from case to case because they depend on the requirements of neighborhood development, location, policy, budget, and transportation needs. There is no single solution applicable everywhere. The fact that highways are nearing the end of their lifespans presents an excellent opportunity to reevaluate their urban setting and ways to mitigate their impact (Ebeling, 2013).

The first option may seem extreme, but the phenomenon of demolishing elevated urban highways is becoming increasingly widespread. While some cases have already eliminated this option, others are openly discussing it. New York, Toronto, Seoul (South Korea), Portland, Colombia and Milwaukee have already demolished their elevated urban highways (ITDP and EMBARQ, 2012). Instead of elevated highways, Bogotá for example chose to invest in a comprehensive mobility strategy that included bus rapid transit, bikeways, and greenways. Also, Seoul implemented BRT and car use restrictions to expand mobility options for everyone when they removed a highway to make a linear park (Hidalgo, 2004).

Figure 11: The Cheonggyecheon elevated highway in 1960s, Seoul, South Korea -Source: (SER, 2020)

Figure 12: The restoration of Cheonggyecheon river in 2003, Seoul, South Korea -Source: (SER, 2020)

Figure 13: The communal activities occurring in Cheonggyecheon river after its restoration project -Source: (The World Bank, 2015)

The second reconfiguration option, whether it includes converting elevated highways into tunnels or relocating them to other areas, can only mitigate a portion of the significant effects. The reconfiguration option requires a substantial budget, but it is feasible in areas where traffic flow must be maintained. Reconfiguring a highway in a different location or in a different form can link lands or liberate valuable lands, thereby reducing noise and air pollution (Dessouky, 2016).

The third solution, which may be the most feasible, focuses not on eliminating highways but on minimising their bad effects. This concept attempts to rehabilitate highways and the areas beneath them, reuniting neighborhoods through the forgotten, gloomy regions beneath elevated highways. In areas where changing the traffic flow is a challenge that cannot be handled with alternatives and when funds are constrained, the only choice for dealing with the highway is to realize its new potential (Bauer et al., 2015). With rapid urbanization, high real estate values, and highways occupying high-value areas, entrepreneurs recognized opportunities in the spaces under highways. (Savvides, 2004). New projects are centered on extending the urban fabric over the vacant areas beneath elevated highways, transforming them from spaces that formerly divided neighborhoods into spaces that reknit communities. In addition to absorbing the consequences of elevated structures, this concept is motivated by the shortage of developable land in urban areas (Savvides, 2004). The "under the elevated" initiative in New York City is an innovative approach to manage and improve area under elevated structures (Bauer et al., 2015). The idea reintroduced the areas beneath the elevated structures as communal assets after observing that New York has over 700 miles of elevated structures that offer mobility to individuals riding cars and darkness to the streets below them (Bauer et al., 2015). Redesigning and reviving places beneath elevated roadways with activities can boost property values, provide better access to retails and shops, remove informal uses "enhance safety," and provide long-term amenity opportunities for communities. Even though rehabilitating the spaces beneath elevated

highways does not provide a permanent solution to the effects of highways, it offers significant possibilities for the surrounding towns. Initiatives established in New York included neighbourhood markets to revitalise economic activity, galleries, public spaces to raise community assets, sound-absorbing panels and vertical gardens to minimise noise and air pollution, and public spaces to boost community assets (Bauer et al., 2015).

The three urban solutions that appeared in various nations were an attempt to absorb and shift the long-term effects of elevated highways. As the removal of highways is likely to be a means of mitigating all of the impacts, it cannot be done without providing new traffic alternatives, particularly in critical areas. Removing or reconfiguring a highway is uncommon in developing nations and the Middle East due to the required high budget and political will. Even though the rehabilitation option does not offer radical change, it has the possibility of providing new urban spaces, and reconnecting the area. Rehabilitating areas beneath elevated highways may appear to be the most feasible way to absorb a portion of the negative effects of highways on the impacted communities, while also creating new opportunities, in terms of budget and mobility. The application of the rehabilitating option concentrates on the space's quality by reclaiming and reconnecting it, which touches on a variety of urban theories (Dessouky, 2016).

Summary

For the past seventy decades, cities throughout the world have been planned with the automobile in mind. In order to meet the needs of a car-dependent population, the form of many cities has evolved from the walkable, people-friendly conventional city into a place where the streets have become "spaces for cars" and public urban spaces have become "spaces for parking," ignoring their significance as places for interaction, diversity, and exchange. While automobile transportation gives flexibility, it also reduces the effectiveness of

urban living by producing traffic congestion, inefficient use of space, longer distances between services, air pollution and greenhouse gas emissions. This evolution has led to the replacement of "access by proximity" with "access by mobility." (Ahlgren, Robson, & Houthaeve, n.d.)

This chapter overviewed the different types and forms of the transportation infrastructures along with elaborating their evolution history throughout the time showcasing how the urban planners went from fully supporting to criticizing those structures after their negative impacts began to appear over the years. While highways may be a useful option for moving large numbers of people over great distances, they disrupt the street grid of communities, creating barriers between the community and its essential daily life destinations and services, such as jobs, education, and retail (Ebeling, 2013; ITDP and EMBARQ, 2012). Through a review of the international literature and impacts related with the elevated structures' existence, it was clear that the impacts varied between many aspects from physical and urban, environmental and economical to health and social issues. However, it wasn't for so long until it was realized that the negative impacts outrun the potentially positive ones that those structures were created for such as enhanced connectivity between different areas, facilitated mobility and increased safety within cities. Shortly after, the public voice started to protest and disapprove the invasion of these structures offering other alternatives to mitigate or diminish those adverse impact on the community and built environment. However, developed cities now are shifting to more sustainable and green transportation urban solutions that stress on creating streets for people rather than cars. The ultimate street design is to include cars but not to prioritize them. Less lanes can still be planned for people and bicycles with properly sized sidewalks, frequent and well-signposted crossings, street trees, and one or more medians creating an attractive and pedestrian boulevard (CNU, 2021).

Back to this research's analytical assessment framework, it is mainly dependent on the sense of place theory that adopts the concept of the strong interrelation between the physical form of places, the activities or behavior associated to this place and finally the image and meaning that this place beholds. And as discussed in the previous chapter, any change in the urban physical setting affects the human perception as well as behavior. But since the addressed physical change in this study is oriented towards construction of new transportation infrastructures such as highways and flyovers in a local district, it was crucial to derive indicators specifically related to the impacts of these structures on the local community and built environment. To achieve this, the research reviewed international literature showcasing the different impacts of those structures in past experiences which were previously categorized into physical, social, environmental, visual and economic issues (see figure 14).

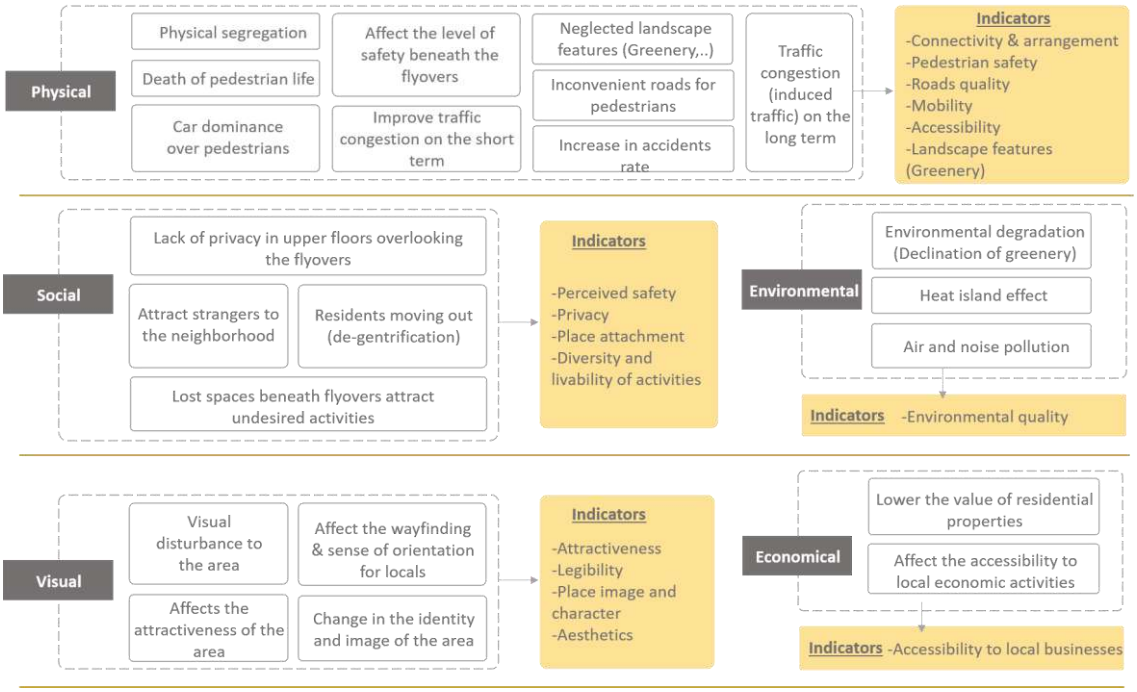

Figure 14: Diagram classifying the different impacts of highways and flyovers into categories from which indicators are derived -Source: Author

Those issues were then used to derive various common indicators of impacts of highways and flyovers on the community and urban environment to be used in the assessment criteria as a guide for the study measurements. Those indicators are then redistributed and assigned to the 'SSS place experience model' to formulate the assessment criteria framework of this study which is used to assess how the new transportation infrastructures –that got induced to the physical urban fabric of the case study area- affected the perception, image and behavior of the local community (see figure 15).

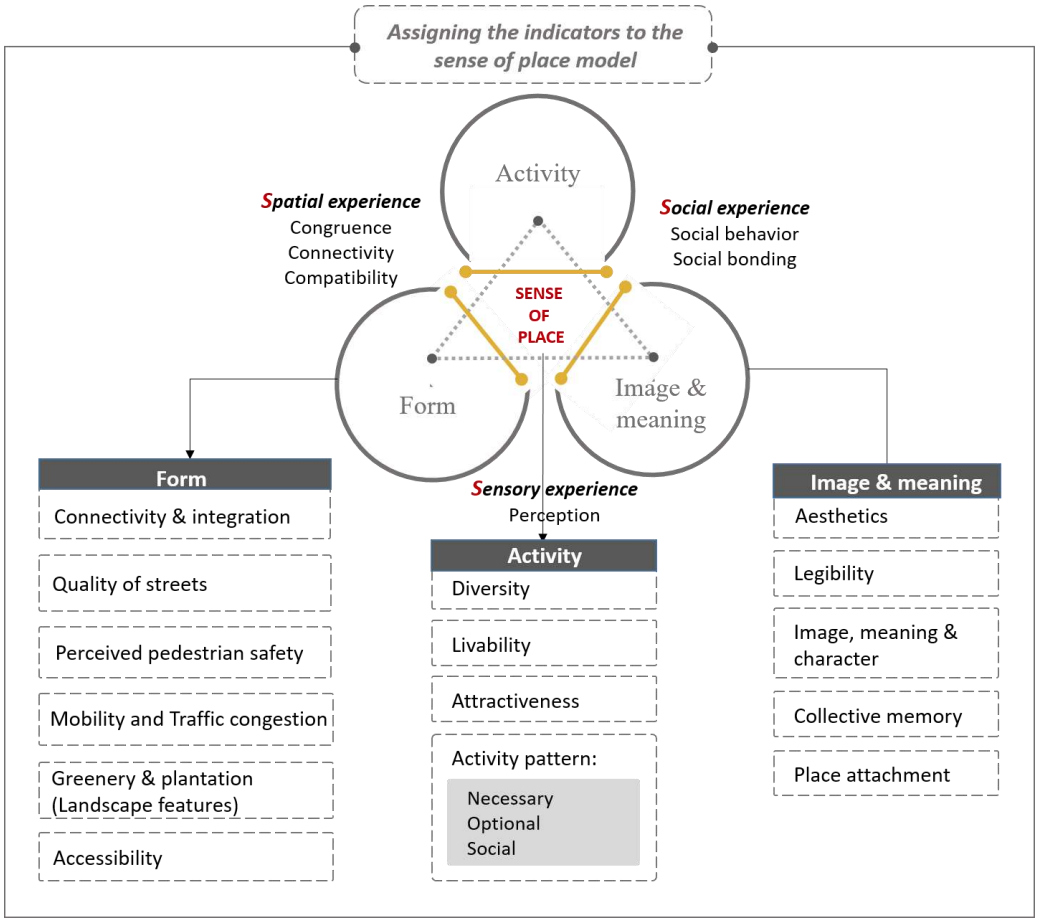

Figure 15: Assigning the indicators to the 'SSS place experience model' to formulate the assessment criteria for the study based on the literature review - Source: Author

The indicators related to the physical setting and urban environment attributes as well as the environmental and economic ones are all assigned to the form category, such as connectivity and integration of the street network, the physical quality of streets, mobility and traffic, accessibility to different services and facilities including the local commercial and retail ones, pedestrian safety and finally the landscape features especially greenery and plantation that also touch on the environmental quality indicator. The activity category includes the indicators of the diversity, livability and attractiveness of associated activities, as well as the indicator of the pattern of the daily life activities of the local community derived from the discussion of Jan Gehl's theory in chapter two which sorted the daily activities into necessary, optional and social activities. Finally, the image and meaning category includes all the visual indicators as the legibility and imageability of the area, aesthetics and character and the collective memory as well as some of the social ones like sense of community and place attachment. However, it is important to mention that the indicators of all the three categories, the form, activities and image are complementary and overlapping in their impact where an indicator in one category may reflect on other indicators in another category which makes the whole framework more comprehensive, sophisticated and verified.

The following chapter will approach the local case study area, Heliopolis district, studying the history of its initial planning till the urban transformation that was induced on its urban fabric in the past three years. This will be followed by discussing the data collection methods and materials and explaining the tools used in executing the empirical study of this research.

Chapter 4

Case Study | Data collection and sampling

4.1 Case study approach

In this chapter, the researcher aims to have a deeper understanding of the history of evolution of the selected local case study area (Heliopolis) since its initial urban planning till the recent urban transformation that occurred to its physical setting through scanning the changed physical features that occurred recently. This is followed by explaining thoroughly the data collection methods and tools used in the analytical study to have an in-depth investigation for the subjective experiences and perceptions of the local community and daily users of Heliopolis before and after the roads development interventions. This is in effort of addressing the main question of this research which questions the impact of the transportation infrastructures on the daily life activities and perception of the local community.

4.1.1 Background

After the dilemma was discussed internationally in the previous chapter, now the research will take a closer look at Egypt; specifically, the Greater Cairo Region (GCR) flyovers and highways. Generally, Cairo's rapid urban expansion in the last few decades have caused many planning flaws. In the last century, Cairo's rapid urbanization resulted in the formation of a fragmented spatial structure made up of multiple minor cities that comprise the huge metropolitan region (Khalifaet al., 2014). As a result, the reliance on vehicular movement has greatly expanded, and planners' primary response to this urbanization pressure has been to construct longer highways and bridges (Elbih, 2020). In this chapter, the intervention area of Heliopolis district,

which is located on the east side of GCR, will be the focus study area to be deeply analyzed after it was exposed to a huge wave of urban transformation to its built environment that will be more elaborated in the following part.

4.1.2 Why Heliopolis?

Heliopolis district was selected as the primary focus of the investigation for multiple reasons. In 2012, the National Organization for Urban Harmony (NOUH) declared the entire district to be architecturally preserved due to its exceptional heritage importance; the declaration includes various requirements addressing the preservation of architecture, urban fabric, and landscape (Alhowaily, 2015). In that sense, heritage plays a great role in identifying the district with a distinct character which adds up to the cultural value of the area. With this heritage comes the significant sense of place that characterizes the district with large gardens, many corner parks, wide streetscapes and boulevards that are lined with trees and the tramline. All of the aforementioned gave the district a significant image and identity that built a strong place attachment between the residents and daily users and its places.

Moreover, it is one of Egypt's very few districts in the Greater Cairo Region that was planned and built with pedestrians in mind; as a result of its unique location in the City Centre, it was a transit-oriented walkable community in which its residents practiced and enjoyed various social activities through nodes, squares, gathering places, open parks and shopping areas. However, the district witnessed a rapid transformation of its street network which is mainly embodied in changes in the transportation infrastructures, landscape design and the open green spaces that once formulated a solid foundation for this district’s identity which mainly affected the perceptions of the district’s local community. This will be discussed further in a detailed manner.

4.1.3 Historical background of Heliopolis

Heliopolis district is one of Cairo's most affluent neighborhoods, and its residents have long enjoyed a high standard of living. Heliopolis was intended

to be a paradise or a "city of leisure and luxury", a garden city, similar to Haussmann's Paris: its master plan included public parks, gardens, playgrounds, and strict building regulations were set (Hubbard, 1996). The district lies on the eastern side of Cairo, about 8 to 10 kilometers away from Cairo's center (see figure 16) and was inspired by the European urban and architectural style (Eldaidamony, Shetawy, Serag, & Elshater, 2019). It was established in 1905 by a Belgian engineer and entrepreneur Baron Emban as Cairo's eastern gate which was based on a set of unique principles, including the metro as a means of transportation, communities centered around green, communal gardens, distinctive heritage buildings with distinctive architectural styles, grand avenues, spacious city squares that serve as nodes connected by wide straight streets that facilitated tram transportation (Hubbard).

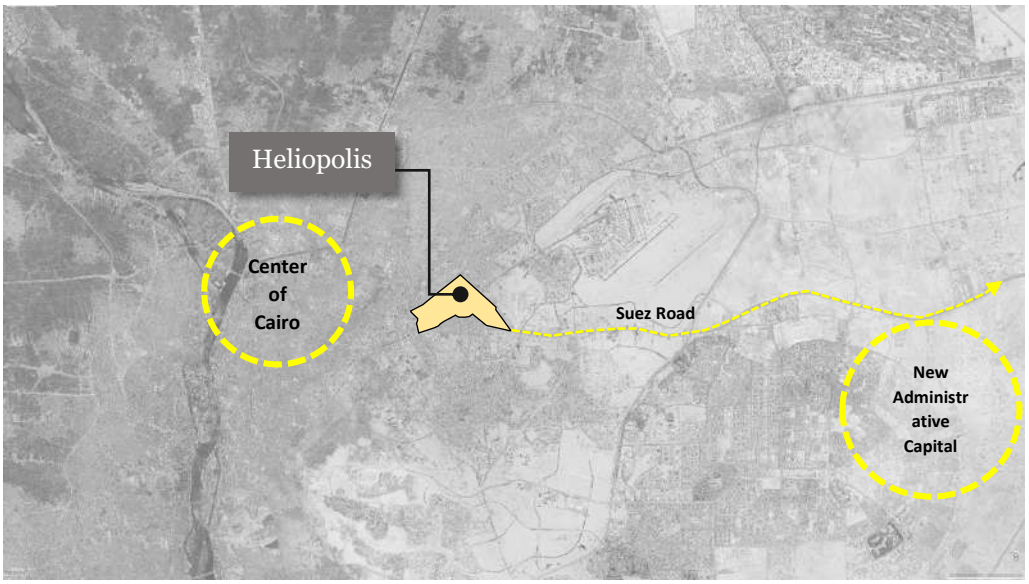

Figure 16: Map representing Heliopolis Location between the center of Cairo and the new administrative Capital - Source: Author using Google satellite image

Heliopolis is unique as it combines between the western urban theme in its layout pattern especially the French boulevards and eastern architectural theme in its Islamic architecture (Alhowaily, 2015) as shown in figure (17). According to El Kadi (2012), Hassan Fathi described Heliopolis as an example of a "happy marriage" between the East and the West (El-Kadi, 2012).

Figure 17: (a)The Basilique Church. (b) Baron Palace, (c) Street colonnade in Heliopolis - Source: LinesHub, 2020

According to Robert Ilbert's book "Héliopolis, Le Caire 1905-1922," Baron Emban obtained a vast piece of land from the English occupation in order to construct his new green city (Ilbert, 1981). *"I want to build a city here. It will be called Heliopolis, a city of the sun I want it to be magnificent",* stated Baron Emban (Dobrowolska & Dobrowolski, 2006). Emban wanted the neighbourhood to have a distinct character, so he commissioned Belgian and French imperial architects and urban planners to establish the new city. Consequently, the Renaissance Baroque Islamic style contributed to the preservation of Cairo's image and the neighborhood's culture (Alhowaily, 2015). And as a result, the area targeted foreigners and wealthy residents and became recognised for its population of culturally and socially notable Egyptians (Alhowaily, 2015). This is because Heliopolis provides the finest urban qualities, including strong continuity and enclosure of public spaces, well-defined urban routes, and pedestrian-friendly streets (Hussein, 2022).

