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THE FUTURE OF PUBLIC SPACE:
HOW TO MEASURE ACTIVE PUBLIC SPACE IN THE DIGITAL ERA

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DECLARATION

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ABSTRACT

This research contributes to the area of architecture and urban design by developing active public space framework to design a better place. Past studies on assessing the quality of public space have focused on either design or social aspect; whereas the Wellbeing, technology and users‘ experience have received very little attention in general. Active Public Space Framework is designed to be effective and respond to the needs of users of public space in the digital era and be a guideline for an architect, planners, urban designers to design better quality place.

The dramatic increase in the urban population numbers nowadays, in most modern cities and towns has a significant and confusing impact on the current urban planning system. The main reason for this environmental chaos is the phenomenon of urbanization; that is, the urbanism phenomenon consequences of the vertical and horizontal growth of built environments, where people from different cultural and social backgrounds live together. Furthermore, urbanism has a positive effect in providing a better quality of living whereas it has a negative effect on many other contexts, such as; increasing populations in the cities and towns, which creates slums and unplanned residential areas, environmental pollution, and other challenges.

This research investigates which criteria can make better public spaces, this investigation has analysed the design aspect, based on the users’ experience and has taken into account the new communication media such as Wi-Fi, to develop active public space framework to design a better place. The list of recommended criteria was developed through three iterations using mixed methods research to ensure data validation. The use of users’ experience questionnaire and Delphi technique helped to develop the framework.

The Framework of Active Public Space is designed to measure and assess the quality of public spaces within five categories – Use and Activities, Identity and Image, Access and Connectivity, Wellbeing, Sociability. Overall this looks at enhancing the quality of the place in urban spaces and also encourage critical thinking of the quality of public space assessment by validating and testing the proposed framework using a real case scenario. The Main outcome achieved from this research is that the quality of place and placemaking can be achieved through engaging the community in design process of the public spaces, including the user's experience and their perception of the place, also taken into account the new communication media such as (WiFi), mental health and wellbeing in the design process. All these elements can enhance the quality of the public spaces.

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Chapter one

1. Introduction

The dramatic increase in urban population numbers nowadays, in most modern cities and towns, causes confusion within the current urban planning system. The main reason for this environmental chaos is the phenomenon of urbanization; That is physically, the urbanism phenomenon consequences of the vertical and horizontal growth of built environments, where people from different cultural and social backgrounds live together. Furthermore, urbanism has had a positive effect in providing a better quality of living, whereas it has a negative effect in many other areas such as; increasing populations in the cities and town which creates slums and unplanned residential areas, environmental pollution, and other challenges (Antweiler 2018).

"Urbanization is the defining trend of the 21st century; by 2030, 75 per cent of the world's 9 billion people will be living in cities. And urbanization is occurring most rapidly in places with the greatest lack of planning for urbanization."
UN-HABITAT Executive Director Joan Clos I Matheu (Clos 2012).

The rapidity of construction and demolishing of the neighbourhoods and buildings, and the rapid movement of people to the city cause concerns due to the time of this movement and the need to develop a place for these increasing population numbers to live in. In fact, the structure of the cities, town centre, and village are undergoing continuous development, due to the rapid movement of urbanism, which is turning these environments into items of consumption. One of the significant components of the city' structure is the place. This raises the concern that, if 'place' is considered the basic structure of the city, then there is a need for a new concept of 'place', Place-making is a new movement to create places for people, as the place-making agenda does not concentrate only on the physical aspect, but takes into account the social impact and perception of the people who use the places (Shakir Alkinani et al. 2018).

In fact, the important role of public spaces in the progress and encouragement of societies has been addressed since a long time. Starting from the Greek Agora until nowadays contemporary squares, parks, urban public spaces which have a positive impact on cities and towns (Hernández-Bonilla 2015). Furthermore, during the 20th century, a redefinition of public space's concept was addressed and a new concept of urban space emerged. The

structure of the urban realm transferred due to these conditions and according to critics (Jacobs 1983, Sennett 1998, Madanipour 2003)

The characteristic of the place has changed over a long time. Ali Madanipour (2003) mentioned the Greek Agora as an example for the development of democracy and political aspect in the urban realm; the Greek Agora is a place where people used to gather, diverse activities (economic, political and cultural) occurred (Madanipour 2003). The Agora is public space which religion, politics and administration were all gathered, considered as the heart of the Greek polis. Nowadays studies of urbanism the Agora is known as the quintessential or great public space, open space where the Athenians conducted the famous ostracisms (Dickenson 2014).