Today, Heliopolis is vital to two important administrative districts: Heliopolis District, which connects Al-Bustan, Almazah, Mansheyet El-Bakry and Al-Muntazah, and Al-Nozha district, which connects Al-Nozha, Al-Matar (Al-

Sheraton). Heliopolis includes four main divisions, which are named "sheyakhat" in Arabic, they are "Manshyet El-Bakry", "Al-Montazah", Al-Bostan" and "Almaza", later, Al Nozha district was constructed close to it from the north-east (see figure 19). According to the statistics of 2019, the district of Heliopolis has a total area of 9.38 km2 and a population of roughly 141 903, with a population density of approximately 15,000 people per km2 (El-Hattab, Amany, & Lamia, 2018). Al-Nozha district covers 67.6 km2 and includes 238,550 inhabitants (Ragab, Girgis, Zaki, & Osman, 2016) (see figure 18). As with Zamalek and Maadi, the suburb of Heliopolis is one of the most prominent in Cairo. In addition, it has housed the presidential palace since the eighteenth century and it is positioned adjacent to the international Cairo airport in the Eastern Gate of the Cairo metropolitan area (Farid & Abdelhady, 2018).

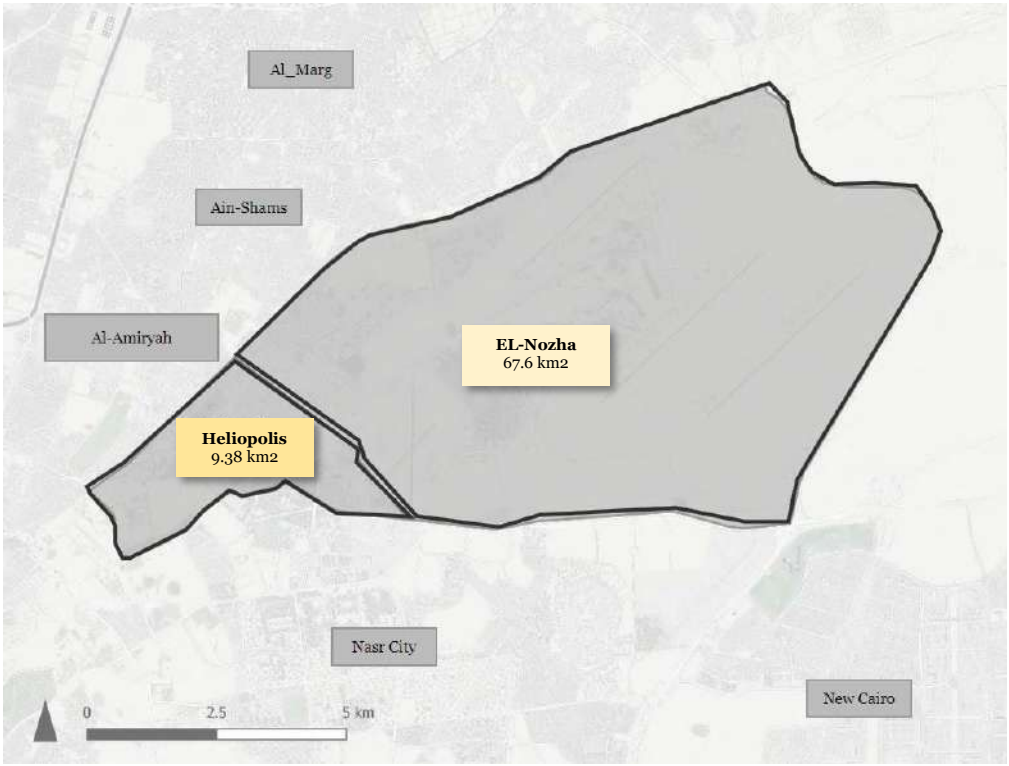

Figure 18: The central districts in "Masr El-Gedida"/ "Heliopolis" - Source: Author

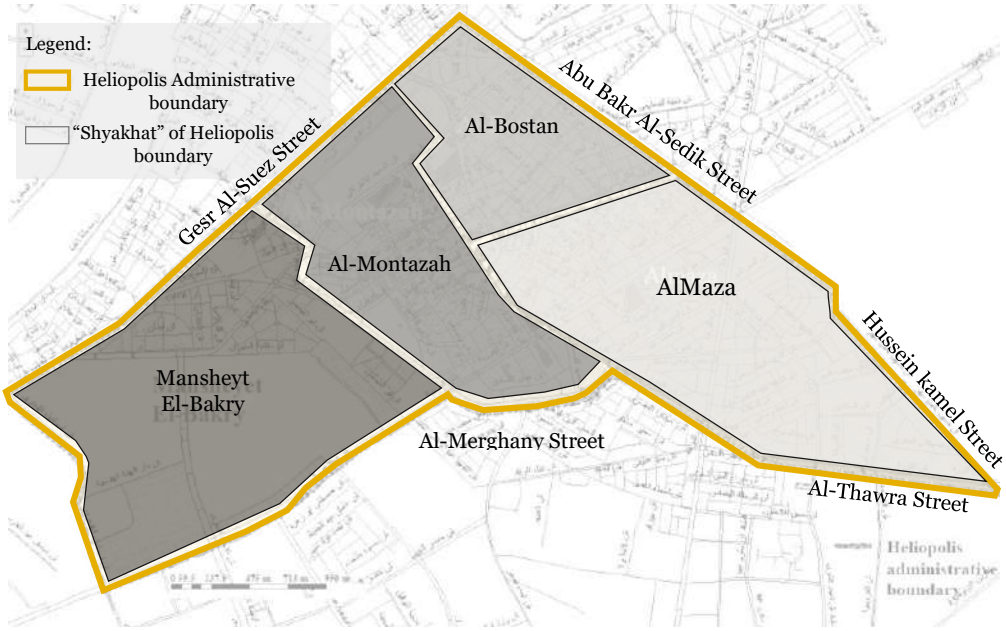

Figure 19: The four divisions "shyakhat" of Heliopolis district - Source: Farid & Abdelhady, 2018

However, the study area of this research will include Heliopolis district as well as a part of the northern district of Al Nozha. These two specific parts forming the study area have been historically known for Masr al gadida district as the part taken from Al Nozha district is considered an extension to Heliopolis district. In that sense, the case study focuses on the area between Gesr Al Suez street from the west, Abd al Hameed Badawy street from the north, Hussein Kamel street from the east and Al Merghani street from the south as shown in figure (20).

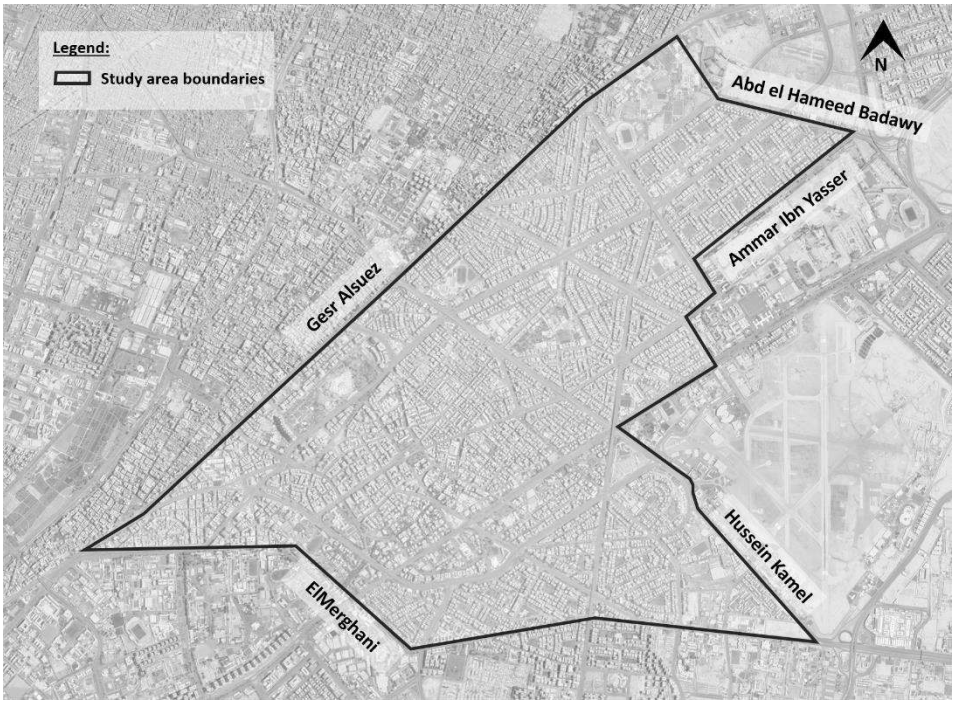

Figure 20: The study boundaries including Heliopolis and part of Al Nozha district - Source: Author using Google Earth satellite image

The city's ancient Egyptian name, which means "city of the sun," has a close correlation with its street network and intersections. Each node functions as a hub from which all the streets radiate, similar to the sun (see figure 20). In addition, the city's layout made using the tram a practical and entertaining means of transportation. The green spaces in Heliopolis have a significant impact on the overall quality of life in the city. Not only were the open green areas of Heliopolis crucial for the health of the environment, but they also served as gathering places for the city's residents, particularly the younger generation (LinesHub, 2020). Greenery and open spaces are abundant in the neighbourhood, with a maximum spacing of 300 metres between residential units and public park areas. The width of the streets on the major thoroughfares ranges from 30 to 40 metres, with green traffic islands containing the tram line in the middle as represented in figure (21) (Ain Shams university, 2015)

Figure 21: The street network of Heliopolis - Source: Author using Google Earth satellite image

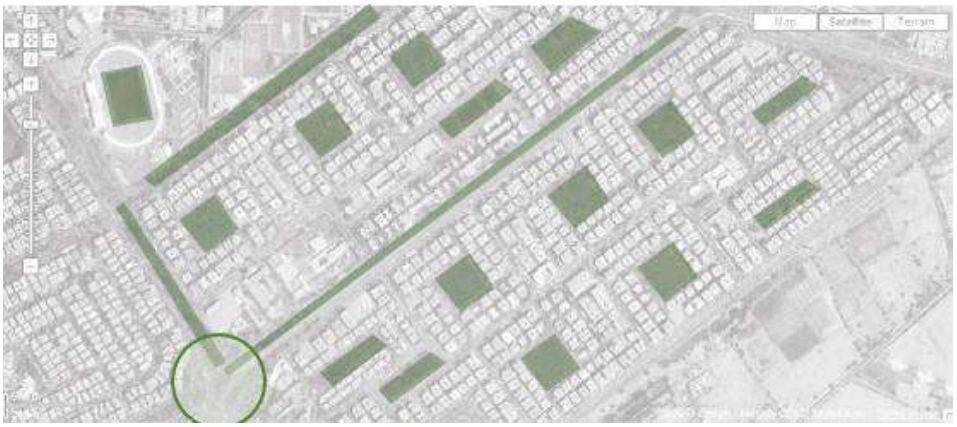

Figure 22: The Green pattern and open spaces between Heliopolis Neighbourhoods, Squares, and Streets before the intervention - Source: Author using Google Earth satellite image

4.1.4 Reason behind the urban shift

As the population continue to rise in Cairo, urban growth became an urgent need for policymakers (Elbih, 2020). As indicated on the map in figure (23), the decentralisation of GCR continues with new satellite cities surrounding the capital, but the system for interconnecting incoming and outgoing

highways was insufficient. The national vision of GOPP -the General Organization for Physical Planning- for GCR has proposed a strategic urban development plan suggesting more than 14 new highways connecting the inside and outside of the Ring Road along 1000 km, in addition to three more minor ring roads added to the road network to be four ring roads in total (GOPP, 2012), as illustrated on maps (Figures 24, 25). Notably, the majority of GCR roads and highways networks are saturated with vehicles; for instance, GOPP reported that the 6th October bridge and the 15th of May bridge are carrying 1.5 of their maximum capacity; therefore, the goal of the vision is to improve the road network with elevated highways in the inner part of GCR for better connections and mobility, with the existing and proposed new ring roads, by adding 170 kilometres of new urban highways (GOPP, 2012). This network will also help connect the new urban settlements in east and west of GCR to the central agglomeration of Cairo and will offer improved accessibility and less travel time in between the cities. One of the most significant emerging satellite cities now is the new capital administrative city and it is believed that the main motive behind the rehabilitation of roads is to pave the way to the new capital to attract more population towards it.

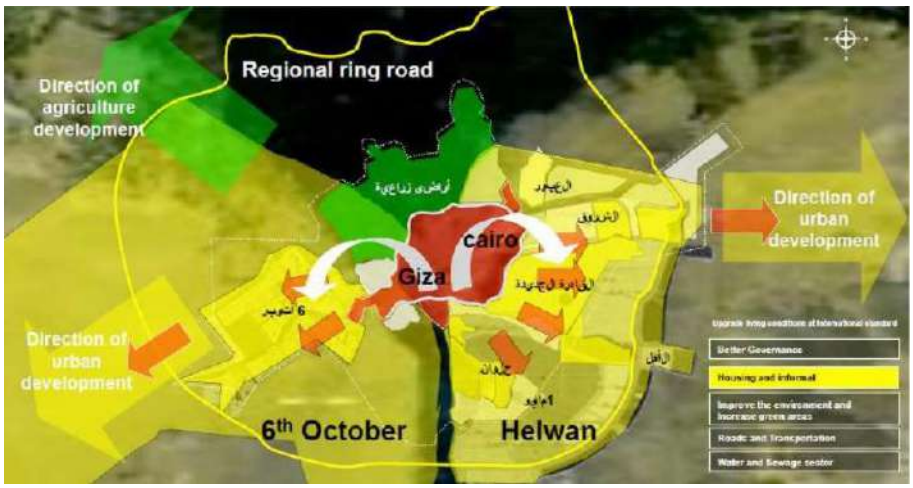

Figure 23: The planned decentralization of GCR (in red) to the new satellite cities. The direction of urban development is served with the Regional Ring Road - Source (GOPP, 2012)

Figure 24: The yellow lines represent new 14 highways in the inner core of GCR by 2030 strategic vision stretching along 1000 km – Source: (GOPP, 2012)

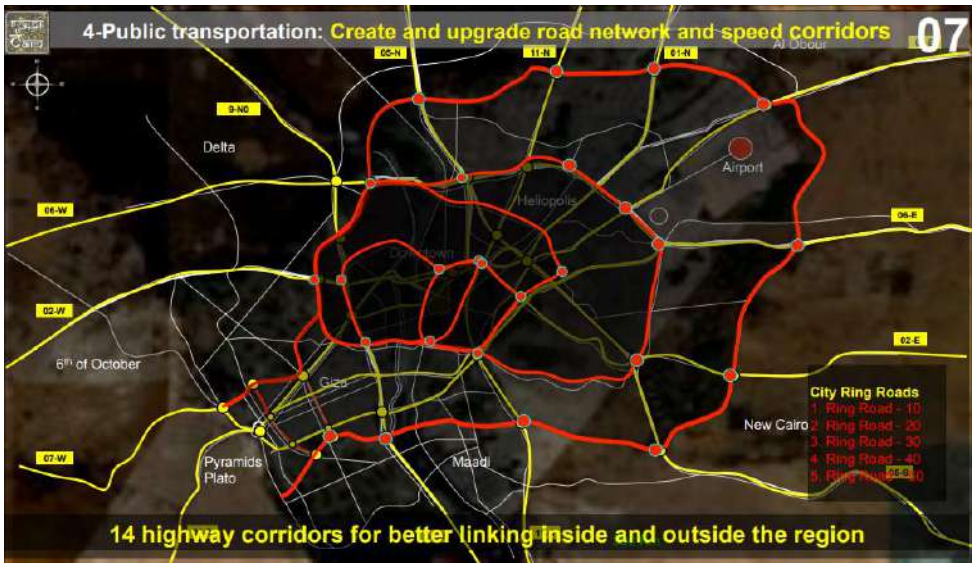

Figure 25: The red lines represent the new 3 proposed ring roads, besides the existing one, aiming for better accessibility in and out the outer cities around GCR by the year 2050 – Source: (GOPP, 2012)

This takes us to Egypt's Vision 2030, a national detailed agenda launched in February 2016, reflecting the country's long-term strategic plan to achieve the

goals and principles of sustainable development all over the country. Egypt Vision 2030 is based on the principles of "comprehensive sustainable development" and "balanced regional development" as shown in figure (26).

It reflects the three components of sustainable development, namely the economic, social, and environmental dimensions. Egypt's vision comprises a list of objectives; the objective of the state plan is to increase the quality of life and standard of living of Egyptians through an integrated development framework. In addition to establishing foundations of justice and equity, the government adopts an efficient and effective integrated system of social protection based on community inclusion, cultural enrichment, environmental improvement, and the development of digital infrastructure (MPED, 2021).

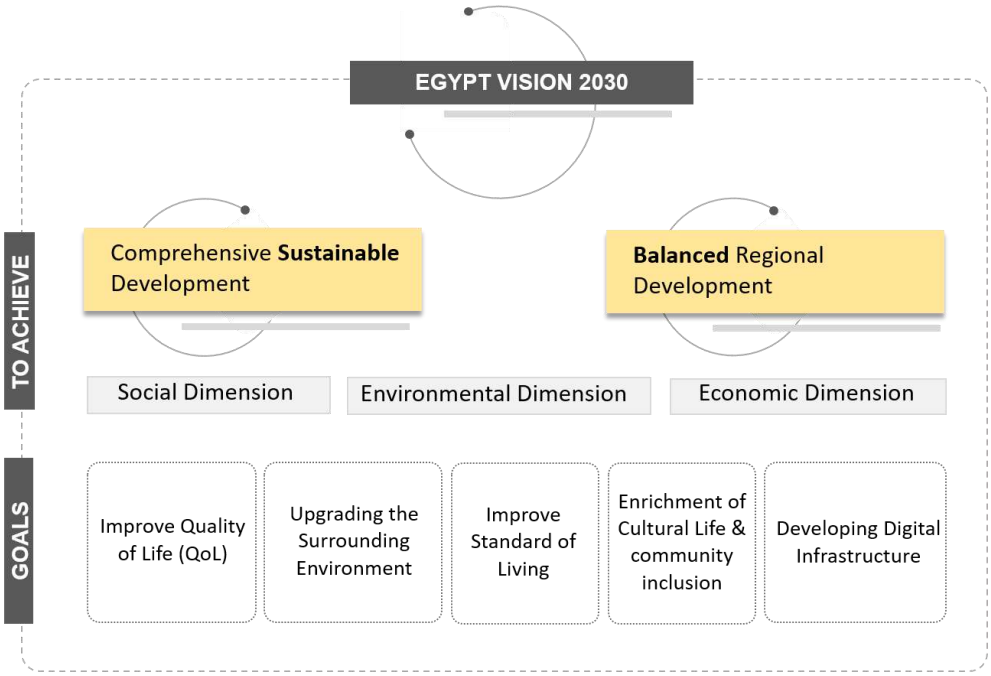

Figure 26: Egypt vision 2030 goals. Source: Author

However, despite the fact that the road network development strategy is planned to elevate the quality of life of people and improve connectivity, the

physical infrastructure and mobility of the area, yet it only throws focus on one angle neglecting the perspective of the social fabric that these roads are cutting through. This particular point sheds light on the core of this research problem, that those transportation structures might be resolving one portion of the issues, but on the other hand they definitely backfired in other problems that are as important as those triggering issues for creating them in the first place. Also, methods by which those interventions are applied are actually going against Egypt vision 2030 that is supposed to be compatible with the sustainable development goals (SDGs). The SDGs assert on the urgent need to address the climate change and protect the environment, whereas the recent road network development projects that are taking place in many of Egypt's districts get thousands of trees chopped leaving streets with greater heat exposure.