Modern cities should necessarily have places to enhance the opportunities that people have to interact with each other and give them more space to express their emotions or practice their daily exercise. For instance, public places provide places for people for more social interaction. The public space contains all ranges of the natural environment and builds (Carmona et al. 2008). Taking into account accessibility as an essential criterion. An accessible place encourages more outdoor and indoor activities to occur and thus creates more opportunities for social cohesions in the place. Accessibility in the public space could be related to the quality of physical layout design, environmental quality or other build environment components that encourage people to do outdoor or indoor activities such as walking, sitting in the place, watching people, chatting and other types of activities. These types of social activities can enhance the quality of the public space (Gehl 1996).

It is believed that memories created through the experience in the place and nothing are more memorable than spending time in livable places or getting involved in enjoyable activities in a public space. Public spaces have the ability to leave a great impact on every individual's experience. Public places preferably in an urban community, are the real image of the variety that the urban community holds and thus perform as "the heart" of that community (Deore & Lathia 2014).

The definition of "Place" is considered a complex notion, which has a different range of meanings (Cresswell 2004), as well as diverse names such as "place, location, landscape, environment, home, city, region, territory, and geography". The place is defined as the "inherent spatiality of human life" (Soja 1998: 1). On the other hand, some of the academic literature referred to the meaning of place as a way of knowing, of looking at and being in the world (Cresswell 2004).

Kearns and Gesler (1998) identified the place as focusses on the sociability practice and their relationship, and as mixed zones between meaning and experiences (Wilson 2003). This mixed effect influences the way we think, understanding, daily life, and social life. For both society and the individual, the integration with surrounding places can lead to perception, symbols, ideas and meanings of landscapes and places (Williams et al. 1995).

In fact, the element of sociability has an impact on creating a place. “Places mainly as socially produced”, according to Hubbard et al. (2004) while virtual places are considered as non-physical places created through the rapid development of technology. Virtual spaces can be a music record or Internet network, such as Twitter and Facebook, where the first virtual space was the Internet (Sheilds 2003).

Moreover, other scholars identified the place as socially constructed and functional; this includes social cohesion in the place between individuals and groups, institutionalised land uses making a decision on both political and economic stances, as well as the way of representation (Thrift & Agnew 1988; Massey 1994; Martin 2004).

The definition of the place has undergone many changes throughout human history, right up to the technology era of today, which has affected the definition of the place dramatically. Nowadays, technology has become an intrinsic part of our daily lives; it has changed the way we live and work. This effect will continue to change the concept of place in the future. Society has developed through industrial revolution reaching today’s technology revolution, which affects its social hierarchy. Time is an important aspect of the metropolis, where it became intelligible life (Younes & Al-Zoubi 2015).

The Internet is a tool to connect people with each other to make life more productive and easier. Nowadays technology has become part of our daily activities and changed people’s attitude and their behaviours in the place on different scales. It has also reduced the crowdedness in some places, such as online banking, booking tickets and shopping, or by increasing the connection between the local and the global (Castells 2011).

The new public spaces design has been developed all over the world, and the traditional concept of public space is being modified based on the contemporary needs. What is the quality of the public space that we normally visit and spend time in? What is the concept of public spaces in the digital era? How does new communication media (Internet) affect the future of public spaces? The quality of public space is a character and an attribute conferred by the community to a place. Furthermore, the House of Commons (Living

Places: Cleaner, Safer, Greener, Eleventh report of session 2002-03) identified that the quality of places "Public spaces are used by everybody. A network of safe, well maintained and people-friendly spaces encourage people to walk, get to know their neighbours and respect their surroundings" (ODPM 2002; 3). Today, the quality of public space is becoming a really important topic in research of urban development, due to the implementation of the sustainability concept and its principle as the foundation of sustainable development (Wojnarowska 2016). This research will focus on public places and how they can be measured?.

1.1 Research Background

Public space is considered one of the significant places in contemporary cities. This is likely because they promote interaction between people (Gardner & Lofland 1999; Fainstein 2005). Appropriation of spaces can lead to more connections to and between these spaces and more opportunities to interact and further, to socialise. Peters et al. (2010) identified the need for people to use public space for relaxation; most of the people visit public spaces in groups with their friends or family members. Thus, people go to use public spaces in an urban community as part of groups, which leads them to interact and create a social connection with friends and neighbours.

Public space is classified according to the diversity of the urban community's functions and the impact of leisure on motivating the users to feel more comfortable in the place. This is due to the fact that, during leisure time, people tend to be more relaxed and free which leads them to choose freely what they prefer to do in the place and with whom. James et al. (2009) pointed out the role of public spaces in a neighbourhood that promotes opportunities for people to integrate into the community. Parks, streets and playgrounds fulfil a diverse range of psychological and social needs of the residents that encourages them to interact with each other in public spaces (Ngesan et al. 2013). The number of public space's users reduced especially in the night due to people being unfamiliar with the place and also because of the safety issue. Users should be encouraged to enjoy the public space. Some public space did not achieve the level of satisfaction sufficient for neighbourhood cohesion, so extra consideration should be given to the user's perception of the place based on the society's needs (Oguz 2000).