4.1.5 What happened to Heliopolis?

As Egypt's population surpassed 100 million capita, with twenty million of them concentrated solely in the Greater Cairo Region, the government began transferring the heart of Cairo and its main service elements and relocating it to a newly founded city in the Eastern Desert, which was given the name "New Administrative Capital" (Ahramonline, 2020). By approaching the end of 2019, The "Heliopolis development plan" was launched by the government and Cairo Governorate. This project was carried out under the direction of the Army's Engineering Authority, and it was rushed to completion in order to complete the first stage in less than three months; while the second stage would take another three months. In effort of increasing the volume of vehicles travelling between east of Cairo and the New Capital, the road development plan consisted of building nine new bridges in Heliopolis and Nozha districts, as well as expanding some main and local streets that were converted to highways in the heart of residential areas (Zenobia, 2020). Those bridges are the bridge at Al Mahkama Square, the bridge at the crossing between Abu Bakr Al-Siddiq Street and Othman Ibn Affan Street, the bridge at the crossing between Al-Nozha Street with Salah Salem above the already

existing El Galaa Bridge, Almaza Bridge, the bridge at the crossing of Al-Merghany with Al orouba, and the bridge at the crossroads of Gesr Al Suez, and Fareed Samika (see figure 27).

Figure 27: Map of new bridges and expanded roads of Heliopolis after the development. Source: Illustration by the author, the base map is from Google Earth/Maps 2022

Change in the urban pattern

As mentioned previously, the width of the main axis ranges from 30 to 40 meters, but it has reached nearly 50 meters in order to boost the absorbent capacity of the streets. The streets have been widened from two to five or six lanes; as a result, the flow of vehicles in the neighbourhoods has increased, while limiting the freedom of pedestrians. In other words, without a good pedestrian way crossing the 50-meter-wide street, it became extremely

impossible to visit other areas in the adjacent neighborhoods because the number of walking paths had been drastically reduced compared to earlier (Elbih, 2020), also, the widening of the streets into highways didn't consider any pedestrian safety measures nor did it come up with alternative solutions for pedestrian crossing. In addition, the green traffic island and the ancient tram in the street's center had to be destroyed in order to construct the bridges. More than 550 trees were uprooted and replaced by concrete supports, according to Egypt Independent (Mounir, 2019). Few of these trees were over a century old. According to the Heliopolis Heritage Initiative (HHI), to make all of this possible, the government removed about ninety acres of vegetation from squares, street islands, and pedestrian walkways, some of which were planted in the early 1900s (Ahramonline, 2020) (see figure 28, 29).

Figure 28: The lower images show the significant degradation of green areas after the construction while the upper images show the green cover in the neighborhood before the construction of the bridge - Source: (ElKhateeb, 2020)

Figure 29: The upper images show the significant degradation of green areas after the construction while the lower images show the green cover in the neighborhood before the construction of the bridge - Source: (ElKhateeb, 2020)

As previously noted, six new flyovers are being constructed in Heliopolis to assist the flow of traffic from Cairo's central business district and the upper portion of the ring road to the new capital in the east. This new plan required the improvement of two key axes. The primary axis is constituted of Salah Salem Street and Thawra Street. This axis required solving all bottlenecks, one of which was the "Orouba tunnel" located in the heart of Elkourba's heritage site; the plan required backfilling this tunnel and converting the traffic to a higher flyover in order to expand the number of lanes on both sides of the street. Also, due to the fact that the Cairo-Suez road terminates at the Eastern entry to Heliopolis, the area between Thawra st and the Cairo-Suez road formed a bottleneck for traffic entering Thawra st. Thus, Al Thawra street was transformed into a one-way seven-lane highway leading to Suez road, expanding a series of local roads into a single one-way seven-lane highway, and redirecting incoming traffic through it. It is worth mentioning that Suez Road emerged from a regional road connecting Cairo to Al Suez through one of the most important axes connecting the Metropolitan Urban Communities on both sides, the New Administrative Capital, and the

remainder of Cairo (The SUbMonitor, 2020). The other axis is the Abou Bakr Elsedik axis, which was designed to carry traffic from the northern section of the ring road, to the new capital in the east via Heliopolis. This free axis demanded the construction of five new flyovers, four at the intersections of Abou Bakr Elsedik with Elhegaz, Osman Ibn Affan, Salah Salem, and Merghany streets, and the fifth at the intersection of Merghany and Nozha streets as shown in figures (31, 32).

Figure 30: AL-Orouba tunnel before and after demolition and constructing the bridge above it (eg24.news, 2020)

Figure 31: The intersection between Thawra street, Suez road and Hussein kamel street before the development, 2019 - Source: Author using Google satellite image

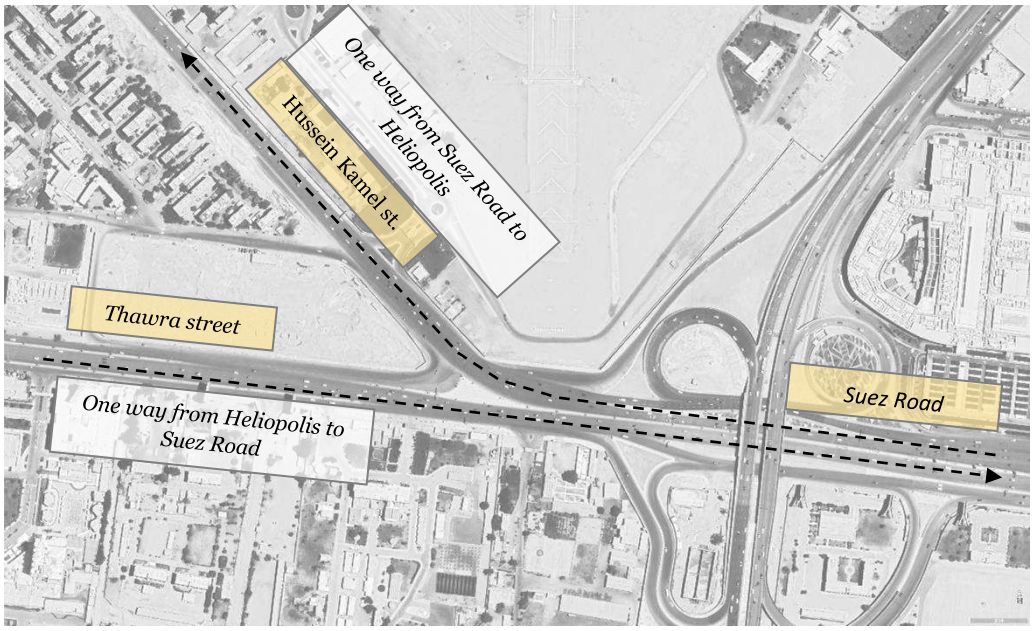

Figure 32: The intersection between Thawra street, Suez road and Hussein kamel street after the development, 2022 - Source: Author using Google satellite image

Streets and flyovers

In urban areas, inner city residential roadways should not approach highways; 3 to 6 metres width is the ideal (DMURS, 2015). These rules protect both automobiles and pedestrians. There are more accidents when roads are made wider. Prior to this development, there were only 2 lanes on each street; the local street widths range now from 17.5 to 22 metres. Also There are almost no crossovers or squares on the major roads, which now have eight lanes instead of four. The district's 50- to 60-meter-wide new roadways, which literally transformed its streets into "highways", made it extremely difficult to access other suburbs owing to a dramatic loss in walking paths. The following streets were significantly affected the most: Farid Samika St, Othman Ibn Afan St, Hejaz St, Abdelaziz Fahmy St, and Abu-Baker elSediq St, Merghany St, Montazah St, Mohamed Farid St, Abdel Hamid Badawi St, Mahkama Sq, Hejaz Sq, Saint Fatima Sq, and Triumph Sq (ElKhateeb, 2020). In order to widen the street, the street levels changed and the middle island

was removed. Consequently, major roadways were congested, and the rights of pedestrians were violated. In light of the reduced greenery, mass-motorization, and lack of participation, as well as the hurdled attempts to prevent or contest the urban changes, many urban health determinants have been weighed towards an unfavorable health outcome (Hussein, 2022).

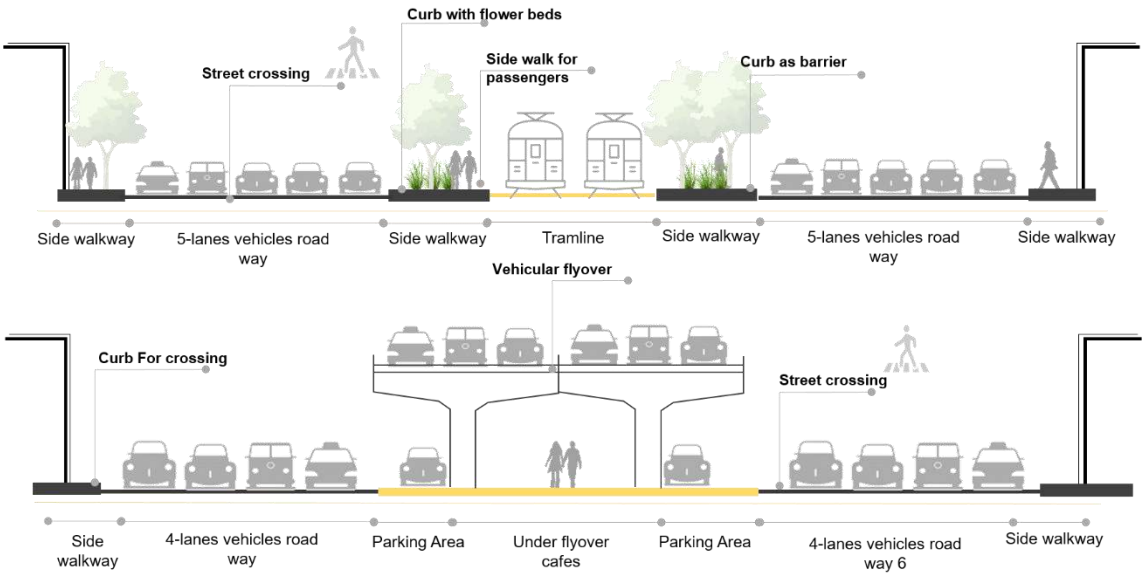

Figure 33: The Before/after sections of the intersection of Othman Ibn Affan street and Abu Bakr El-sedik street (Safeer square) in Heliopolis - Source: Author and source of images below: Facebook page (Ana min Masr Algadida , 2019)

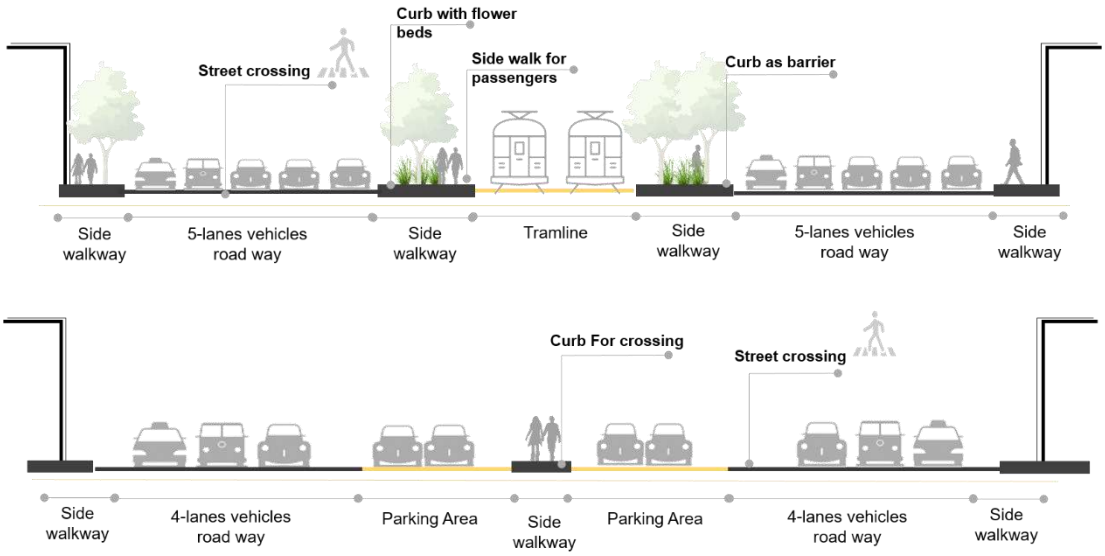

Figure 34: The Before/after sections of El-Hegaz street in Heliopolis - Source: Author

Figure 35: El-Hegaz square before and during the construction of the flyover – Source: Facebook page (Ana min Masr Algadida , 2019

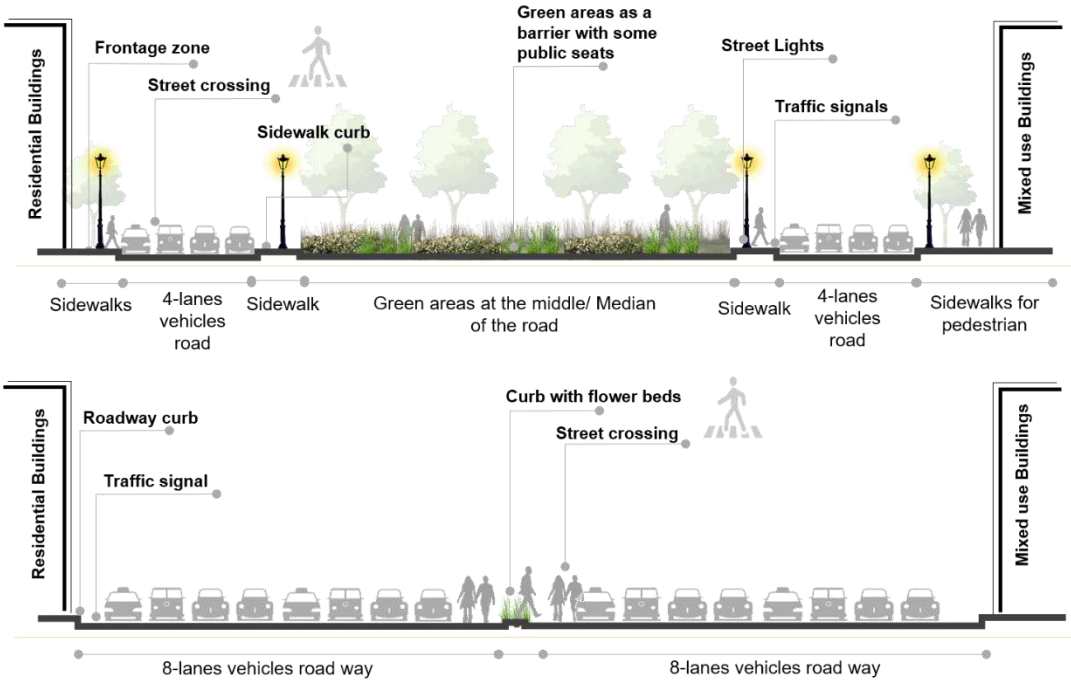

Figure 36: Before and after the development of Farid Smeika street, which was transformed by replacing the green median spaces with wider automobile streets - Source: Author

The authorities and the government made the decision to take action over the vacant places under flyovers. The areas below the bridges have been transformed into attractions and a place for various activities ranging from cafes, restaurants, supermarkets and parking as shown in figure (37).

Figure 37: Forms of investments below the flyovers - Source: (Linesmag, 2021)

Tramline

The Heliopolis tramway is the most environmentally friendly method of transportation since it had been built in 1906, its removal has aroused heated debate and opposition. Even though the majority of Cairo's trams were removed from operation in the 1990s so that highways could be extended, Heliopolis stayed the only successful Transit Oriented Development (TOD) in the city. Despite the service's poor restricted reach and declining functioning, trams remained a popular mode of transportation and a cultural icon in Heliopolis, even after they had become an integral part of the city's identity (ElKhateeb, 2020).

Figure 38: Removing the tram line in Heliopolis – Source: Facebook group (HHI , 2019)

This hot toppic has been extremely controversial in the public domain and attracted a great deal of debate between criticism and support from authorities, planners, and the general public; however, both arguments are founded on valid foundations (Henedy, 2020). People were divided between those who supported the proposal and believed it made driving much easier, faster, and eliminated traffic congestion in the area (Linesmag, 2021). The other viewpoint asserts that the once tranquil and green spaces have been transformed into a highway labelling what occurred as an "Act of Sabotage," claiming that this mega-project transgressed the urban image of Heliopolis (Ahramonline, 2020). Also, Numerous members of the national press have praised this initiative as a great endeavor that will help connect Old Cairo with

recent eastward expansions, particularly the New Administrative Capital (egy-map, 2019). All of these opinions and perspectives are to be examined in details in the following chapter.

4.2 Data Collection and sampling

The urban theories as well as other parameters deduced from the international review discussed in the literature provided basic ideas of analyzing and connecting ties between the psychological, functional and spatial aspects of the case study. Gehl's (1981) analysis and sorting of outdoor activities into necessary, optional and social activities also guided the empirical work to trace whether or not the new urban spaces in Heliopolis accommodate the daily life activities of the users as much as before the development.

So, in order to understand the phenomenon of the urban transformation in Heliopolis having highways and flyovers cutting into its neighborhoods fabric and its impact on the local community, it is important to evaluate the current situation both objectively through mapping the reality by tracing the changed built environment (spatial mapping tool) and subjectively through mapping perceptions by evaluating the feelings, emotions and perspectives of the people using these spaces through their daily life (questionnaires and interviews tools). However, the research primarily focuses on the subjective approach as it's mainly concerned with the affected personal experiences of the daily users and eventually the direct or indirect impact on their daily life activities. And since it is a recent construction; so, all the users who participated in the study already had a general before and after idea. Accordingly, primary data was collected and analyzed with the help of some tools and methods to have a more in-depth analysis.

As indicated in figure (39), the approach used in this study divided the gathered data into two main parts mapping reality and mapping perceptions.

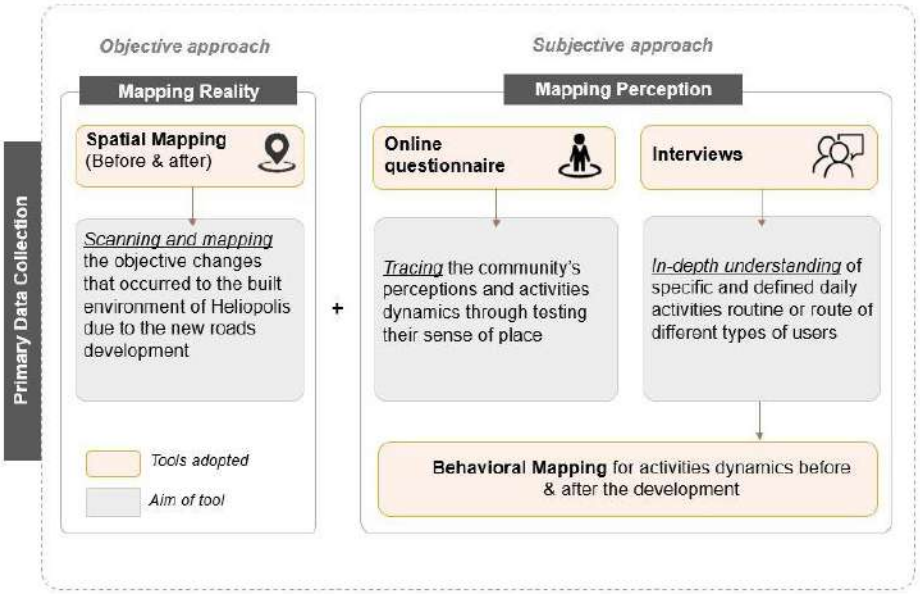

Figure 39: Tools used in the primary data collection process - Source: Author

4.2.2 Tools and methods

4.2.2.1 Spatial Analysis

To get a better image of the selected area, spatial mapping for the district's layout was crucial to be carried out to scan the new developments and transportation infrastructures and compare the physical state before and after the interventions which is already discussed in the previous part of this chapter. This was conducted through using satellite images to verify the initial and current situation with the documentation of photographs. Also sections in the most affected and transformed streets were drawn to give a better sense to the new condition and to put the dimensions in context to have a deeper understanding of why and how the daily activities could have changed its patterns.

4.2.2.2 Questionnaire

Aim:

This questionnaire is aiming at scoping both the positive and negative perceptions of the local community towards their newly transformed district and how their daily life dynamics were affected accordingly. It targets providing the complex and exploratory detailed descriptions, live experiences and subjective insights of how people experience the presence of such huge structures as the urban highways and flyovers in their community. Since the study follows the model of sense of place proposed by Canter, which explains the components of place and the intertwined relations between them, the questionnaire was designed according to the three main elements that compromise that model which are physical setting (form), activities and meaning (image), as a basis of formation of the study framework to study and investigates the effect of physical form changing on how users receive information about their neighborhood and how they deal with it on a daily basis. Together with other factors and indicators derived from the international literature review and studying of previous experiences, a comprehensive questionnaire structure was formulated to cover the addressed issue.

Structure:

In that sense, the questionnaire was divided into four main sections, the first is the demographic study section focusing on important personal data that are crucial to the study such as the age, gender, duration of residence, allocation of residence and the frequency of visiting the district. The second section which is concerned with the changing physical setting is split into two parts, one of which encompasses the physical attributes and the other concentrates on the transportation infrastructures in particular. Section three tried to further understand the different typologies and patterns of the outdoor activities held by the various district actors. Finally, the fourth and last section is devoted to how the users feel about the urban image, collective

memory, sense of community and place attachment concepts in relation to the recent changes (See appendix 2 for the full questionnaire form).

Statistics:

The questionnaire was established in both English and Arabic languages to reach a wider platform of Egyptian citizens of different ages and backgrounds. It was launched for two weeks from 8th June 2022 till 20th June 202. The sample size was calculated through Cochran formula:

$$Z = \frac{\mathrm{d}^2 * X(1 - X)}{\mathrm{N}^2}$$

Z value represents the sample size; N is the desired level of precision (i.e., the margin of error which was calculated on 5%). While X represents the (estimated) portion of the population of the district which is approximately 140,000 capita. The d is the value that corresponds to the required level of confidence which is considered 95%. This last value is deducted from the d-table, which helps to describe what percentage is below the curve at any specific point (Glen, 2019; Alden, 2007).

The random sample intended to ensure a wide range cross-section of age, gender and type of Heliopolis users, so the questionnaire was launched online on social media channels such as WhatsApp and Facebook especially the groups of Heliopolis residents which helped in reaching the elderly people who are a very important actor to the study. It was clearly declared at the brief of the questionnaire that contribution is not obligatory yet welcomed. It was also mentioned and advised that respondents less than 20 years should seek parental approval before participating. The questionnaire was completed by 317 participants, two of which refused to proceed answering which makes the total responds 315 inputs. The questionnaire results and discussions are to be studied in the following chapter.

4.2.2.3 In-depth interviews

Typically, in-depth interviews are conducted when the core of the investigation is unclear and the existing data is insufficient to rely on. Therefore, a deeper comprehension must be achieved by exploring a few of leading questions in a casual discussion manner. In order to help the respondents feel more comfortable providing their information and to allow them the flexibility to express their own thoughts, it was decided that they will stay anonymous in the study. Accordingly, in-depth semi-structured interviews were carried out with community members who can provide daily insights on the elevated urban highway that bisects their community. Residents and business owners who immediately overlook elevated urban highways are ideal candidates for assessing the structure's direct and indirect effects. One interview was held online through a social media platform, and the others were face-to-face interviews. The aim was to understand the specific daily life routines and scenarios of users of different ages to trace in further details the change that happened to their preferences and choices of their destinations and the duration of staying outdoors after the roads development took place.

The interview questions were semi-structured as follows;

-How did the road development project affect your daily life activities?

-What is your opinion whether positive or negative?

-In your opinion, what do you need to change in the current situation?

Chapter 5

Data Analysis

This chapter applies the theoretical concepts addressed in previous chapters to a detailed analytical evaluation of the case study region, Heliopolis district. Chapter five explores perceptions of the updated road network development in Heliopolis and how it is impacting the sense of place for the local community and eventually their daily life activities, through the use of both qualitative and quantitative research. As discussed in the previous chapter, the analysis is based on the results of a detailed questionnaire for the existing local residents and daily users as well as in-depth interviews with locals for more detailed scenarios. The analysis work flow follows the deduced assessment criteria tackling and discussing the framework indicators of the study in detail to reach a better understanding of the subjective insights and perceptions of the daily users regarding the addressed issue whether they are positive or negative.

5.1 Results

The questionnaire mainly measures the impact of the recent roads development strategy applied in Heliopolis on its community's perception and accordingly their physical activities in the open spaces of the district. To achieve this, the questionnaire included before and after questions as well as a mix between closed and open ended questions to better understand and grasp the dynamics of the change between the previous daily life before the intervention and the current one after it. The investigation generally shows that the majority of participants agree that there is no doubt these projects have had a positive influence on their travelling behavior inside the district as well as from and to other surrounding regions. Developing the streets enhanced the flow of vehicular movement and reduced the travel time

remarkably. However, negative impacts were grossly scoped through their perceptions which will be discussed thoroughly below.

A total of 317 participants contributed in the questionnaire with only two invalid responses which makes a total of 315 valid inputs. The demographic introductory section shows a balance in the gender of the participants where 52.1 of them are females while 47.9% are males. The inputs demonstrate a variety of age range, yet a respectively big ratio are youth below 30 years. 159 respondents (50.5%) are below 30 years, distributed as 5 respondents aged from 15 to 20 years and 154 respondents between 21 and 30 years. However, 158 respondents (49.5%) are more than 30 years who are distributed as follows; 43 of them are from 31 to 40 years, 45 are aged between 42 and 50 years, 41 are from 51 to 60 years and 25 are above 60 years. In fact, it was crucial to reach citizens of older ages for multiple reasons; one of which is that older ages indicate longer contact or residence in the district area and accordingly have stronger knowledge, connection and memory with the study area. Also, elder people alongside with the disabled and children are the most vulnerable groups when it comes to outdoor poor or inappropriate built environment conditions which makes it very important to know their perceptions and conscious feeling about the place.

Also the participants were classified according to their type of use of the place where 56.8% are current residents of Heliopolis, 18.7% are former residents, 6.7% are business owners or rentals of retails, 5.7% work in the district, 20.6% are regular visitors and 10.8% are passer-bys. In addition, they were asked to clarify their duration of residence/working in Heliopolis; the results show that 51.7% of the respondents lived there more than 20 years, 12.7% lived there from 10 to 20 years, 11.1% stayed there from 5 to 10 years, 8.6% lived there only less than 5 years and 15.9% never lived or worked there. Actually, the duration of residence is a very important factor in the study because as the length of stay in a place increases, place attachment and sense of belonging automatically increases.

As discussed before, the questionnaire is based on three elements constituting the sense of place model; the form, the activities and the image/meaning. Therefore, the results are going to be analyzed according to those three aspects. First, the analysis will go through the physical form aspect of Heliopolis and how the community perceives it before and after the road network development.

5.1.1 Community perceptions of aspects of physical form

Regarding the formation of sense of place, the role of the urban environment's physical setting will be studied. Since the first impression of a place is typically formed by its physical characteristics, the geographical location of a city, the natural features, its territorial boundaries, mountains, rivers, or the sea, the regional characteristics, flora, and climatic characteristics provide important clues regarding the formation of an urban settlement and contribute to the general mental image of a city. In addition, the urban morphology, as the form of the settlements, the spatial characteristics, urban pattern, blocks and building lots, street layouts, landmarks, public spaces, squares, open spaces between buildings, parks and gardens, and the third dimension in the city, as the architectural structure, form and typology, constitute the essential element of the physical environment. Nevertheless, the form aspect addressed in this study is mainly concerned and focused on the streetscape physical features, quality of streets and transportation infrastructures.

As stated in the previous chapters, the national roads project in Cairo emphasized mainly on car-centric streets that encourages motorized mobilization over active travel, open spaces, greenery and plantation and puts the pedestrian lives at risk of death. The community perceptions concerning this physical aspect are analyzed into different indicators as it was previously classified in the assessment criteria framework as follows;

Connectivity and integration

Regarding the connectivity between the different areas and zones inside the district of Heliopolis, the daily users were asked whether they feel that some neighborhoods in Heliopolis got isolated from each other prior to the development of the road network. It was agreed by over than 75% of the respondents that a physical disconnection between the different areas is clearly sensed where 65.4% believed that there was a partial isolation, 12.8% saw that they became totally isolated while 21.8% didn't agree on any form of sensed segregation. This reveals that widening the streets and building flyovers made some homogenous sectors as if they are islands bordered by highways from all directions making it more difficult to access other surrounding zones especially through walking. This also indicates that the street in its new form is seen as an edge that the individuals perceive as both a physical and visual barrier that disconnects them from adjacent areas in the same district. As stated by one of the questionnaire respondents who is a current Heliopolis resident "I can't deny that it is much easier and faster now to travel through the main corridors in Heliopolis especially to other districts, yet it became more difficult to access the inner streets due to the very far U-turns". It is worth mentioning that before the transformation in Heliopolis road network, the sequence of nodal points handled the integration between different parts of the suburb, as well as the pedestrian friendly street network that eased the navigation and access through various parts of the district. Nevertheless, the roads development projects might have improved the outer integration between Heliopolis district and the surrounding districts, yet it is not what perceived by the local community concerning the internal integration and connection between Heliopolis neighborhoods.

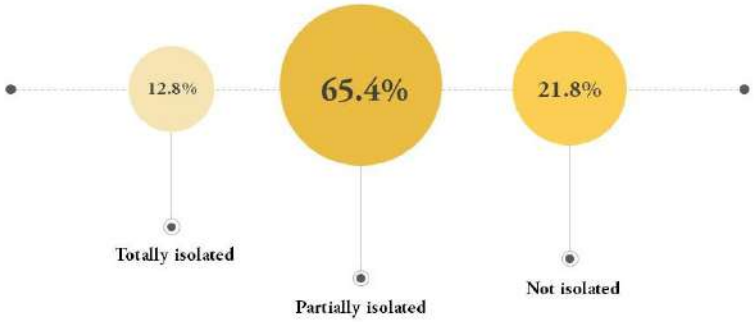

Figure 40: Questionnaire responds to "How much neighborhoods in Heliopolis got isolated from each other as a result of the road development plan?" – Source: Author

Perceived safety and quality of streets

Despite the fact that the massive investments in roads development projects might have reaped its benefits in the short term concerning improving the traffic flow and avoiding traffic congestions as well as bottle necks in the local neighborhoods junctions, yet the new highways, flyovers and wide automobile-centric streets are designed solely for motorized traffic neglecting the pedestrian use or active transportation as walking and cycling. Those roads grossly encourage vehicular movement giving cars right-of-way with little to no regard to any of the walkability aspects. Bearing in mind that some of those streets were once on the local level of the neighborhood, they were suddenly upgraded from two-lane streets to five and seven lane roads that threaten the pedestrian life declaring the complete dominance of vehicles in one of the most districts that served a pedestrian friendly environment. In that sense, private automobiles and motorbikes are substantially incentivized, whilst public transportation is dis-incentivized. Thus, those car-centric streets are in direct conflict with broader transport policy, climate policy, and sustainable development policy objectives that are adopted by Egypt vision 2030, all of which seek to reduce private motorization levels (MPED, 2021).

In order to understand how the new developed roads affected the perceived safety of the daily users of Heliopolis, they were asked to rate the safety of

their pedestrian experience after the road development plan on a scale from 1 to 5 where 1 indicates very dangerous while 5 indicates very safe. As shown in figure (41), over 88% (278 out of 315 in total) stated that they perceive their walking experience to be from dangerous to very dangerous with 0% agreeing on the streets to be safe for pedestrians. This means that the majority are convinced that the developed roads totally lack of any safety measures for pedestrians but rather they became source of deadly danger for them.

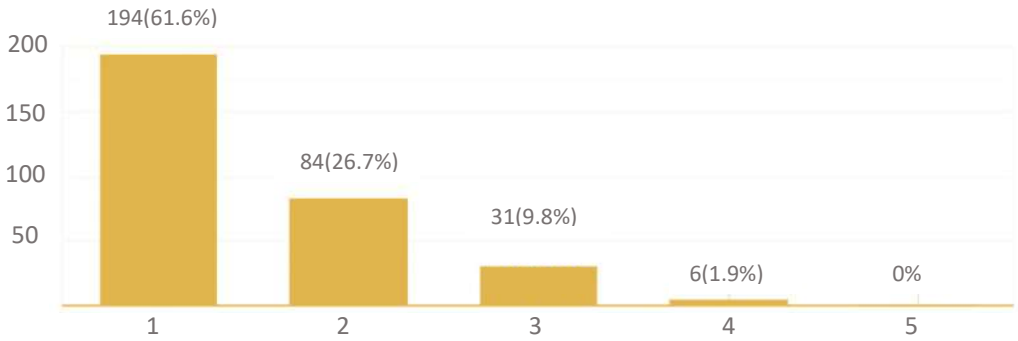

Figure 41: Questionnaire responds to "On a scale from 1 to 5, how do you rate the safety of your pedestrian experience after the road development plan" – Source: Author

"I have a car but I like to walk, now I have to think where I can cross the streets because it's becoming a suicidal mission" A quote by one of the respondents to the questionnaire describing the unpleasant life-threatening pedestrian experience in Heliopolis streets. After the widening of roads and construction of flyovers, the phenomenon of deadly accidents especially pedestrians kept on rising. Immediately following the opening of these bridges, the rate of traffic accidents and road mortality spiked sharply (Alaraby, 2020). *"I myself saw more than 4 accidents in less than two months"* said one of the questionnaire respondents. In about six months after the expansion of streets commenced, around 40 pedestrian-vehicle collision accidents at least took place on the expanded roads (Heliopolis Facebook page, 2020), see figures (42, 43, 44). The primary problem is the design of roads which prioritizes car traffic at the cost of all other road users and doesn't follow the design guidelines for safe streets. Only a few traffic lights and

pedestrian crossings exist on inner-district arterial roads in most of Heliopolis (Shawkat, 2020). According to a World Bank report from 2019, 78% of roads in Egypt do not have pedestrian sidewalks, and 97 % of all streets lack traffic signals, putting pedestrians in risk for the majority of their trip. The main cause for such accidents go back to the lack of convenient pedestrian infrastructure in the roads network which seems to be a common problem in the Egyptian streets that this new road plan in Heliopolis also didn't manage to recover.

Figure 42: Ambulance arriving at the scene of a pedestrian-vehicle accident below a newly built bridge in Heliopolis. Source: (Heliopolis Facebook page, 2020)

Figure 43: A young man running across the street avoiding speedy cars. Source: (Heliopolis Facebook page, 2020)

Figure 44: Two police officers helping a pedestrian cross one of the recently widened roads in Heliopolis. Source: (Heliopolis Facebook page, 2020)

One of the questionnaire respondents expressed his resentment about the pedestrian poor conditions as follows "*People, elders, kids and mothers have now to cross very wide streets, and cars are very speedy, all of which had to be taken into account before the expansion of streets especially the ones that didn't need to like Abdul Hamid Badawi and Al Hegaz streets*". Thus, to understand the users' perspective about the current safety measures in the street, the districts' users were asked in the questionnaire an open ended question to indicate the missing design elements of street to increase the pedestrian safety in their point of view (Fig ()).

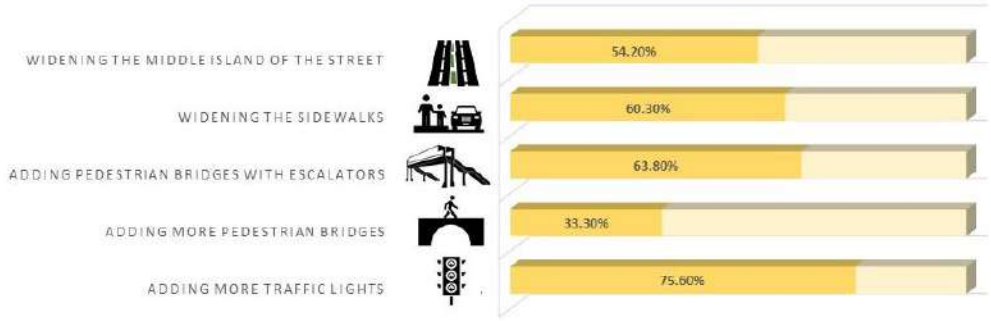

Figure 45: Questionnaire responds to "In your opinion, what are the missing design elements of street to increase the pedestrian safety?" – Source: Author

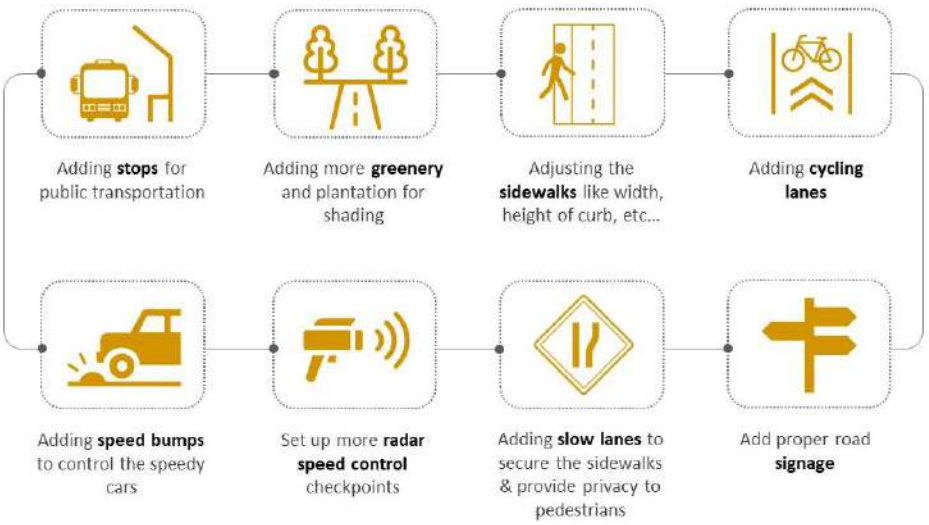

Figure 46: Questionnaire open ended responds to "In your opinion, what are the missing design elements of street to increase the pedestrian safety" – Source: Author

Above are shown two figures (45, 46) representing the users' perceptions on the missing safety measures in Heliopolis roads. It is agreed by the majority that adding traffic lights, adding pedestrian bridges with escalators and widening the sidewalks are the most three important and demanding missing safety measures for pedestrians that need action. Other suggested solutions from the participants included adding speed bumps to control the speed of cars along with radar checkpoints, adding trees and greenery, installing proper street signage, adding cycling lanes and specific stops for public transportation. Psychologically, the sense of safety and security in any urban context is not necessarily limited to the fear of physical accidents and damages only, but it also reinforces and enhances the sense of place and community in this area as well as the urban quality of life (Rudlin & Falk, 1999). Affording a safe environment offers a comfortable and easy daily life in an attractive and functional surrounding (Gehl, 2009). There are a number of characteristics and urban treatments that can enhance the sense of safety in streets, such as divided paths for every movement, activity, and user, including walkers, cyclists, automobiles, and merchants, and the selection of landscape components that suit these movements (Saeed & Omar, 2019).

The following figure (47) shows the deficiency of traffic lights across the 7 lane streets that can be called now highways. The diagram illustrates that the spread of traffic lights is still very poor and inconsistent. Some streets totally lack from any sort of pedestrian crossing whether a traffic light or a pedestrian bridge. While other streets have traffic lights but very insufficient where some of them include only one over a distance of approximately two kilometers such as Farid Semeika street, Abu Bakr Al Seddick street which has only one traffic light and one pedestrian bridge over 2.7 kilometers, and Al Hegaz street which has only one traffic light over around 5 kilometers, which means walking extra long distances to cross the street or risking to directly cross it or picking a vehicular transportation just to get to the other side. In addition, traffic lights are not necessarily located in the ultimate spots where many

points of expected high volume of road crossing pedestrian flux are left behind with no direct or near means of safe crossing.