Public space gathers people to interact with each other and spend time in the place, which leads to social interaction. The low quality of the physical layout can give the impression of unsafe public space which leads to a decrease in the number of users in the place (Coles

& Bussey 2000; Williams & Green 2001). Indeed, many studies on the environment and human component recently showed that the current knowledge about using public space in the mixed community is lacking (Bell et al. 2007).

People who prefer to spend their free time outside are more likely to use public space. Ali and Ayeghi, Ujang (2014) identified the role of the public space such as streets, playgrounds, and parks in promoting the social cohesion to increase the place attachment and sense of belonging; this is due to the interaction and engagement between the users. Thus, the roles of the public space such as town squares or parks in the urban community have long been highlighted in the benefits they bring and their role in enhancing the functionality of the place in terms of social, environmental and physical benefits (Mansor et al. 2012).

This research investigates which criteria can make a better public space, in the design aspect, it also redevelops a framework to assess the quality of public space to design a better place. A list of criteria is developed through three interactions stages using mixed methods to ensure data validity.

1.2 Motivation and Problem statement

In the mid-twentieth century, city planners believed that cities were well organised, well arranged, and capable of being planned and designed in order to be more flexible in terms of improving the quality of place for the users by developing the physical layout of the place. This was a vision held by most of the urban planners and architects. This view was also held within the social sciences. that is established on the premise that the social element, and its contribution in physical settings such as town and cities, was comprehensible similarly to the meaning of the physical element since the enlightenment (Batty & Langly 2001).

By the last decade of the twentieth century, urban life changed as new ways of living were emerging. The new situation was caused by technology that dramatically affects our daily lives, transformed the relationships between people, and drew the attention to the “virtual world”. Technology development such as new forms of communication encourages people to use cyberspace for their daily lives as a favourite way to communicate with each other. Nevertheless, the old traditional meaning of place is still held in some nations; while elsewhere, as the utilisation of the virtual reality dramatically increased, the interaction between virtual and real-life today become even more confusing.

New technological developments such as telecommunications, digital technology, electronics, social media, Wi-Fi and sensors have affected the real world. These technologies have rapidly developed, which will lead to change in both time and space that we use these days. New technology is creating interactions among two different environments; the first is the physical element with a local identity, and the second is the virtual reality in cyberspace.

"…Where Information Is Infrastructure, Reality Is Always Blended, and the Studio Re-Designs Itself Overnight. The classical unities of architectural space and experience have shattered—as the dramatic unities long ago fragmented on the stage—and architects now need to design for this new condition" (William Mitchell, City of Bits 1995: 44).

According to Mitchell's (1995) publication "City of Bits" he considers 'soft' in two aspects: software was added to the urban infrastructure, also highlighting the way of IT-augmented urban systems and the use of the Internet as a new public space form, where public communication and social are not the only systems accelerated. Meanwhile, suggesting new affordances for new social formations is subject in turn to constant reconfiguration driven by the ad hoc evolution of the digital ones. In fact, this could be still a public space in the front yard or around the buildings, but most of what has been designed and built has transferred online; meanwhile, the Internet is continuing to change the concept of place without giving any notice.

Technology such as the Internet has changed the concept of the place, which in turn has changed the character of the place. Furthermore, Mitchell (1995), Menezes and Costa (2017) pointed out the role of the Internet as a new communication tool in affecting the quality of the place. Urban designer, architects, planners and scholars should take into account the fact that the impact of new communication media such as the Internet is changing the concept of place and place-making, (Mehta 2014a).

Nowadays, the quality of public space is often an issue that challenges urban planners and architects to design a better place. The methods of quality of public space assessment such as recording, fail to provide detailed information about which criteria can select to design better quality of public space, taking into account the changing of the concept of the place due to the new technology such as the new communication media (Wi-Fi) (Nowicka 2015).

Quality of place is the character given conferred by society to the place. The benefits to the community on a big scale and to individuals on the small scale lie in improving the sense

of belonging, activity and social interaction, which enhance the community cohesion. Minimising the crime' number in society, as well as dealing with anti-social behaviour can increase the feeling of safety and wellbeing to utilise the public space (Note 2009).