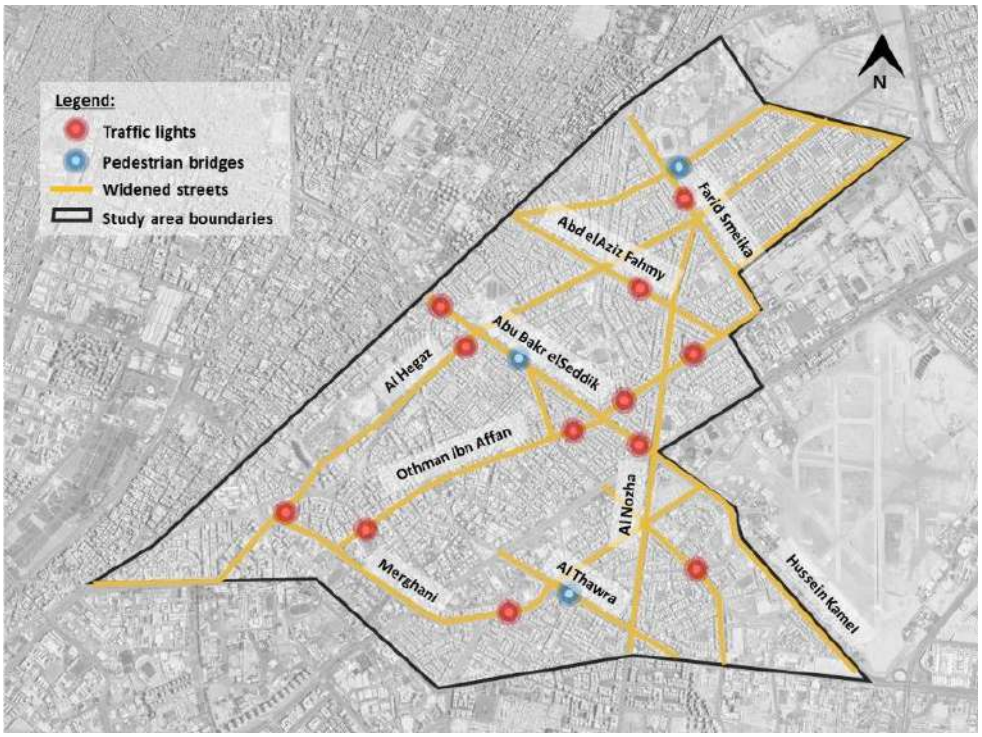

Figure 47: Mapping the traffic lights and pedestrian bridges in Heliopolis after the roads development – Source: Author using satellite image from Google

Mobility and traffic congestion

One of the core objectives of this road development plan is to upgrade the streets of greater Cairo region to ease the traffic congestion and accommodate the growing influx of cars. This specific target led the urban planners set one main goal; expanding the roads and constructing bridges at all the intersections to achieve a smoother flow of vehicles regardless any other costs that would result from this. As discussed earlier, two and three lane streets transformed into six or seven freeways through removing the green medians and shrinking the sidewalks. Additionally, the remaining Heliopolis tramway lines were demolished to make room for these extensions. The expanded streets may have reduced some congestion in the short term, but they will also induced traffic and speed (Almoghazy, 2020).

Induced traffic is a concept that adopts the idea that expanding roads is a temporarily solution that will not necessarily solve the traffic congestion problem, but it will rather increase it on the long term as it encourages more people to utilize cars and transportation over active travel. This can be deduced clearly from the questionnaire participants' replies when they were asked how their mode of transportation changed before and after the development. "*It changed from walking to using public transportation regardless how short the distance is because street crossing became impossible to me*", said one of the respondents. Over 41% of the respondents chose that they changed their travel mode from walking to using cars or car hailing applications. From another perspective, one of the interviewees (1) stated that she always used to go to the nearby supermarket which was a five-minute walk on foot, however, now that she finds it tremendously unsafe to cross the street, she doesn't go by herself to the supermarket anymore, rather she chooses to order delivery. All of the aforementioned prove that users now prefer –even unwillingly- vehicular travelling especially for kids and elderly which will make the streets be loaded with more and more vehicles which puts us in an endless loop.

However, it is agreed by the high majority of the interviewed and surveyed sample that the roads' development plan had a great positive impact on easing the transportation within Heliopolis and saved a lot of time for mobilized users especially during rush hours. "*Now I can travel from east to west of Heliopolis in 10 minutes, before, it barely took me from half an hour to 45 minutes*.", stated interviewee (4). Also, another interviewee (6) assured on the same idea; *"I lived all my childhood and youth period in Heliopolis, now I live in Al Rehab and I used to avoid going to Heliopolis due to the severe traffic jams but now I find it really easy which made me come more often."* Time is a very crucial factor in this dynamic life and performing everyday activities. People tend to avoid travelling in peak hours seeking improved travel experience (Schwanen, Kwan, & Ren, 2008). Travelling during rush hour can have a substantial impact on the quality of a journey, as it can affect

all of the main trip characteristics such as travel cost, travel safety, travel time and travel comfort as well as increasing the stress levels due to intense crowding (Aminian, 2019). The surveyed sample were asked whether they believe that the road development plan helped the traffic flow in Heliopolis (see figure 48) and more than 60% agreed that it did help in traffic evaporation and improved their travel satisfaction. Yet, some of the questionnaire respondents believe that the streets are of poor quality with very far U-turns that push many to drive reversely. Others also criticized the activities below the bridges as –in their opinion- many cars try to park around these activities as well as the random dropping off in front of them which causes congestion that those bridges were built to solve in the first place. Also, the main common concern mentioned by multiple respondents is the lack of parking slots as after the development of streets it is only allowed to park on one side of the street unlike before, one of the respondents stated; "*Cars now park accumulatively on the inner local streets in second and third rows which became unbearable and a serious issue that generates many disputes between the residents.*"

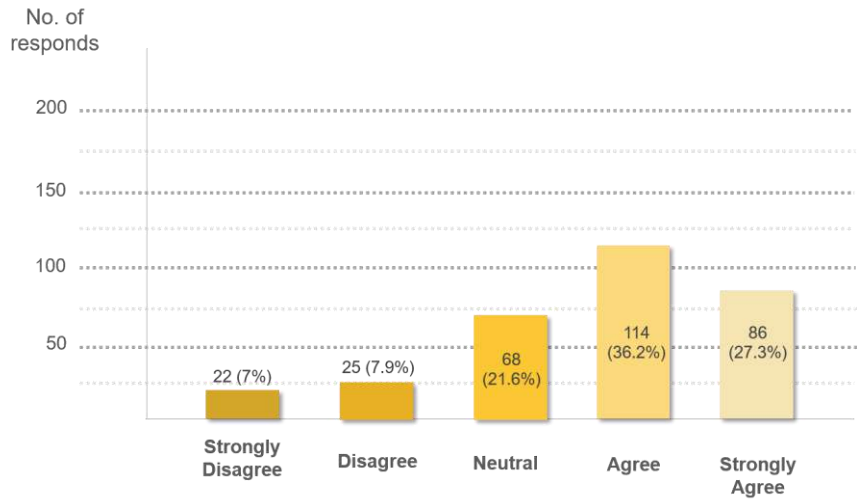

Figure 48: Questionnaire responds to "How much do you agree with the following statement? The road development plan helped traffic flow in Heliopolis" – Source: Author

Accessibility

It is worth mentioning that accessibility is a crucial spatial feature that plays a considerable role in the relationship between transportation and land-use decisions (Hansen, 2009). Easily accessed services increase the urban quality of life in neighborhoods. So, it was important to understand this factor before and after the interventions in Heliopolis and whether the developments of roads and bridges eased the accessibility to the surrounding services in the district or made it more difficult. In the questionnaire, the sample was asked to describe their experience with the accessibility through both vehicles and walking. Concerning walking, more than 50% expressed their extreme dissatisfaction with their experience. "*It's extremely unsafe to cross the street so it became difficult to me to reach shops on the other side of the road*", stated one of the questionnaire respondents. Another interviewee (3) also said "*My friend died while crossing the street to the supermarket, he got hit by a speedy car at the bridge ramp.*" In addition, one of the interviewees (2) in his late sixties said that he now can't go to the mosque he always used to pray in because it is across the street and it's totally unsafe to cross it." However, concerning the vehicular experience, the questionnaire results show higher satisfaction than the walkable one (see figure 49). The majority highly praised the significant easiness of the traffic flow that helped them access facilities faster. Yet, some of the respondents and interviewees mentioned some of the drawbacks they sensed concerning the accessibility. One of them expressed her discontent from the very far U-turns that made the route to certain facilities much longer. Another one complained about the deficiency in the parking areas especially after the roads developments which affects her accessing experience to shops on the main road.

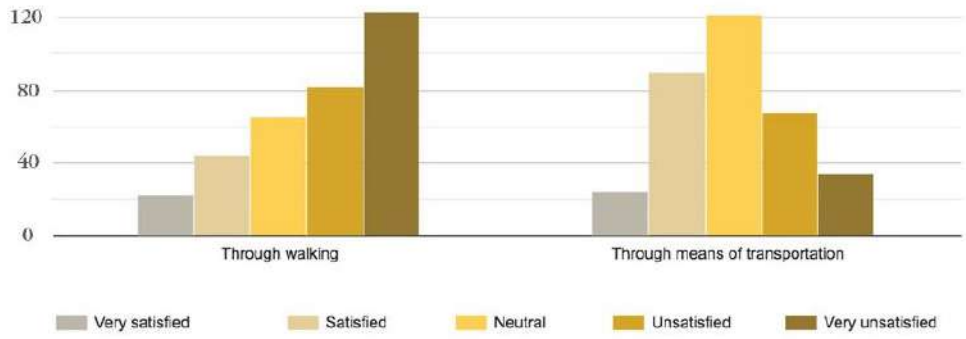

Figure 49: Questionnaire responds to "Rate your satisfaction with the accessibility to different places (Mosques, barber-shops, grocery shops, etc.) in Heliopolis after the road development" – Source: Author

Nonetheless, the perspective of the shop owners couldn't be neglected. Upon interviewing two shop owners in two different spots, there appeared to be conflicting opinions. Interviewee (8) who is a shop owner overlooking a newly constructed bridge believes that despite that the activities below the bridge might have attracted more customers to the area in general, however, the bridge itself deprived his shop from a large visitor flow that now passes above his entity, he complains that now he is much less exposed than before describing his status as being 'buried'. The other shop owner (interviewee 7) who is on a main road mentioned that he recognizes less footprint on his shop due to the difficulty in crossing the streets from other surrounding areas. Yet, both agreed that the new roads and bridges facilitated the movement of their goods. Widening streets and building flyovers reallocates street space from pedestrians and local district use (commerce, recreation) to motorised travel. Vehicle-centric streets promote high-income car owners and ride hailing users over public transit users and active travellers. This changes the economic behaviours of shop owners and shoppers as the new traffic patterns elevate some locations and diminish others (Hegazy, 2020).

Greenery and plantation

In order to add extra lanes, the projects in Heliopolis consumed a significant fraction of the green spaces that had occupied the street medians (see figures

50, 51, 52). According to the Heliopolis Heritage Innovative (HHI), 90 feddans of green space were lost and more than 2600 trees have been razed as a result (Al Ahram, 2020).

Figure 50: Trees razed during construction phase – Source: Al Ahram, 2020

Figure 51: The intersection between Gesr al Suez, Abd el Aziz Fahmy and Mohamed Farid streets in 2019 before the development – Source: Google Earth satellite images

Figure 52: The intersection between Gesr al Suez, Abd el Aziz Fahmy and Mohamed Farid streets in 2021 after the development – Source: Google earth satellite images

The questionnaire tried to understand the daily users' perception towards this issue and how it affected their daily life pattern so they were asked about the factors that most impacted their sense of place of their district. 244 out of 315 respondents in total chose that removal of green areas had a negative impact on their sense of place. "*Removing the trees that characterized Heliopolis led to increasing the street temperature which made me avoid my presence on the street and eventually affected performing my daily activities*", stated one of the questionnaire respondents. Another one highlighted that this issue could have been avoided, "*Trees could have not been removed on the central island of the main streets or the local streets, the road could have been expanded while taking into account the aesthetic side and the shade*". Also another one supporting the same point of view, "*They could have used the removed tram rails area to increase the green public space, there are even now a few relatively large green street medians without any trees planted in it that can be invested in it differently*". The most common believed that removal of trees has led to the loss of shade which makes walking unfavorable, short distance trips like grocery shopping and going to school are now more likely to be by car rather than walking in the hot weather.

Apparently, this issue in particular mostly affected the residents' sense of place and conscious feeling about their neighborhood. "*They removed all the vast green areas in the middle of the street that I have always enjoyed walking everyday by them and enjoy watching the flowers blossom, those green areas were the source of tranquility and mental relief to me*", said one of the respondents. Also interviewee (2) who lived in front of Al Hegaz bridge stated the following, "*I used to overlook Al Hegaz square that was very green and full of trees that inhabited many birds which we used to listen to every morning which isn't the case now, however, this sound is now replaced by the noise resulting from the coffe shops that opened below the bridge*." In addition, demolishing the green areas had a strong negative impact on the urban image of Heliopolis. The surveyed sample were asked in the questionnaire what is the most significant change that had an impact on the

urban image of Heliopolis, the highest response goes to removing greenery and trees with 294 responds (90.3%) and then removing the green squares with 209 responds (66.3%) (see fig()). "*Those trees aren't only a form of aesthetics but they are part of Heliopolis history, removing them represents demolishing part of the heritage of Heliopolis image*.", said one of the surveyors. The results also showed that the greenery declination has triggered the users' collective memory in a negative manner. When they were asked what made some places in Heliopolis memorable in their point of view, 253 (80.3%) chose greenery and plantation indicating its significant association with the memory of Heliopolis streets. Moreover, the green areas clearly helped in the legibility and navigation through Heliopolis as more than 35% of the respondents chose greenery as one of the tools that helped them in the wayfinding and distinguishing places.

5.1.2 Perceptions of Image and meaning

Moving to the last element of the assessment criteria framework, an analysis of the aspect of the image, meaning and memory is to be discussed. According to Montgomery (1998), a legible and attractive urban form promotes human pleasure. He believes that a sense of belonging to a place may be achieved by successfully representing that place to be attached in one's mind and consequently acquiring feelings from it. Thus, it is important to shed light and understand how the urban transformation of an old established district impacted the feelings and perceptions of the daily users towards it. To achieve this, the following indicators will be further studied to form a clearer comprehensive image;

Aesthetics

The formation of good attractive urban spaces has been a subject of discussion amongst psychologists and urban designers for many years. Formal aesthetics was identified as one of the psychological components of a legible and

imaginable city because "aesthetic values of an object can provoke emotions of interest and pleasure" (Barlas, 2006). Lynch (1981) highlighted sensual pleasure that provides psychological satisfaction to the viewer in order to underline the significance of aesthetic forms. Positive impacts of an imageable setting undoubtedly enhance the recognition of a place (Eraydin, 2007). The results of the interviews showed that visual appeal was from the main concerns of Heliopolis daily users that affected their sense of place. One of the interviewees (4) expressed his distress by saying, "*The amount of concrete constructed in these last three years hasn't been used in Egypt through the past fifty years.*" The responds of the questionnaire also reflected on the same issue when they were asked about their insights about the investments that took over below the bridges, 204 participants out of 315 in total believed that it negatively affected the visual image of Heliopolis. "*Without a unified architecture design code for the shops below bridges, it became a licensed but random visual intervention*" claimed one of the questionnaire respondents. In addition, an elder interviewee (5) in her late sixties who has been living in Heliopolis for over fifty-five years expressed that the brutal loss of the green color destroyed the joyful visual image of Heliopolis, "*It will now only be in our memories*", she said.

Legibility | Sense of direction -Way finding

Wayfinding is the primary concern of the physical design procedure and a crucial aspect of easily perceived environments (Eraydin, 2007). The strategic connection in the process of wayfinding is the environmental image, the individual's generalised mental image of the outer physical world. Lynch defined navigation as "the constant application and organisation of distinct external sensory inputs." Actually this was very significant in Heliopolis initial planning that was based on organized sequence of squares that acted as nodal intersection points which made the area easily readable and perceived by all users the local residents as well as visitors. In order to understand whether the disturbance in the physical organization of the physical setting affected

the daily users wayfinding or not, they were asked to demonstrate their means of navigation through Heliopolis before and after the development (See figure 52).

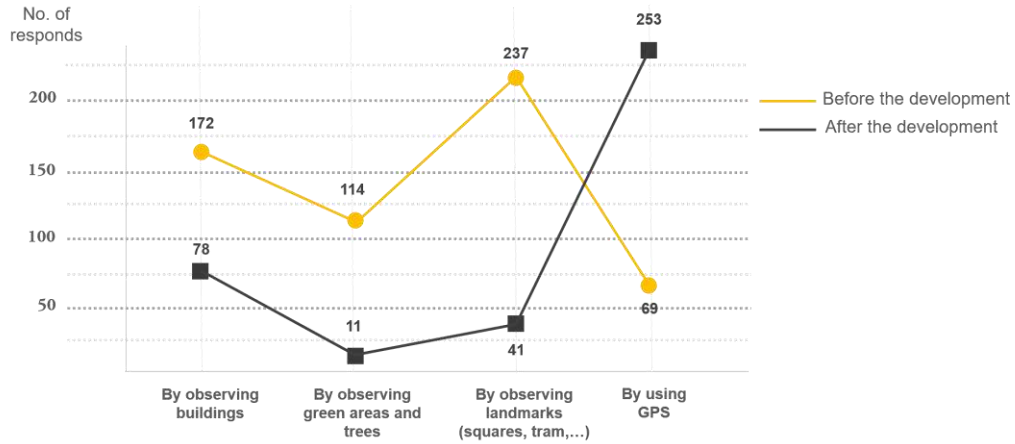

Figure 53: Questionnaire responds to "How do you usually navigate through Heliopolis before and after the road development" – Source: Author

The results show that before the roads development, the respondents' choices were divided with close ratios between observing buildings, green areas and landmarks such as squares and trams, with only 20% choosing GPS as a tool for navigation. One of the respondents clarified, "*I am born in Heliopolis and I recall every street here by heart, I need no guide.*" However, after the development, the replies changed in the favor of using the GPS where it spiked to over 80% of the respondents who started using GPS to help them travel through the new streets system. It is also recognized that by increasing the rates of choosing GPS after the development, the rates of observing the buildings dropped from 55% to 24%, which indicates that the change in the physical setting of the streets pattern may affect people's perception and recognition to the surrounding buildings. Similarly, the observation of landmarks dropped from 75% to 13% because the tram and squares were from the most significant landmarks in Heliopolis, "*I lost the sense of where i am after removing most of the squares",* said one of the respondents.

The results also show that 87% of the elders over 51 years chose using GPS in way finding, one of them expressed himself saying "*I get lost and reroute for thousand times."* Also one of the interviewees (5) in her late sixties stated that she always gets lost now because she doesn't get out that much which makes her feel like a stranger in that new surrounding. All of this demonstrates that the elders were highly affected concerning their feeling of orientation in their district. Yet, also the high majority of youths agree on the necessity of using GPS in the way finding after the new interventions. One of the respondents stated the following, "*GPS itself gets confused with the bridges popping out of nowhere.*" However, these results might be short termed and people will get more acquainted with the surroundings over the time, interviewee (6) in her early forties highlighted that she faced the same issue of getting lost at the beginning until she developed more relevance and acquaintance by time and trial and error. She added that initially she was frustrated but her distress faded away when she started experiencing the easiness of the traffic flow and reduced time of travel.

Image and collective memory

The image is the result of both immediate sensation and memory of past experience, and it is used to analyze information and guide behaviour (Lynch, 1960). Indeed, one of the most affected parameters due to the development were the urban image and memory of Heliopolis. Heliopolis is a heritage district with distinct architectural style and urban form which made it from the most reputable high class districts in Cairo. In order to scope the dynamics occurred to Heliopolis image and collective memory of its places according to the daily users, the surveyed sample were asked to indicate what affected the urban image of Heliopolis the most after the development (see figure 54).

Figure 54: Questionnaire responds to "From the following, what do you think had an impact on the urban image of Heliopolis?" – Source: Author

The results demonstrate that there is consensus that all the suggested factors such as removal of the tram, removal of greenery, removal of squares and construction of bridges affected the perceived image of Heliopolis. The respondents also reflected on this issue in their replies, *"The wide roads and bridges destroyed the walkable nature of Heliopolis which was one of the unique features of the district's identity as well as the tranquility and slow paced simple daily life"*, stated one of the questionnaire participants. Another one also said "*Numerous people are attached to living in Heliopolis for its tree-lined streets, tranquil atmosphere, and spacious building blocks with space for trees, gardens, play areas in the street medians, sunlight, and views of the sky, what happened distorted the visual and psychological image of Heliopolis.*" However, the most chosen affecting parameter is the removal of greenery and trees from all the streets, interviewee (3) affirmed that by saying, "*I am from the supporters of this project but it is totally unaccepted to raze thousands of trees including perennial ones, something should be done to compensate this loss*." And the construction of buildings comes in the second place in the affecting parameters, *"Bridges and ugly buildings below the bridges that attracted strange type of outsider people changed Heliopolis image from being a high end suburb to an unfamiliar area.",* described one of the respondents. Also, another one said criticizing the bridges; "*The bridges changed the skyline of Heliopolis and blocked the sky, it destroyed the district's squares that we all still name them after the names of the squares*." Moreover, the tram removal was a destruction to an

important symbol of local heritage of Heliopolis's neighborhood identity, "*The tram was one of the icons of Heliopolis, my father and many elders used to ride it recently, it would have been better if it was developed and upgraded like the tram of Alexandria.", s*aid one of the surveyors.

Figure 55: The old tram of Alexandria – Source: (Fouad, 2022)

Figure 56: The updated tram of Alexandria – Source: (UKR press, 2019)

Mai Al-Ibrashy, an architectural engineer who is a Heliopolis resident, explained in her article her struggle with the changing urban morphology of Heliopolis over the time recalling memories of her past experience in the district's streets; "*My journey from Ard al-Golf, where I reside, to Roxy, the commercial hub of Heliopolis, has increased from 15 minutes to 30 minutes to nearly impossible during my lifetime. Memories have changed from walking along a street lined with fragrant Daqn al-Pasha trees, to walking along a wider street with a metro running down the middle, to the metro being removed and the street being widened, to the introduction of a flyover and the threat to my life as I attempt to cross Salah Salim Highway*" (Al-Ibrashy, 2020).

Additionally, the questionnaire also addressed the issue of the memory associated with places in the district. The surveyed sample were given six photos in which they were required to identify Heliopolis based on their formulated image from their personal memory (See figure 57). Actually, those six photos weren't even fully related to Heliopolis, two of them represented

Heliopolis before the interventions (no.1&4), other two were of also of Heliopolis streets and bridges after the development (no.2&5) while the last two were of another district, Nasr city, that was also subject to urban transformation of its streets (no. 3&6). Actually photo no.6 specifically was chosen as the bridge's painted column in blue typology is not present in Heliopolis yet, so it is supposed to be recognized. The aim of the question is to explore whether the users will get confused between the image of Heliopolis and Nasr city. The most two chosen photos are 1 and 4 both with 85% of the responds which indicates that people still refer to the old images including dense greenery and the tramline as Heliopolis. However, only 8% agreed on photo no. 2 and 12% agreed on photo no. 5 which represent Heliopolis nowadays after the development. This is a very strong indicator that the current image of Heliopolis is indistinguishable and not unique and people still retain and refer to Heliopolis in its original form. On the other hand, photo no. 6 was voted also by 8% of the votes similar to the ratio of a current Heliopolis image. This reveals that people got puzzled between Heliopolis and other districts. It indicates that Heliopolis identity which was very distinctive is fading away and this is due to the unified design of bridges and streetscape all over Cairo's developed districts with no recognition to the different backgrounds, communities, history or identity of each area that should be dealt with separately. Photo no. 3 got the least votes (6%) and that might return to the architecture style of the buildings that doesn't look like Heliopolis.

1

2

3

4

5

6

Figure 57: Attached suggested photos to the survey question: "Which of the following images do you believe is a representation of Heliopolis? – Source: Author based on compiled resources

Place attachment

People's lives and behaviors are shaped by a network of memories and identities that are deeply connected to their surrounding environment (Cheshmehzangi & Heat, 2012). Therefore, comprehension of place attachment is essential for maintaining the attraction and value of places. The objective is to prevent the loss of familiar and significant user traits that influence their feeling of attachment. In the effort of exploring the impact of the road network development on the sense of belonging and place attachment of Heliopolis users toward their district, the surveyed sample were asked to state whether they further plans of leaving Heliopolis in the future due to the recent interventions. The results show that 54% of the current residents don't intend to abandon Heliopolis while 46% are willing to. This shows that the perceptions of sticking to or leaving the place are very close with a slight favour to the staying option which shows that people despite the intruded change to the physical environment are still attached to

the place. However, their daily engagement with the built environment is discouraged due to the previous factors that have been discussed above especially their sense of safety. Identifying the components that matter to users ensures that any urban intervention will neither impede their daily participation nor endanger their sense of belonging to the places they visit (Ujang & Zakariya, 2015).

5.1.3 Activities' dynamics:

Back to the assessment criteria framework, as discussed before, the analysis is based on the three main elements of sense of place model. This section tackles the change in dynamics of daily life activities of the daily users of Heliopolis due to the construction of the bridges and highways. In Death and Life of Great American Cities, Jane Jacobs was the first theorist to emphasize the value of "activity" for urban quality (1961). She referred to activity patterns when she used the term urban quality. In terms of the range of community activities, the sensory experiences and perceptual processes of an urban area determine its success. Accordingly, after it is found through the study that the urban transformation affected, with different magnitudes, the perception of the community towards the discussed physical attributes as well as the psychological ones, it is crucial to study whether those perceptions and conceptions affected the daily life activities pattern of Heliopolis users. One of the most major services and facilities that the new development project offered are the commercial and recreational activities below the bridges that should be thoroughly analyzed to examine the impressions of the community towards it. As deduced from the literature review, the indicators of this aspect are as follows;

Diversity and livability:

The activities below the bridges was a new concept to the Egyptian districts that attracted controversial insights and opinions in the public community. In order to understand the perspective of the daily users of Heliopolis and their impressions about these new forms of interventions, the sample of the

questionnaire were asked to express their perception concerning this issue. The results show that 32% of the respondents agree that these activities provide diversity, however, 90% of these respondents are from the younger ages from 20 to 40 years which indicates that those activities basically attract and are appealing to the younger generations more than the elderly who seem to resist and oppose it. "*It is the same supermarket below most of the bridges and it is very expensive*", said one of the respondents reflecting on the diversity of activities. Furthermore, another one expressed that those activities don't offer basic needs but they rather offer recreational leisure facilities; "*Most of them are cafeterias, cafes or commercial activities, and they do not meet the needs of the residents of the region as weekly or monthly services, and their prices are higher than the prices of similar commercial services.*" Moreover, most of the respondents complained about not utilizing this space as a parking area; "*It was a priority to make those zones below the bridge parking areas as there is a serious parking deficiency in Heliopolis and it could have solved a problem.*" Similarly, only 32% believe that those activities add livability to the place in which 93% of them are youth. However, one of the participants objected saying; "*It adds vitality to an area that is already vital, and thus causes noise and increases crowding due to cafes that are not considered among the basic needs services.*"

Attractiveness:

The majority of the surveyed sample feel that these activities didn't maintain an attractive environment neither visually nor psychologically. 60% of the respondents believe that those activities negatively affect the visual image of Heliopolis as discussed before in the image and meaning indicator. "These activities affect the heritage style of Heliopolis, they should have had a unified architectural design code to be in harmony with the surrounding context", expressed one of the respondents. In addition, 35% believe that they attract outsider strangers to the district which makes them feel uncomfortable and not in place in their own neighborhood. Also, many of the surveyors

complained about the increased noise and congestion that is caused by these activities as well as the negative impact it has on the privacy of the overlooking apartments, "*Those activities besides the speedy cars on the bridge led to extreme noise that I don't prefer to spend time in my balcony that overlooks a bridge.*" Additionally, another respondent expressed his opinion saying; "*It could have been better if the spaces below the bridge were green areas open for the public to compensate the loss of greenery but these investments are pure commercialism.*" However, other respondents also believe that these activities are a good initiative that is better than the dark dead spaces usually created below bridges. "*At least they are a better use for that space instead of being a dump site for rubbish or a space for inappropriate attitudes*", said one of the surveyors.

Activity pattern:

Also, in order to deeply understand the effect of the development plan on the daily life activities of the daily community, a detailed interview was held with one of Heliopolis residents to track precisely the change that happened to her regular daily routine. This study was conducted through mapping of the interviewee's everyday scenario before and after the interventions. The interviewee (1) is in her early forties, she was born in Heliopolis and she lives in a residential block at the intersection of Al Hegaz and Alnozha streets. The interviewee was asked to describe her daily activities that she used to do before the development and how those habits changes after it. She stated that before the interventions took place, in a regular day, she used to take her kids in the early morning to the adjacent Saint Fatima school through walking, then she used to go for a walk with her neighbor friends in the garden in Al Hegaz street large median (see figure 58). After that, she would go on her way home to supermarket Zaher that was 5 minutes' walk from her home for grocery shopping which she enjoyed to do by herself. Then, at the evening she would usually go with family and friends to Al Shams Club by walking and

finally on their way home they go walking to some cafes in front of Al Shams club gate for some snacks and a drink with her friends.

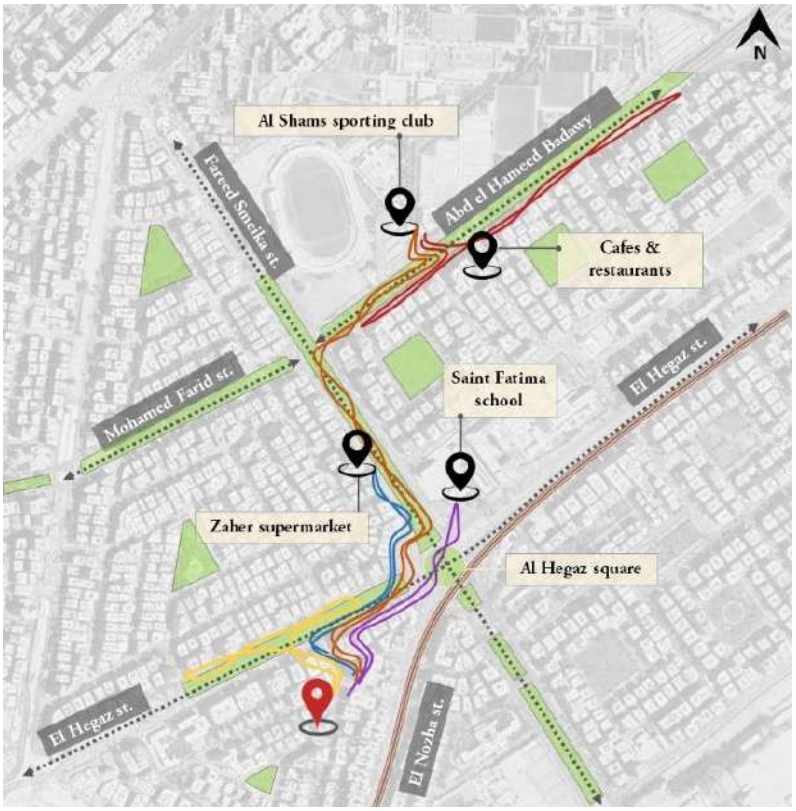

Figure 58: Activity mapping of an interviewee's daily scenario before the road network development – Source: Author using Google earth satellite images

It is evident from her scenario that she depended on walking in doing most of her daily errands within her home area. However, after the development, her daily routine started to shift from walking to driving her car or taking a taxi even for the shortest journeys. *"I am now avoiding outdoors as much as possible",* she said. Also, she demonstrated that now she drives her kids to the school and that she doesn't go by herself to the supermarket anymore, rather she depends on ordering delivery instead. *"I have to take taxi for 10 LE just to cross all the streets surrounding me",* she added. She continued; "*I don't*

go to the club as much now because I enjoyed the safe tranquil pedestrian journey with my friends before, now I have to take a taxi taking far U-turns to get me directly to the gate." She also expressed her distress from the loss of greenery which she enjoyed to walk around every day. As shown in figure (59), it is very obvious that her sense of being unsafe drastically affected her presence in the outdoor commons of the district.

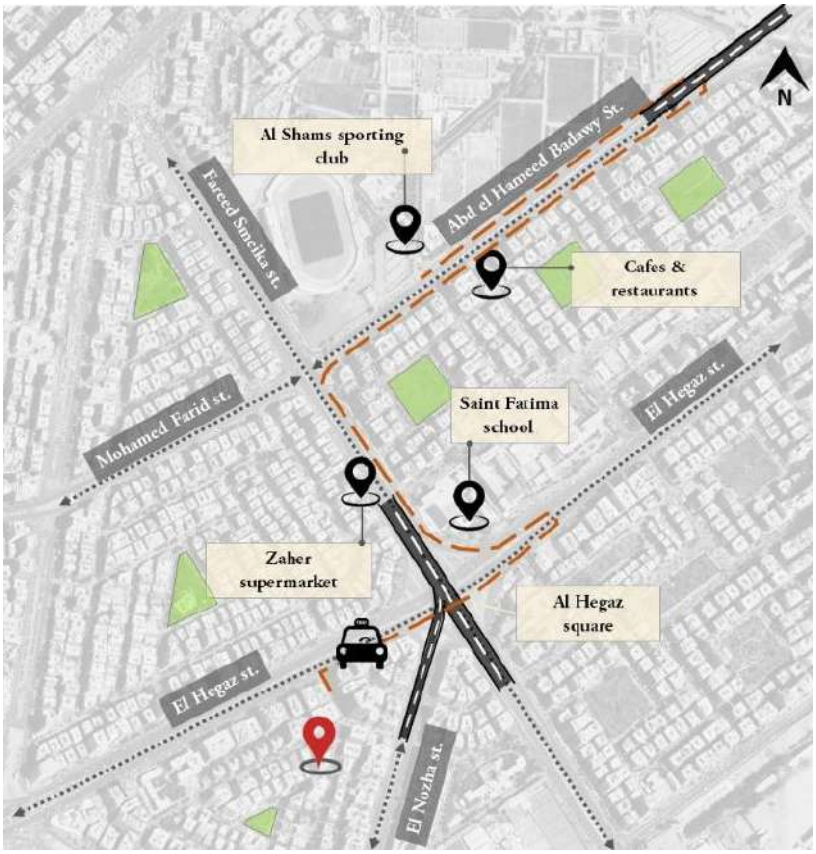

Figure 59: Activity mapping of an interviewee's daily scenario after the road network development – Source: Author using Google earth satellite images

This study reveals that before the implementation of the streets development, she used to carry out all types of activities simultaneously, necessary activities such as walking her kids to school and going for grocery shopping, optional and social activities such as roaming around with her friends for a nice walk

for some fresh air to relax and accompanying them through walking to the club. However, after the interventions that occurred to the streets, it's obvious that this pattern has been distorted. The necessary activities still take place but with a different travel behavior that deprive her from real contact with the physical surrounding environment. Also, some of the necessary activities like grocery shopping have been replaced by a more convenient alternative that also diminishes her existence in the outdoors. Any other optional practices like having a walk by the garden faded away and are fairly avoided which consequently eliminates the possibility of accompanied social activities. In this regard, it is evident that the new physical setting doesn't provide a suitable and attractive environment for active travelling which constitutes a large portion of the residents' daily life activities in Heliopolis due to the proximity of all the commercial, leisure, recreational and basic services. This eventually affects the daily behavior of the community with less existence as possible in the outdoor commons, "*I believe that the new change that happened totally facilitated the vehicular travel and positively affected the traffic flow and I personally benefit from this, but it took away our joy of enjoying the little everyday errands and it changed the atmosphere of Heliopolis from being a calm slow paced district to a busy and speedy one with extra wide roads. Now Heliopolis is unsafe nor aesthetically pleasant for walking, our lives are now threatened if we went grocery shopping across the street*", said interviewee (1).

This chapter attempted to analyze the empirical results of the questionnaire and interview, the following chapter will discuss an overview of the whole journey, the conclusions as well as potential recommendations for future urban development projects.

Chapter 6

Discussion

6.1 Key findings

The primary concern of this research was questioning the impact of the tangible transformation in the urban pattern of Heliopolis district -through changing its streets network morphology and building new huge transportation infrastructures- on the intangible psychological and social aspect of its local community. Heliopolis has initiated a traffic development project to make the neighborhood's elevated roads more accessible and to connect them to the key axes that connect it to adjacent cities, new cities, and the city Centre through constructing more than nine flyovers as well as expanding many main and local streets converting inner city streets into highways. Due to its unique location as a gateway and entryway between East and West Cairo, Heliopolis was the first neighborhood in Cairo to undergo this transformation. The results show that streets of Heliopolis stopped to be spaces for social interaction and active communal activities after they were replaced with arteries for the flow of fast, loud, polluting cars. The street is the most diverse space within the city. There are as many images and interpretations of the street as there are purposes and functions. A city's urban fabric comprises of buildings and open spaces, with streets forming the majority of these spaces. Thus, the streets and their sidewalks are regarded as the city's most precious assets where all activities, movements, and interactions between citizens occur (Mehta, 2013).

The purpose of this section of the research is to establish a connection between the spatial change in the physical setting of the district, the perception of the community, and eventually the direct and indirect reflection upon the users' behavior and activities based on the studies and analysis introduced previously.

The investigation of this thesis particularly focused on the subjective perceptions of the local community from residents, employees, shop owners, regular visitors or regular passer-bys while addressing the socio-spatial dimension in their daily life. It is evident from the research results that the modifications that took place to the streetscape of the district affected the local community's day to day interactions with the built environment.

However, the conflicts, debates and controversial opinions that arose among the public community and the professional urban practitioners right after commencing in the recent road development project were totally verified through the evaluation of this research. The results show that the local community's perceptions towards these projects aren't fairly unified nor do they agree on the same direction, yet their impressions are very different and vary between parties who support and others who totally criticize and condemn these interventions. This is believed to go back to various factors such as the duration of residence in the district, the age range and the location of the settlement whether it is directly overlooking a main street, a newly constructed bridge or just in a residential block on a local street. With the variation of these variables, comes the wide spectrum of different opinions and arguments. However, there are set of common positive and negative perceptions that the majority agree on that will be discussed in details in the following part.

Common community perceptions

The held interviews and questionnaire revealed a more complete picture of the perceived potentials and challenges related to the newly constructed transportation infrastructures. Most of the positive impacts, particularly at the macroscale, confirm on the significant and instant benefits concerning mobility and travelling behavior. The respondents showed a great satisfaction of shorter travel times to surrounding districts and the suburban cities in a smother and easier manner that actually affected the performance of their daily journeys especially the ones who usually travel through vehicles whether

it is their private car or public transportation and don't necessarily depend on active travel. It is worth mentioning that time is a very crucial factor in this dynamic life and everyday activities. People tend to avoid travelling in peak hours seeking improved travel experience (Schwanen, Kwan, & Ren, 2008). It is a fact that the investigation showed that this particular factor affected people's decisions as well as choice of mode of transportation. As declared from various participants who are regular visitors to Heliopolis and discussed their experience from past and present situations described that before the development of roads they used to avoid Heliopolis as a destination for their optional activities due to the extreme traffic congestion while now it became much easier and faster to navigate through Heliopolis which increased their frequency of visits to the district. Also, the interviewed shop owners expressed their contentment with the easy and fast delivery of their goods and merchandise due to the new street network. This shows that the majority perceive the projects as successful concerning the transportation evaporation perspective and that it enhanced their travelling experience.

However, on the microscale, there are other common negative impacts that the majority agree on of which the most notable is the very poor pedestrian safety. Almost all the participants agreed that the new developed streets lack any pedestrian safety measures and grossly discourage walkability. It is a fact that a high percentage of the participants complained that the new streets are not only inadequate for walking but also life threatening. Crossing a street became an impossible mission that many of them may take a taxi just to get to the other side of a street and some of them mentioned that this added a financial burden on them. Many of them also mentioned that they witnessed a lot of accidents and some of them lost friends or siblings as a victim of these roads while crossing the street. It is also important to mention that despite that elderly and kids are indeed the most vulnerable groups subject to higher possibilities of pedestrian danger, yet, this problem is irrelevant to a specific age group. In addition, this issue affected the choice of mode of transportation of many users where the results showed that over 40% of the respondents

changed their travel mode from walking to using vehicular methods. A lot of the current residents expressed their feeling of enjoyment while doing their daily activities and errands through walking before the roads development such as going grocery shopping, having a walk by the gardens, and going to the near-by services, however, they totally avoid walking to these activities now or choose other alternatives that include vehicular travelling or delivery service. From another perspective that we can call aftermath, shop owners also complained about the less pedestrian flow approaching their shops due to the vast and wide streets that prevented people from crossing to their shops as well as the bridges that let a high volume of cars pass over the shops and skip the exposure to their frontages. Widening streets and constructing flyovers reallocates pedestrian and local district (business, recreation) street space to motorised travel. Vehicle-centric streets favour high-income vehicle owners and ride-hailing customers over transit riders and active travellers. This alters the economic behaviours of merchants and consumers, as the changing traffic patterns elevate some sites and devalue others (Hegazy, 2020). On the short term, there are still no signs of change in the local economic business configuration, yet it is very possible to happen on the long term which opens a door for further research.