The diversity of urban fabric and the current issues in contemporary public space are related to the function of public space, " What is clear is that contemporary trends in public space design and management are resulting (over time) in an increasingly complex range of public space types" (Carmona 2010). Moreover, many public spaces nowadays are not welcoming enough for people to use in terms of providing a place to sit. Although these places seem to be well designed and clean and at the same time empty of people, this is an indication that there is an issue in the place, which could be in the design process or management or even in both (Peinhardt 2017).

The researcher has experience in city planning and urban design field, during his work as architect and urban designer for 7 years at consulting engineering company in Libya, his background on designing housing projects and city centres encouraged him to concentrate on developing the design principles that meet users' needs in the digital era, which criteria can gather people to use the place? How technology can affect the design principle in the future? These questions enhanced the researcher to choose this research in order to end up with a guideline for an architect, urban designers, planners to design better place.

In fact, huge investments and public funding have focused on projects of urban design in recent years. However, many recent public space projects still focus on isolated units or even local actions, but normally these projects face some problems of lack of connectivity or integration issues, in order to provide more health, economic, environmental and social value to create a sustainable place. These projects have weak utilisation of the place, low economic activity attraction and poor social cohesion; this evidence is often due to the poor quality of public space This means there is a need to develop assessment tools to ensure the functional and spatial continuity in the urban fabric (Brandão & Brandão 2017).

In general, the interaction between the virtual world and the physical world for most developing countries has become more problematic. History and traditions of contemporary life must be ignored. Technology is continuing to change our daily lives and this affects the way we live in the city, so the quality of public space assessment needs to be assessed by addressing the developing principles and criteria to design better public space, and more sustainable place.

1.3 Research Questions

To measure the quality of public space, the following research questions are set:

1- What is the concept of public space in the digital era?
2- What are the most significant indicators and assessment tools used to measure the quality of public space?
3- What are the gaps in the current frameworks for assessing the quality of public spaces and how can these be improved
4- How does new Communication media (the Internet) affect the future of public spaces?
5- How active public spaces can be measured and assessed?

1.4 Research Aim and Objectives

In view of the above subject matter, this research aims to develop a framework for measuring active public spaces by taking into account the new communication media and technologies development in the twenty-first century.

The objectives of the research are:

1. To understand and critically analyse the concept of place and placemaking agenda;
2. To analyse the role of digital technology in shaping the future of public spaces.
3. Develop a set of criteria to assess and measure the quality of public space and propose a framework more adapted to the digital era;
4. To test and validate the characteristics of a active public space framework, using real case scenario.
5. Summarise the research output and identify the areas of future research

1.5 Research Significance and Contributions

The effect of the technology of the information exchange and the communication media have changed the situation of the urban site as no longer connected to the location geography. Meanwhile, contemporary cities have become fragmented and discontinuous spatially. In fact, these cities nowadays are connected through an invisible network, where money, information can transfer freely from location to another. Furthermore, Philosopher in social Paul Virilio highlighted “The representation of the contemporary city is no longer determined by a ceremonial opening of gates, by a ritual procession or parades nor by a

succession of streets and avenues. From now on architecture must deal with the advent of a 'technological space-time".

In fact, the changes that are made by these new technologies to the structure of our cities has been profound, contributing in changing the traditional concept of the historic city and the reconstruction of our daily lives has shifted irrevocably. Gradually, the way of thinking about the concept of the city should take into account the fact that people are not just simply living in places instead, we live in cities that have been constructed as simulations and complex webs. Furthermore, daily living has transferred from the typical main street or shopping centre to a more flexible space which is a cyber-environment for online shopping websites and video screening. The rapid development of these technologies has overthrown the concepts of the place which were familiar to us. Instead, these technologies create dialogue and allow the interaction between two different realms; the first realm is the physical with a local identity, and the second is the virtual reality in cyberspace.

Quality of public space matters in many ways, and a number of features of the public space are needed for the individual, for the family, and for the community. Bad design and planning of the place reduce the feeling of safety, undermine the place attachment and sense of community belonging, and ensure a significant cost (HM Government 2009).

In this research, the new concept of the place and place-making agenda has been reviewed. Moreover, further research needs to be considered to engage leading thinkers and writers among architects, urban designers, philosophy, planners, and social scientist in examining questions such as How to measure active public space?

In summary, this study is expected to:

1- Introduce a new paradigm of the concept of public space in the future, taking into account the new communication and media technologies (e.g. Wi-Fi)
2- Develop a framework to measure active public space, which gives a guideline for urban designers and planners to design better public space in the future.
3- Lay the groundwork for future development that will enhance researchers and planners to develop better places.

1.6 Thesis Outline

The research is organised into eight chapters as shown in Figure 1 below.