Moreover, from the main concerns that affected the community's perceptions collectively is the demolishing and razing of the vast green areas and thousands of trees that aside from their substantial environmental benefits like shade and purified air quality, they were also an essence core of the image of Heliopolis district and even part of its heritage. Apart from its effect on the image and collective memory of place for the community, it also affects their carrying out of daily life activities by the morning as many participants mentioned the increased heat of the street and absence of shade which used to encourage walking over transportation, particularly for short distance trips such as grocery shopping which is not the case anymore. After that, the AFEA (Armed Forces Engineering Authority) project's responsible authority claimed that these trees had been uprooted so they could be transplanted

elsewhere, which is not a solution for the damaged district. In addition, the minister of EEAA (Ministry of Environment and Egyptian Environmental Affairs Agency) has declared that the district will be thrived with green covers and trees, despite the fact that the district's highways and bridges are too dominant to suit these claims.

Adding to this, from the common and significant drawbacks resulted from the roads' development is the change in the district image where these transportation infrastructures are perceived as distorting intruding elements that don't fit to the distinctive heritage context of Heliopolis district. These structures grossly contribute in the loss of the visual identity and character of the place which was very evident in the participants responds when they were asked to distinguish Heliopolis out of several proposed pictures according to their memory. A remarkable ratio of them chose Nasr city –another district- that also featured similar urban transformation in its fabric like Heliopolis. This clearly indicates that the current image of Heliopolis could be easily confusing with other places. This returns back to the systematic planning and unified design of both the structures, streetscape and urban solutions followed all over Cairo's developed districts with no consideration or regard to the different unique contexts, identities or community background and needs of each area that should be dealt with separately.

6.2 Interpretations

Building on the research analysis, the findings can be looked at from different angles, thus the research will discuss the different varying perceptions classified on both a spatial and functional base in order to find a common denominator that creates a clearer solid image in comprehending the issue.

Spatial physical pools

The perceptions of the community will be looked at from the spatial perspective of different physical pools according to the different locations of residence. Like it was discussed before, the location of residence grossly

affected the manner by which the highways and flyovers were perceived. It is clear from the study that the residents overlooking a flyover are the most affected and the ones who criticize those interventions the most. Comes in the second place the residents who live on a main street that witnessed expansion and lastly followed by the ones who live on a local street in inner residential blocks. It is interesting to compare how the different allocations in the same neighborhood could create diverse impressions and affect the magnitude of impact towards this initiative.

It is evident from the study that residents who overlook a bridge specifically complained about issues that didn't appear to concern other users. According to this category, from the most significant concerns is the activities below bridges. While they could be perceived as a good attraction force for others, they are a huge source of disturbance for residents overlooking them. This was clear as those residents described the experience to be extremely noisy and attracting strangers out of the neighborhood which changed the atmosphere and sense of place of the place. Also, those activities as well as the bridge itself affects their own privacy that disturb their sense of comfort in their own residence. Moreover, the activities below the bridge cause increased traffic congestion and create a real struggle in the parking. In addition, vast green medians or squares were replaced by those bridges. These green areas inhabited a lot of trees that were a home for different species of birds that created a special ambience in the area and razing those trees affected the ecosystem of the environment which consequently affected the sensory dimension of the residents.

However, residents who live on the main street have other direct concerns mainly related to crossing the street and accessing basic services that are on the opposite streets and were once considered near-by and easily accessed on foot but now it requires a vehicular journey after widening the street. This category is the most exposed to endangered sense of safety as they are directly subject to speedy cars with no regard to calming slow lanes approaching their

building entrances. Also, on the contrary, residents of the main street don't complain about the noise as the other group but oppositely, they believe that the eased flow of traffic lessened the noise of horns.

On the other hand, residents who live in inner residential blocks on local streets are the least exposed to the developed streets directly and the least of the others to sense negative impacts. This category's main concern is the deficiency in the parking lots as with the development of the main streets, parking became prohibited to be more suitable for speedy flow. This caused all the parking cars to shift to the inner local streets instead causing a real congestion problem for the residents of those streets. Those residents don't complain about accessing basic services due to the proximity of these service already in their inner premises. Generally, this category is the one affected by the least magnitude among the others and are mainly appraising the road interventions.

Functionally

To have a clearer picture of the issue, this study could also be interpreted from a different angle that looks into the dynamics of activities pattern with reference to Jan Gehl's theory that classified the daily activities into necessary, optional and social ones and their relation to the quality of the built environment. The results revealed that before the implementation of the streets development, most of the daily users especially residents used to carry out all types of activities simultaneously, necessary activities that mainly depend on walking, optional activities like relaxing, taking a walk by the gardens, enjoying the outdoors with friends or carrying out leisure activities like skating or cycling or working out. However, after the interventions that occurred to the streets, it's obvious that this pattern has been distorted and the street no longer welcome optional activities. The necessary activities still take place but with a different travel behavior that shifts to vehicular mobility instead of active travel which deprives them from real contact with the physical surrounding environment. Also, some of the necessary activities like

grocery shopping have been replaced by a more convenient alternative that also diminishes their existence in the outdoors. Any other optional practices like having a walk by the garden faded away and are fairly avoided which consequently eliminates the possibility of accompanied social activities. In this regard, it is evident that the new physical setting doesn't provide a suitable and attractive environment for interactive surrounding or active travelling which constitutes a large portion of the residents' daily life activities in Heliopolis due to its planning nature depending on the proximity of all the commercial, leisure, recreational and basic services. This eventually reflected on the change that occurs to the daily behavior of the community with less existence as possible in the outdoor commons.

6.3 Way Forward

In order to keep up with the realistic picture, the current situation in Heliopolis is clearly irreversible on the short term. But a set of mitigation actions that might lessen the negative impacts which are massively affecting the community could be discussed and proposed. It is excluded to rethink the re-allocation or demolishing of the flyovers or shrinking back the roads, yet some factors if reconsidered could greatly foster the sense of place, humanize those road network projects and look at the human needs and perceptions, all of which will be discussed in the following part;

Mitigations

There are some issues that need urgent interventions and are possibly doable to modify and improve the status quo for a more enhanced human interactive experience with the environment according to the perceptions of the community from this study. The most critical issue that needs immediate action is the pedestrian safety which could be easily tackled by applying multiple safety measures some of which the participants of the questionnaire suggested themselves. This include street calming factors such as street bumps, pedestrian bridges with escalators and most importantly pelican

traffic lights that are smartly controlled by pedestrians to give pedestrian priority and right of way. These to be suitably allocated in efficient spots of expected high volume of street crossers mainly in front of public services such as schools, hospitals, official buildings and so on. The pedestrian experience could also be supported with slow lanes on the main streets that have retails and commercial activity on its frontages for better access to these shops as well as to safely separate the pedestrians from the speedy car flow.

Other mitigation actions concerning the activities below the bridges could be regarded. In general, the results show that those activities basically attract and are appealing to the younger generations more than the elderly who seem to resist and oppose it, yet, they collectively agree that it affected the image of Heliopolis negatively. To ensure a better visual image of the area, shops under the bridges could have unified frontage design that blends with the context and identity of Heliopolis. Also, for a more inclusive and interactive alternative, spaces below bridges could be a strong potential for public spaces that can have various forms. It is worth mentioning that the results show that a high percentage of the respondents criticize the under flyover activities as they are source of noise and they consider them overloaded in a neighborhood that is already saturated with sufficient commercial and leisure activities. Also, many of the surveyors complained that the investments below the bridge are a pure commercialism and that they don't offer basic needs. As suggested by many participants, they can be green areas to compensate the significant loss of greenery and plantation and be responsive to the community's complaints and needs. As a response to the public's complaints, the government attempted to add more greenery to the bridges' structures so they added some vegetation on Al Mahkama bridge columns and body as shown in figure (60), yet this is an insufficient solution and more significant intervention should be taken.

Figure 60: Al Mahkama bridge body covered with vegetation – Source: Author

Adding to this, these spaces can either be public spaces with public seating attached with private entertaining facilities that can maintain the quality and maintenance of the space or it can be used for creative events like art and cultural purposes such as art galleries or cultural seminars (see figures 61, 62) for an intervention of Saqyet el Sawy, a cultural hub below 15th May bridge in Egypt). It is also recommended to use sound isolating panels on the structure of the bridge to decrease the noise effect on the surrounding residents. The most demanded use for these places is to provide more parking lots as it will solve a stressing problem in the district. Actually, this could be a good starting point for further research to measure the most demanded mitigation measures to the streets and spaces below the bridges by the users through using virtual reality tool.

Figure 62: Saqyet el Sawy providing public space below 15th May bridge – Source: (Al Akhbar Al Yawm, 2020)

Figure 61: Art exhibition in Saqyet el Sawy on the body of 15th May bridge– Source: (Al dostor, 2018)

Reconsiderations

This part will discuss the measures that would definitely enhance the user experience in the built environment in Heliopolis yet they are not imperative or urgently pressing. However, these interventions seek an optimum modification for the current situation. In order to enhance the walkability experience, it is required to bear in mind the continuity of the sidewalk as well as the cycling networks besides its efficiency. A well designed sidewalk especially a one with a commercial frontage, which is the case in almost all Heliopolis main streets, should consider separate lanes for different movements and activities as shown in figure (63).

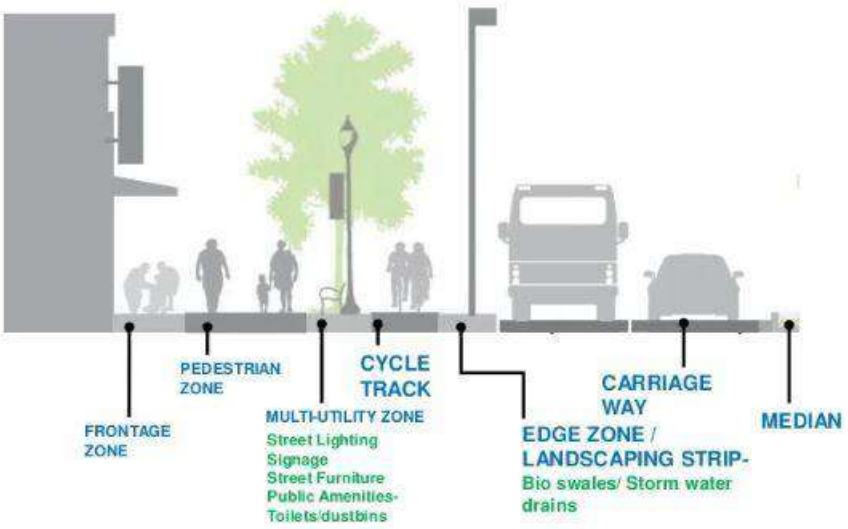

Figure 63: The segregate lanes of a sidewalk – Source: (IBI, 2016)

The concept of complete streets builds healthier, safer streets that encourage active transportation and the use of public transportation. Complete street is a strategy of accommodating all street users regardless of their age, ability, or mode of transportation, but it typically does so by providing a designated space for each movement type inside the street cross section. They reallocate

street space away from private automobiles and toward lanes for public transportation and active travel, as well as regulate vehicle speed and enhance public space (ITDP & MHUA, 2019). Complete Streets encourage individuals to abandon their automobiles in favor of shifting to sustainable, clean modes of transportation, so enhancing mobility, air quality, and creating a safer, more dynamic urban environment (Hegazy, 2020).

Chapter 7

Conclusion and recommendations

7.1 Conclusion

After establishing the district of Heliopolis as a significant gateway to connect the administrative capital and cities of east Cairo with other regional cities to the west, Heliopolis became a major transportation hub regionally. The adjustments occurred to the physical environment focused only on a car-centric approach and didn't consider the human aspects nor their needs which had a remarkable impact on the local community's perceptions and behaviors that can be summed up as follows;

- Loss of aesthetic value, human scale, and tranquilly in numerous urban places and streets.
- Heliopolis streets became unsafe for pedestrians and cyclists.
- Highways and flyovers with the activities below the flyovers negatively affected the image of the district.
- Mobility and traffic became much easier in the district yet not all flyovers or street expansions were necessary.
- Removal of greenery and tramline affected the urban identity of the district.
- Removal of greenery and the dominance of grey asphalt decreased the attractiveness and joyful image of Heliopolis.
- Overall deterioration in urban quality of life.

The research brings up the question, "Was that the optimal action for the regional road development plan? Elevated roadways are a reality in Greater Cairo and may play a role in the city's future growth. It is expected that decision-makers and policymakers will be able to make more mature urban decisions regarding existing and future elevated urban roads if they are aware

of the many consequences and potentials of raised urban highways. The local context of elevated urban highways displays a multitude of urban, social, environmental, and economic challenges, as well as urban solutions that do not address these demanding issues.

7.2 Recommendations

Rapid urbanization strains city resources and infrastructure. Urban mobility is a global problem. Existing mobility systems are inadequate in many places, and urbanization and population growth will increase demand. Cities have historically responded to demand by boosting capacity. Capacity-building alone isn't effective or sustainable. Mobility needs are changing and expanding, and travelers anticipate seamless movement. New mobility solutions use technology to improve service and manage demand (Aoun, 2014). A holistic balanced approach to urban transportation is needed to optimize supply and demand while promoting sustainability.

Undoubtedly, Egypt appears to be out of date in terms of planning; after completing a lengthy process of study, fieldwork, and surveys, a considerable number of gaps were discovered. First, regarding Cairo's policymakers, there are critical planning process gaps; the public should be involved, as they are the primary beneficiaries. In all plans, the description of important stakeholders is lacking, and there is no legally mandated process for the engagement of diverse actors. Since the current regime is interested in implementing as many projects as possible, speed is the most critical factor, thus, this element is often left to the conscious and subconscious of the planner or designer and is sometimes disregarded. This is seen in the public opposition to street renovation projects, particularly in east Cairo and, more recently, in the Heliopolis neighborhoods, where locals are typically unaware of the project until its implementation. In order to do this, the paper asserts that a defined strategy must be implemented, as well as constant conversation and collaboration with all relevant parties. In order to engage the public and gain support, plans would also require complete transparency.

Secondly, it was evident that the project had not undergone an environmental impact assessment, as it appears that in Egypt, pre-environmental assessment analysis is frequently neglected. The Egyptian legislation of environment law 4/1994 mandated an environmental impact assessment for all new projects. Nevertheless, slight gaps in such laws let projects like elevated urban highways appear feasible despite their obvious negative effects (Dessouky, 2016). There is an inclination for major, politically motivated projects to avoid EIA studies in general. To be able to properly evaluate the effects of future elevated highway constructions, it is necessary to reconsider such minor legislative gaps. Also, it is crucial to conduct a Social Impact Assessment on the implemented highway and bridges projects in order to avoid the negative effects on future projects. SIA is the investigation, planning, and management of social change or consequences (good and negative, intentional and unintended) brought about by policies, programs, activities, and projects (UNEP, 2007).

Thirdly, as previously said, Egypt's 2016 sustainable development plan is based on the UN's sustainable development goals and aims to improve the quality of life, economic standing, and environmental conditions. Also, national and regional plans show similar goals in urban development plans; these objectives are aligned with the goals and benefits of adopting more inclusive streets policies; however, inclusive streets were either absent or typical car-oriented plans were assumed at the level of projects and programs. The guidelines and codes of Egypt reveal high levels of car-oriented highway design requirements, which fall behind the international standards. Also, these guidelines are not mandatory to be implement by law which lets them totally neglected by the authorities (Khaled, 2021).

To wrap it up, some recommendations are required to enhance future road development projects in Egypt as follows;

- Community involvement and participation in decision making.

- Decisions about roads and highways must be made with the affected community in mind, and not merely with cars and traffic flow in mind.
- Reassess the EIA legislation with regard to the needed studies for urban projects inside cities and impose the SIA as a mandatory approach for mega projects.
- Complete the missing regional and governorate strategic plans in order to generate general and detailed plans for better integrated project implementation.
- Adopt inclusive street design programs and plans in national and regional strategies to initiate and encourage institutional, legislative, and process changes related to street design and implementation.
- Regulate fast track projects to encourage greater consideration of local surroundings.
- Revisit and update design codes and guidelines that integrate proper full landscape design for streets, and give them the legal weight they need to be taken into account during the design and implementation of projects. This can give the minimum components required to make highways accessible and useful by a variety of users.

Last but not least, this discussion will be finalized by Norman Foster's words when he was asked in a panel discussion in the American University in Egypt about his opinion regarding the roads' development projects going on all over Cairo. Foster answered: *"History, one has to question why Egypt is building huge roadwork when elsewhere in the world the lessons have been already learned. In the Big Dig in Boston, the road of the '60s has been ripped up and replaced with a tunnel and green parts. Creating higher value, greater mental health, and less crime. And so we have seen motorways removed and made into parks and the city doesn't freeze, it's liberated. In China, when I first went there you look on the road it was a sea of bicycles and now it's a sea of cars. But everyone today is wondering how to get the bicycles back. So lessons should be learnt, building highways for something already extinct*

like a dinosaur. We have to learn the lessons and apply them, look far ahead and have the courage of leaders." (LinesHub, 2019)

7.3 Limitations

Due to the limitation of time, this research approached the issue holistically only on the macroscale of Heliopolis without focusing on specific case studies of specific bridges or areas within the district. The focused case study could have shown different detailed links and connections that are fully contextual which didn't appear within this study. However, this opens the door for further research to focus on microscale cases in the district through a comparative analysis.

7.4 Further research

This research focused on the subjective perception and impression of the local community towards the development that took place in Heliopolis district without a deep objective perspective on the application of the streets and bridges' design guidelines and standards. Further research is needed to measure the physical quality of the streets' interventions and compare it to the global urban street design standards. Additionally, this research was conducted on a short term after the development took place which might result in instant outcomes that could possibly change or mutate over the time so further research could investigate the impacts on the long term. Moreover, this research concentrated more on the socio-spatial dimension while further research can focus more on the socio-economic dynamics especially on the real estate sector resulting from the road network development.

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Appendices

Appendix 1: Interviewee profiling

NO.	Gender	Age	Profile	Duration of residence	Date of interview
01	Female	Early forties	A resident in a residential block at the intersection of Al-Hegaz and Al-Nozha streets	Over 20 years "Born in the area"	June 14th, 2022 "Online platform"
02	Male	Early sixties	A resident in Farid Semeka Street overlooking at the intersection Al-Hegaz bridge	Over 20 years	July 2nd, 2022 "Face to face"
03	Male	Late fifties	A resident in a residential block behind Heliopolis club	Over 20 years	July 12th, 2022 "Face to face"
04	Male	Late fifties	A current resident and architectural engineer	Over 20 years	July 12th, 2022 "Face to face"
05	Female	Late sixties	A current resident	Over 20 years	July 12th, 2022 "Face to face
06	Female	Early forties	A former resident	From 5-10 years	July 12th, 2022 "Face to face"
07	Male	Mid forties	Shop owner of an electronics shop on Al-Nozha street after Triumph square	More than 10 years	July 15th, 2022 "Face to face"
08	Male	Early fifties	Shop owner of a supermarket overlooking Al-Hegaz bridge	More than 10 years	July 15th, 2022 "Face to face"

Appendix 2: Questionnaire form

Heliopolis before and after the development - هليوبوليس قبل و بعد التطوير

A brief about the questionnaire:
This ten-minute questionnaire is a part of research work that aims to investigate the impact of the new road development plan in Heliopolis district (including highways and bridges) on the perception of the local community to their city and consequently the change that occurred to their daily life activities.

Questionnaire structure:
The questionnaire is composed of 26 questions divided into five sections; the first section includes personal information about the participants while the other four sections gather perceptions about the form, activities and image of Heliopolis after the road development plan.

Terms and conditions of participation:
-By clicking one of the buttons below, you can agree or disagree with participating in the study as a data collector as a survey participant.
-If your age is below 20, your parents must be aware of your participation in the questionnaire.
-For any inquiries, you can contact the researcher on this email: yasmina.safwat@eng.asu.edu.eg

موجز عن الاستبيان:
هذا الاستبيان الذي مدته عشرة دقائق هو جزء من العمل البحثي الذي يهدف إلى التحقق من تأثير خطة تطوير الطرق الجديدة في منطقة مصر الجديدة (بما في ذلك الطرق السريعة والجسور) على تصور المجتمع المحلي تجاه مدينتهم وبالتالي التغيير الذي حدث في أنشطتهم اليومية.

هيكل الاستبيان:
يحتوي الاستبيان على 26 سؤال مقسمين إلى خمسة أقسام ، يتضمن القسم الأول معلومات شخصية عن المشاركين بينما تجمع الأقسام الأربعة الأخرى تصورات عن شكل وأنشطة وصورة مصر الجديدة بعد خطة تطوير الطرق.