Chapter 1: This chapter offers an overview of current research into the quality of public space assessment along with the concept of place. This chapter states the research background followed by motivation and problem statements which highlighted the effect of technology on our daily lives. This was followed by the research question which linked to the research aims and objectives to discover the outcome of the research result. Furthermore, it provides a more basic foundation on which to discuss the organisation of the thesis chapters.

Chapter 2: This chapter presents the literature review that discusses the relevance of the research and creates the basis of the framework. This research then discusses the concepts of place based on the effect of the new communication media on our daily lives. It also examines which criteria can make public space more successful, taking into account the people's perceptions and the role of the community towards constructing a reliable research study that can clarify the need of the users of public space for a better quality of life.

Chapter 3: This chapter reviews the role of the place-making process and looks at effects the developing of the quality of place assessment. And analysis the existing assessment tools and frameworks.

Chapter 4: This chapter reviews the main methodologies that support the study to achieve the research aims and objectives. This chapter suggests Three iterations; the first is the outcomes from comparative analysis for existing frameworks to design better place and previous studies of which criteria can make better public space in the design aspect, while the second iteration is using the online survey to target users of public space in Nottingham city centre to enrich the list of criteria from the first iteration that makes public places more successful. The third iteration targets experts to validate and enrich the outcome of the survey.

Chapter 5: This chapter discusses the analysis and results of the users' experience survey (second iteration). The outcome of this stage will enrich the list of criteria and develops the framework of active public place; it gives details of data collection results that were gathered through questionnaires (online survey) and analysed by SPSS software.

Chapter 6: This chapter presents the results of the Delphi consultation process and the redevelopment of the framework (Third iteration). The purpose of this iteration is to evaluate and validate the outcome of the framework of active public space.

Chapter 7: This chapter tests and examines the characteristics of a active public place framework. This process has been achieved through three stages: the first stage (observation) reviews the current situation by using an infrared camera (thermal image) to understand the user's behaviour and pedestrian movement, while the second stage (simulation) used MassMotion software to asses and measure the pedestrian movement density to redesign better place. Moreover, the third stage is based on assessing the new design from the simulation process by applying the principle of the new design to the site in real life and then observe the site again by using the infrared camera to check the validity and reliability of the new design.

Chapter 8: The significant goal of this concluding chapter is emphasised to the need for the implementation of the effective framework of active public space. The significance of applying such a framework is based on the findings and the outcomes that were gathered during the developing process of the framework. Furthermore, the chapter discusses the contributions as well as provides general recommendations for future research work, implementation and limitations. The figure 1 below illustrates the thesis chapters and the flow of the research.

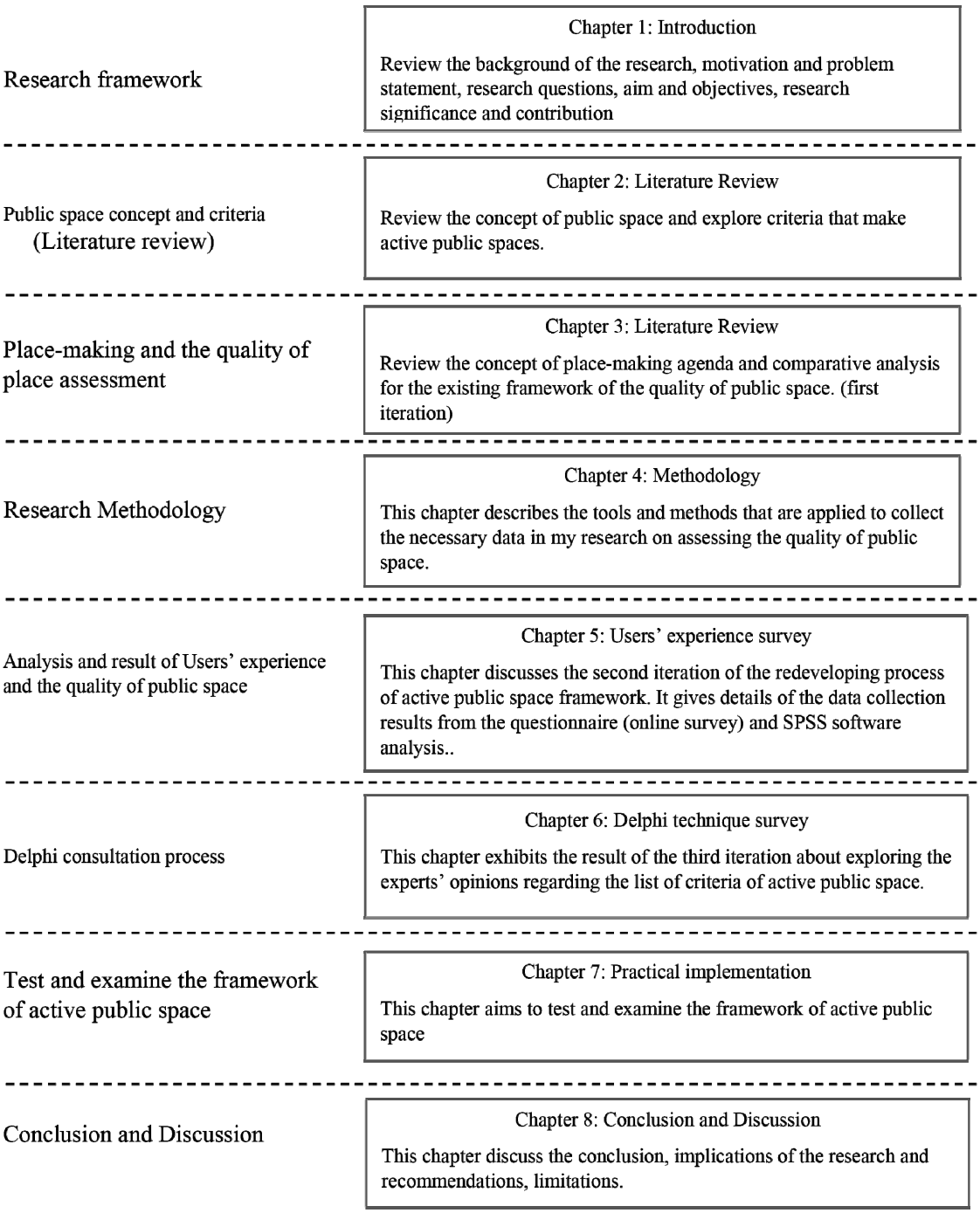


Figure 1: Thesis chapters and the flow of the research

Chapter Two: Public space concepts

2.1 Public space – Meaning and concepts

According to Carmona et al (2003), public space consists of an outdoor layout that generally promotes relief from urban life. These public spaces can be town square, streets and parks. These places are considered as liveable settings; they enhance the identity of the community, encourage the sociability in the society and increase the sense of belonging, also playing an important role in the land-use values in society.

Public spaces represent the mix between social life, cultures and customs, as they are a mirror of the integration between social, political, economic and physical perspectives. They represent the larger community or cultural aspect. People understand the concept of public space through diverse types of activities, roles and functions in people's daily lives. The users of public space share knowledge and have the ability to exchange context of politics. Public spaces enhance social contact. Public life is important for the community, it helps to reduce the isolation between people in the place (Stephen Carr et al. 1992).

In defining public space, it is essential to consider the meaning of the term "public". Ali Madanipour (2010: 8) p.8 suggests, "The word public originates from the Latin and refers to people, indicating a relationship to both society and the state". This suggests that "public" may be any entity, regardless of whether physical or not, that relates to people and is shared by and open to them for the whole community. The concern here is space as the physical entity that is linked to the term "public". This provides a basic understanding of public space as the space that concerns people and maybe interpreted "as [space] open to people as a whole". These ideas are one of many various public space definitions.

Carr et al. (1992) define public space as the "common ground where people carry out the functional and ritual activities that bind a community, whether in the normal routines of daily life or in periodic festivals". While, Madanipour (1996) p. 148 defines public space as a "space that allows all the people to have access to it and the activities within it, which is controlled by a public agency, and which is provided and managed in the public interest". Furthermore, Tibbalds (2001) p.1 identified the space and the public realm as "all the parts of the urban fabric to which the public have physical and visual access. Thus, it extends from the streets, parks and squares of a town or city into the buildings which enclose and line them". Also, Tibbalds identified the public realm as "the important part of our towns and cities" where the majority of people communication and integration take

place. Moreover, Gehl et al. (2006) p.2 illustrates that "public space is understood as streets, alleys, buildings, squares, bollards; everything that can be considered part of the built environment".

This diverse range of definitions of public space demonstrates that public space is basically a physical layout promoted for a different variety of social activities that take place within a community. Also, accessibility is essentially another key element for public space. Madanpour (2010) pointed out that any public space that is defined as public, means that it should be accessible to all people, and all people have the right to be there.

In these definitions, public space is considered as a space organised by a public agency or a community. However, due to the increasing level of public life and social interaction taking place in public spaces, this research proposes to use the concept of public space in a slightly varied way. Public space in this research will mean any physical space with the potential to develop social interaction in terms of control or ownership. It can be in both outdoor and indoor locations (Woolley 2003), but these places have to be accessible to users. This definition of public space also includes street networks and the buildings that belong to the community, as well as the open space and indoor public space.