أحكام وشروط المشاركة:
- من خلال النقر فوق أحد الأزرار أدناه، يمكنك الموافقة أو عدم الموافقة على المشاركة كمجمع بيانات كمشارك في الاستطلاع.
- إذا كان عمرك أقل من 20 عامًا، فيجب أن يكون والداك على دراية بمشاركتك في الاستبيان.
- لأي استفسارات، يمكنك الاتصال بالباحث على هذا البريد الإلكتروني: yasmina.safwat@eng.asu.edu.eg

* Required

1. Q0: Do you accept to proceed with this questionnaire? هل تقبل استكمال هذا الاستبيان *

   Mark only one oval.

   - I accept to proceed/ اقبل الاستكمال
   - I don't want to proceed/ لا اقبل الاستكمال

Personal Information - معلومات شخصية

2. Q1: Please select your gender - النوع *

   Mark only one oval.

   - Male / ذكر
   - Female / انثى

3. Q2: We would like to know your ages approximately - اختار فئتك العمرية *

   Mark only one oval.

   - 15-20
   - 21-30
   - 31-40
   - 41-50
   - 51-60
   - Above 60 - فوق 60 عام

4. Q3 : What type of user are you according to the following classification? - أي نوع من المستخدمين أنت حسب التصنيف التالي ؟ *

   Check all that apply.

   - [ ] Current resident - مقيم حالي
   - [ ] Former resident - مقيم سابق
   - [ ] Owner or rental of a retail - مالك او مستأجر المتجر
   - [ ] Employee - موظف
   - [ ] Visitor - زائر
   - [ ] Passer by - عابر

5. Q4: If you live/work in Heliopolis, how long have you been living/working there? - إذا كنت تعيش/تعمل في مصر الجديدة، فما المدة التي تعيش/تعمل فيها هناك ؟ *

   Mark only one oval.

   - Less than 5 years
   - 5-10 years
   - 10-20 years
   - More than 20 years
   - I never lived/worked there - لم اعش/اعمل هناك

6. Q5: How often do you visit places in Heliopolis during the last two years? - كم مرة تزور أماكن في مصر الجديدة خلال السنتين السابقتين؟ *

Mark only one oval.

- Daily - يومياً
- Weekly - إسبوعياً
- Monthly - شهرياً
- Occasionally - من حين لآخر

7. Q6: Where do you live/work now in Heliopolis? - أين تعيش/تعمل حالياً في هليوبوليس؟ *

Mark only one oval.

- I live/work on a main street that witnessed road development plan - أعيش/أعمل في شارع رئيسي شهد خطة تطوير الطرق
- I live/work on a local street that witnessed road development plan - أعيش/أعمل في شارع محلي شهد خطة تطوير الطريق
- I live/work on a street that didn't witness any road development plan - أعيش/أعمل في شارع لم يشهد أي خطة لتطوير الطريق
- I don't live/work there - لا أعيش/أعمل هناك

Form (Physical attributes) - (الشكل) (الخصائص المرئية)

8. Q7: Which of the following changes had an impact on your sense of place? - أي من التغييرات التالية أثرت على إحساسك بالمكان ؟ *

Mark only one oval per row.

	Positive impact - تأثير إيجابي	Neutral - محايد	Negative impact - تأثير سلبي
Green areas and plantation - المساحات الخضراء و الشجير			
Visual connectivity - الاتصال البصري			
Physical connectivity of roads - الاتصال المادي - الطرق			
Walkability - قابلية المشي			
Privacy - الخصوصية			

9. Q8: According to you, how much neighborhoods in Heliopolis got isolated from each other as a result of the road development plan? - وفقا لك، الى أي مدى ترى ان بعض المجاورات في مصر الجديدة تم عزلها عن بعضها البعض نتيجة لخطة تطوير الطرق ؟ *

Mark only one oval.

- Totally isolated - معزولة بالكامل
- Partially isolated - معزولة جزئياً
- Not isolated - غير معزولة

Form (Transportation infrastructure and Mobility) - (الشكل) (الهياكل الأساسية للنقل والتنقل)

10. Q9: How did your mode of transportation through your daily life activities change after the roads development plan? - كيف تغيرت وسيلة النقل الخاصة بك من خلال أنشطة حياتك اليومية بعد خطة تطوير الطرق ؟ *

Mark only one oval.

- It changed from walking to using a private car - تغيرت من المشي إلى استخدام سيارة خاصة
- It changed from using public transportation to using a private car - تغيرت من استخدام وسائل النقل العام إلى استخدام سيارة خاصة
- It didn't change - لم تتغير
- Other: _____

11. Q10: How much do you agree with the following statement?: The road development plan helped traffic flow in Heliopolis - كم تتفق مع الجملة التالية؟: ساعدت خطة تطوير الطرق في سهولة حركة المرور داخل مصر الجديدة *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree - أرفض بشدة						Strongly agree - أوافق بشدة

12. Q11: Rate the road services after the development - قيم خدمات الطرق بعد التطوير *

Mark only one oval per row.

	Sufficient - كافية	Insufficient - غير كافية	Not existing - غير متواجدة
Walkable sidewalks - أرصفة قابلة للمشي			
Slow lanes for ground floor services - الممرات البطيئة لخدمات الطابق الأرضي			
Pedestrian bridges & road crossings - جسور ومعابر طرق المشاة			
Public transportation stops - أماكن انتظار النقل العام			
U-turns			

13. Q12: On a scale from 1 to 5, how do you rate the safety of your pedestrian experience after the road development plan? - على مقياس من 1 إلى 5، كيف تقيم سلامة تجربة المشاة الخاصة بك بعد خطة تطوير الطريق ؟ *

Mark only one oval.

	1	2	3	4	5	
Very dangerous - خطرة جداً						Very safe - آمنة جداً

14. Q13: In your opinion, what are the missing design elements of street to increase the pedestrian safety? - في رأيك، ما هي عناصر التصميم المفقودة لشارع لزيادة سلامة المشاة ؟ *

Check all that apply.

- [ ] Adding more traffic lights and zebra crossings - إضافة المزيد من إشارات المرور ومعابر المشاة
- [ ] Adding more pedestrian bridges - إضافة المزيد من جسور المشاة
- [ ] Adding pedestrian bridges with escalators - إضافة جسور المشاة بسلالم للمتحركة
- [ ] Widening the sidewalks - توسيع الأرصفة
- [ ] Widening the middle island of the street - توسيع الجزيرة الوسطى للشارع
- [ ] Other: _____

Activity pattern - نمط الأنشطة اليومية

15. Q14: How frequent did you use to practice these activities 'before' the road development? - ما مدى تكرار ممارستك لهذه الأنشطة قبل تطوير الطريق ؟ *Swipe left for more options - مرر إلى اليسار لمزيد من الخيارات *

Mark only one oval per row.

	Never - أبداً	Daily - يومياً	Weekly - أسبوعياً	Monthly - شهرياً	Occasionally - من حين لآخر
Walking/Jogging/going to school or work - المشي/الركض/الذهاب إلى المدرسة أو العمل					
Doing sports (playing football, roller-skating, etc...)- ممارسة الرياضة (لعب كرة القدم، ...)					
Cycling - ركوب الدراجات					
Grocery shopping - تسوق البقالة					
Commercial shopping - التسوق التجاري					
Meeting friends - مقابلة الأصدقاء					
Relaxing - الاسترخاء					
Walking the dog - تمشية الكلب					

16. Q15: Which places were you used to carry those activities in? - ما هي الأماكن التي اعتدت على ممارسة تلك الأنشطة بها ؟ *

Check all that apply.

- [ ] Sidewalks - الأرصفة
- [ ] Street - الشارع
- [ ] Middle island of the street - الجزيرة الوسطى من الشارع
- [ ] Open green areas - المساحات الخضراء المفتوحة
- [ ] Parks - المتنزهات
- [ ] Other: _____

17. Q16: How frequent did you use to practice these activities 'after' the road development? - ما مدى تكرار ممارستك لهذه الأنشطة بعد تطوير الطريق ؟ *Swipe left for more options - * مرر إلى اليسار لمزيد من الخيارات

Mark only one oval per row.

	Never - أبدا	I rarely do that now - نادرا ما افعل تلك الآن	Daily - يوميا	Weekly - إسبوعيا	Monthly - شهريا	Occasionally - من حين لآخر
Walking/jogging/going to school or work - المشي/الركض/الذهاب إلى المدرسة أو العمل	◯	◯	◯	◯	◯	◯
Doing sports (playing football, roller-skating, etc...)- ممارسة الرياضة (لعب كرة القدم وما إلى ذلك))	◯	◯	◯	◯	◯	◯
Cycling - ركوب الدراجات	◯	◯	◯	◯	◯	◯
Grocery shopping - تسوق البقالة	◯	◯	◯	◯	◯	◯
Commercial shopping - التسوق التجاري -	◯	◯	◯	◯	◯	◯
Meeting friends - مقابلة الأصدقاء	◯	◯	◯	◯	◯	◯
Relaxing - الاسترخاء	◯	◯	◯	◯	◯	◯
Walking the dog - تمشية الكلب	◯	◯	◯	◯	◯	◯

18. Q17: Rate your satisfaction with the accessibility to different places (Mosques, barber-shops, grocery shops, etc.) in Heliopolis after the road development - قيم رضاك عن إمكانية الوصول إلى أماكن مختلفة (المساجد، صالونات الحلاقة، السوبر ماركت، إلخ) في مصر الجديدة بعد تطوير الطريق *

Mark only one oval per row.

	Very satisfied - راضي جدا	Satisfied - راضي	Neutral - محايد	Unsatisfied - غير راضي	Very unsatisfied - غير راضي أبدا
Through walking - عن طريق المشي	◯	◯	◯	◯	◯
Through means of transportation- عن طريق وسيلة نقل	◯	◯	◯	◯	◯

19. Q18: What do you think of the different forms of investments under bridges? - ما رأيك في الأشكال المختلفة للاستثمارات تحت الجسور ؟ *

Check all that apply.

- [ ] It provides diversity of activities - توفر تنوع الأنشطة
- [ ] It offers proximity to basic needs services - توفر القرب من خدمات الاحتياجات الأساسية
- [ ] It adds livability to the place - تضيف حيوية للمنطقة
- [ ] It attracts stranger out comers to the neighborhood - تجتذب الزائرين الغرباء إلى الحي
- [ ] It negatively affects the visuel image of the area - تؤثر بالسلب على الصورة البصرية للمنطقة
- [ ] It positively affects the visual image of the area - تؤثر بالإيجاب على الصورة البصرية للمنطقة
- [ ] Other: _____

Image and perception - الصورة والإدراك

20. Q19: After the development, how likely is it for you to go to other areas in Heliopolis to fulfill your daily life activities? - بعد التطوير ، ما مدى احتمالية ذهابك إلى مناطق أخرى في مصر الجديدة للقيام بأنشطة حياتك اليومية ؟ *

Mark only one oval.

	1	2	3	4	5	
Very unlikely - نسبة منخفضة	◯	◯	◯	◯	◯	Very Likely - نسبة كبيرة

21. Q20: How do you rate the effect of the roads development on the following? - كيف تقيم تأثير تطوير الطرق على ما يلي ؟ *

Mark only one oval per row.

	Negatively strongly affected - تأثرت بشكل سلبي جداً	Negatively affected - تأثرت بشكل سلبي	Neutral - محايد	Positively affected - تأثرت بشكل إيجابي	Positively strongly affected - تأثرت بشكل إيجابي جداً
The urban environment & nearby landmarks - البيئة العمرانية والمعالم القريبة	◯	◯	◯	◯	◯
Heritage architectural style & identity - النمط المعماري والهوية الثقافية	◯	◯	◯	◯	◯
Place attachment - الانتماء والمكان	◯	◯	◯	◯	◯
Readability of Heliopolis map (Navigation in Heliopolis)- إمكانية قراءة خريطة مصر الجديدة (الملاحة في مصر الجديدة)	◯	◯	◯	◯	◯
Sense of community - الإحساس بالانتماء للمجتمع	◯	◯	◯	◯	◯

22. Q21: From the following, what do you think had an impact on the urban image of Heliopolis? - ما رأيك فيما يلي الذي كان له تأثير على الصورة الحضرية لمصر الجديدة ؟ *

Check all that apply.

- ☐ Removal of the tram - إزالة الترام
- ☐ Removal of greenery and trees - إزالة المسطحات الخضراء و التشجير
- ☐ Removal of squares - إزالة الميادين
- ☐ Construction of bridges blocking the visual connection - إنشاء كباري تحجب الاتصال البصري
- ☐ Other: _____

23. Q22: How do you usually navigate through Heliopolis 'before' the road development? - كيف تتنقل عادة عبر مصر الجديدة قبل تطوير الطرق ؟ *

Check all that apply.

- ☐ By observing buildings - بمراقبة المباني
- ☐ By observing green areas and trees - بمراقبة الأشجار
- ☐ By observing landmarks (squares, tram, statues,...) - من خلال مراقبة المعالم (المساحات، الترام، التماثيل ...)
- ☐ By using GPS - باستخدام نظام تحديد المواقع العالمي (GPS)
- ☐ Other: _____

24. Q23: How do you usually navigate through Heliopolis 'after' the road development? - كيف تتنقل عادة عبر مصر الجديدة بعد تطوير الطرق ؟ *

Check all that apply.

- ☐ By observing buildings - بمراقبة المباني
- ☐ By observing green areas and trees - بمراقبة الأشجار
- ☐ By observing landmarks (squares, tram, statues,...) - من خلال مراقبة المعالم (المساحات، الترام، التماثيل ...)
- ☐ By using GPS - باستخدام نظام تحديد المواقع العالمي (GPS)
- ☐ Other: _____

25. Q24: Name the streets, squares and outdoor spaces of Heliopolis that you have memories in: - اذكر الشوارع و الساحات والمساحات الخارجية لمصر الجديدة التي لديك ذكريات فيها *

26. Q25: Based on the previous question, what made these spaces memorable? - بناءً على السؤال السابق، ما الذي جعل هذه المساحات لا تُنسى ؟ *

Check all that apply.

- [ ] Green areas, trees & plantation - المساحات الخضراء و الأشجار
- [ ] Street furniture - أثاث الشوارع
- [ ] Tram - الترام
- [ ] Commercial activities - الأنشطة الإقتصادية
- [ ] Social activities - الأنشطة الإجتماعية
- [ ] Architectural style - الطابع المعماري
- [ ] Other: _____

27. Q25: Which of the following images do you believe is a representation of Heliopolis? - أي من الصور التالية تعتقد أنها تمثل لمصر الجديدة ؟ *

Check all that apply.

- [ ] 1

- [ ] 2

- [ ] 3

- [ ] 4

- [ ] 5

- [ ] 6

- [ ] None of the above

28. Q26: Do you have any plans to leave Heliopolis in the future? - هل لديك أي خطط لمغادرة مصر الجديدة في المستقبل ؟ *

Mark only one oval.

- ( ) Yes - نعم
- ( ) No - لا
- ( ) I don't live there - لا اعيش هناك

Thank you for participating in this questionnaire! اشكرا لك على المشاركة في هذا الاستبيان!

Your participation is highly appreciated! يسعدني مشاركتك بشكل كبير

أظهرت نتائج البحث بشكل عام أن الافتقار إلى التخطيط الفعال الذي يعطي الأولوية لحركة المركبات على العامل البشري له آثار كبيرة على تصور وسلوك المجتمعات المحلية. وتبين النتائج أن غالبية المجتمع المحلي في مصر الجديدة يتفق بالفعل على أهمية مشاريع تطوير الطرق التي يسرت خبراتها في السفر داخل المقاطعة، ومع ذلك فإن لديها العديد من الشواغل بشأن أساليب ونهج تطبيق هذه المشاريع التي أدت إلى آثار سلبية كبيرة على حياتهم اليومية. يقترح هذا البحث أيضًا توصيات لأنشطة التخطيط الحضري المستقبلية للمشاريع الضخمة التي يجب أن يأخذها الممارسون وصانعو القرار الحضريون في الاعتبار.

الكلمات الرئيسية:

تطوير شبكة الطرق، الطرق السريعة، الجسور الجوية، الإحساس بالمكان، الإدراك، أنشطة الحياة اليومية، السلوك البشري، مصر الجديدة

ياسمينا صفوت ابراهيم

المستخلص

تركز استراتيجيات التنقل في مصر حاليًا على توسيع البنية التحتية لشبكات الطرق داخل المدن وفيما بينها. مع النمو السكاني السريع وبالتالي التوسع الحضري المتزايد الذي تشهده منطقة القاهرة الكبرى، أصبح من الأولويات الاستثمار في بناء ممرات جديدة، وكذلك زيادة قدرة الممرات الموجودة، لربط قلب القاهرة بالمدن الفرعية الجديدة الناشئة لاستيعاب السكان المتزايدين. وفقًا لذلك، تحدث موجة كبيرة من بناء سلسلة من الطرق السريعة والجسور العلوية في جميع أنحاء مصر، خاصة في أحياء القاهرة. يُعتقد أن البنية التحتية للنقل هذه هي أسهل وأسرع الأدوات لحل تحديات حركة المرور لضمان تنقل أسرع وأكثر تحسينًا للمركبات وتقليل وقت السفر. ومع ذلك، على الرغم من الفوائد الكبيرة لهذه الهياكل ولكن جعلها تنحت من خلال النسيج الحضري للمقاطعات والأحياء تؤثر بشكل كبير على أنشطة الحياة اليومية للمجتمعات المحلية التي تخترقها.

والهدف من هذا البحث هو دراسة الآثار الإيجابية والسلبية للهياكل الأساسية للنقل على المجتمع المحلي لمنطقة مصر الجديدة في القاهرة مع التركيز على التغيير الذي طرأ على إحساسهم الذاتي بالمكان وتصوراتهم لمدينتهم وفي نهاية المطاف ممارسات حياتهم اليومية. وبالتالي، تضفي الدراسة وضوحًا على مسألة كيفية إدراك الناس وشعورهم وإحساسهم وتفاعلهم مع البيئات المحيطة بهم لفهم العلاقات المحددة بين الأشخاص. يتم الحصول على ذلك من خلال مراجعة النظريات الحضرية والممارسات الدولية السابقة من خلال الأدبيات للوصول إلى فهم أعمق للعلاقة بين التغيير في الشكل المادي الملموس للمدينة وانعكاسه غير الملموس على أنشطة وتصورات المستخدمين والسكان.

وثانيًا من خلال إجراء أساليب نوعية وكمية لتتبع السلوك البشري للمستخدمين اليوميين والمقيمين في مصر الجديدة ومقارنة روتينهم اليومي قبل وبعد تطورات الطريق لتوسيع نطاق التغيير والديناميكيات المختلفة التي تؤثر عليه. يتم جمع البيانات الأولية لهذا البحث من خلال أدوات متعددة مثل رسم الخرائط السلوكية والمكانية والاستبيان عبر الإنترنت بالإضافة إلى مقابلات متعمقة مع المستخدمين المحليين للمنطقة.

إقرار

هذه الرسالة مقدمة في جامعة عين شمس وجامعة شوتجارت للحصول على درجة العمران المتكامل والتصميم المستدام. إن العمل الذي تحويه هذه الرسالة قد تم إنجازه بمعرفة الباحث سنة 2022

هذا ويقر الباحث أن العمل المقدم هو خالصة بحثه الشخصي وأنه قد اتبع االسلوب العلمي السليم في الإشارة إلى المواد المؤخوذه من المراجع العلمية كل في مكانه في مختلف أجزاء الرسالة.

وهذا إقرار مني بذلك،،،

التوقيع :

الباحث: **ياسمينا صفوت إبراهيم**

التاريخ: / /

آثار تطوير شبكة طرق مصر الجديدة على أنشطة الحياة اليومية

رسالة مقدمة للحصول على درجة ماجستير العلوم الهندسية في العمران المتكامل و التصميم المستدام

إعداد: **ياسمينا صفوت إبراهيم**

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لجنة الحكم **التوقيع**

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أستاذ
جامعة

تاريخ المناقشة: / /

الدرسات العليا

ختم الاجازة أجيزت الرسالة بتاريخ: / /

موافقة مجلس الكلية: / / موافقة مجلس الجامعة: / /

جامعة عين شمس

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إعداد:

ياسمينا صفوت إبراهيم

المشرفون:

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جامعة عين شمس

2022