2.2 Understanding Public Spaces

The idea of providing places for people to communicate and interact with each other such as public space has attracted commitment from both central and local governments in the UK, as well as many voluntary organisations. In fact, many researchers indicate the significance of the high quality of public spaces and their effects on a different aspect such as the local economy, as well as encouraging people to get involved in more social life. Furthermore, Woolle and Rose (2004) identified public space as a democratic place because everyone has the right to be there. Public space is 'our open-air living room, our outdoor leisure centre' which is a really significant place and can benefit the mental health of users of different ages.

Social places are important for social groups and became one of the ways these groups could practice their activities as well as increase their sense of belonging to the society due to the fact that all people can use these places (W. Mitchell 1995; Mitchell 2003) These places enhance different social groups in terms of gender, ethnicity, and so on for frequent visits (Valentine 1996; Malone 2002).

How public spaces are used and how these places are understood by the users may also depend on individual and group characteristics, see for example, (D. Mitchell 1995; McDowell 1999; Low 2000). For example, the childhood sociologists James et al. (1998) identified that public spaces can provide the children and young a place where they can freely create a place with a more greater level of privacy away from their parent's control, where they can practice their activities with more freedom. Malone (2002) thus states that places have a sense of control and power; encouraging particular social groups can be done, or even regulated; sometimes these can be excluded or the accessibility of some social groups into the place can be reduced based on their participation and social interaction. For example, some behaviours such as drinking, loitering or skateboarding in public space can be considered as inappropriate and unacceptable due to particular social or cultural representations of which activities types or groups can be seen in these public space (Wilson 1991; Valentine 1996). Consequently, these public spaces should be accessible to everybody, and the users should not just have the right to be in the place but also to be part of that public space which is a really significant role to attract different social groups to the place. This can increase their sense of belonging for a more inclusive and democratic life.

Laws (1997) refers to age as a specific realm, by arguing that our local identities are based on our material acts, our daily activities, what we say, and how we contribute to the social behaviour of what is considered suitable in these places, as well as who controls these public spaces at a certain time. Moreover, public spaces have their own history and their local identities, which can affect the way they are, used by people if they know these identities and history of the place. Furthermore, people tend to visit and use unknown public space, which may lead them to experience different emotions from a need to discover more, or an unsafe feeling, which can also lead to a different attribute. That is why all individuals and groups compete in terms of the accessibility to the places for the level of control; these processes are more complex than common issues of design or public space. In fact, the way of designing active social public space is based on understanding individual and group attitudes, which can then be integrated within the public space.

2.3 Forms of public spaces

The structure of most modern cities usually incorporates places and facilities that are important to everyone and become a popular destination to visit. Public space is one of these places in the city; it can be in many different forms from the size and the shape, or indoor or outdoor. Diversity in the forms of public space can play a significant role to

bring people to the place, encourage social interaction, and make the place liveable. Public space forms whether indoors or outdoors can affect the well-being of the people in the place (Budner 2016).

Indoor public space such as shopping malls transformed from being a city component to become an essential urban component. The shopping centres are not just for shopping destinations, but also promotes physical space where a diverse range of social activities can occur; as a result, indoor places have changed the concept of the public space and all principles of urban life. On the other hand, the city centre should be more flexible and function as a “place”, where “everybody occupies its place” (Wang 2011).

Nowadays, shopping centres have become increasingly popular destinations for people. Obviously, indoor public spaces are privately owned and they are not truly public, even though these places are for public use. There is a presumption of publicness in these privately owned public spaces, but in reality, they are in the public realm. The concept of public life is related to the idea of a “public sphere” and the concept of civil society, where the concerns of the public world are discussed in public space. Furthermore, public life is also consequent based on our needs such as the need for relaxation, social contact and entertainment. These activities are not necessarily carried out in a public space but on neutral ground.

According to Budner (2016) “the forms of public space may affect the emotional attitude people have towards the place they live in”. Moreover, Apple store used the concept of public space to convert their stores into more comfortable spaces and customers can spend more time in the store, as they established a new design for their retail Town Squares, Designed by Foster + Partners. Angela Ahrendts, (Apple's senior vice president of retail and online stores) illustrated the new design of "Town Squares" as shown in (figure 2) below. In fact, the new retail store's design based on the concept of public space, as the traditional glass cube design will return but expect them to be outfitted with more plaza-like green space (Ahrendts 2017).

Figure 2: Apple design concept (Town Square)
Source: http://www.zdnet.com/article/apple-touts-new-town-square-retail-store-concept/

Nowadays, sociability affects everything; Apple's glass-and-white-walled stores are to gather people in the place. People will be invited to "relax, meet up with friends, or just listen to a local artist on the weekends." (Christian et al. 2017).

"Look, it's true: People gather in Apple Stores. Kids play games. Design nerds fondle iPad Pros. Befuddled people seek refuge at the Genius Bar" (Ahrendts 2017).

Moreover, different forms of public space can play an important role to bring people together to interact, encourage social cohesion in society, and make the place liveable. Both indoor and outdoor public spaces have the ability to gather people together and enhance sociability in the place.

2.4 Dimensions of "public spaces"

Public space is a multidisciplinary research domain as it concentrates not just on the physical element but takes into account the non- physical elements as well as the overlap among them. These manifold dimensions have drawn wide attention from a diverse range of academic disciplines besides architects, urban planners and designers. This research focuses on the physical, social and psychological dimensions of public space as shown in Figure 3 below.

The physical dimension is about "provision" or the physical structure of public space, which provides an environment for social integration, while the social dimension is about how these places are used, or the activities that occur within them (Carmona 2010).

Furthermore, the psychological dimension is about how people perceive the place and give meaning to it, which helps this meaning in developing the place attachment and sense of belonging to the community. These dimensions are important to this research because they form the units of analysis in the investigation of what makes public space active and are explored further in the research design.

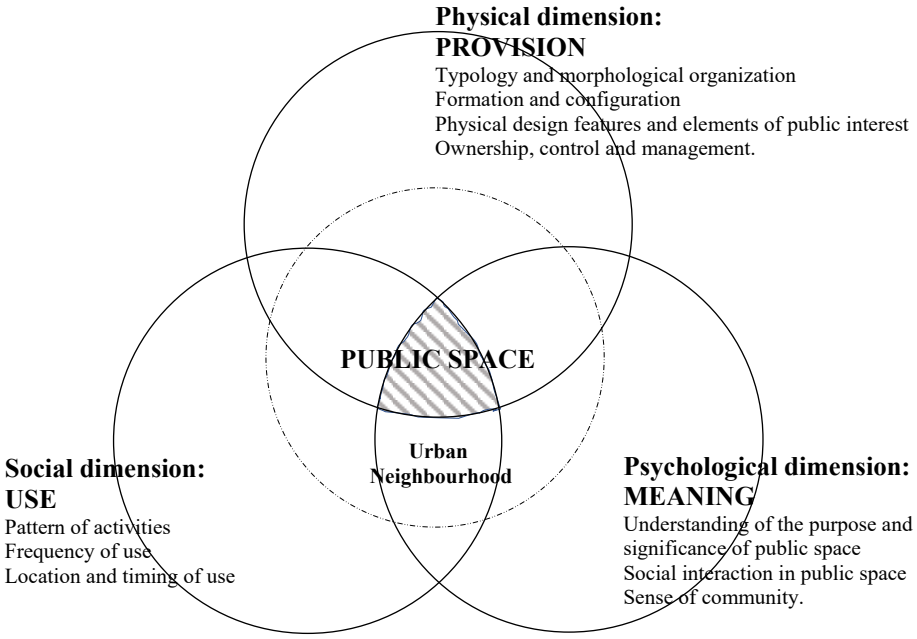


Figure 3: Dimensions of public space
Source: (Chitrakar 2015)

Studies have shown a strong relationship between the physical qualities of public space and its use. Gehl (1987) suggests that the physical design and condition of public space can largely influence the pattern of use. He argues that good quality public space can attract a range of activities, making it lively and vibrant. The quality of public space may be assessed in terms of its provision, the physical features, design elements, and the degree of accessibility. Similarly, Whyte (1980) argues that most sociable spaces are the ones, which are easily accessible to the users, both physically and visually, with plenty of amenities to support the activities occurring in them. According to Lynch (1981), accessibility of urban space is crucial to public life and thus, should include human concerns.

2.6 Key qualities of active public spaces

Active public spaces are developed and designed based on providing accessibility and can attract a diverse range of use and activities to occur in the place, thereby enhancing social interaction between the users of the place. The Project for Public Spaces (PPS) (2000) p.18 outlines four key qualities of successful public spaces: a) access and linkages; b) comfort and image; c) use and activities; and d) sociability (see Figure 4). The Project for Public

Space (PPS) defined successful public space thus: "A successful public space is easy to get to, and is visible as well", so people can utilise different parts of the place with easy to go throw. Another key quality of public space is an activity, which is the purpose why people come to public space. The PPS (2000, p. 18) also points out that the use of public space is determined by its image and the level of comfort it offers because "perceptions about safety and cleanliness, the scale of adjacent buildings, and a place's character or charm are often foremost in people's minds in deciding whether to use a place". While people use public spaces, they tend to socialise with each other (Madden 2000).

Whyte (1999) p.9 writes: "*What attracts people most is other people. Many urban spaces are being designed as though the opposite were true and what people like best are places they stay away from".*

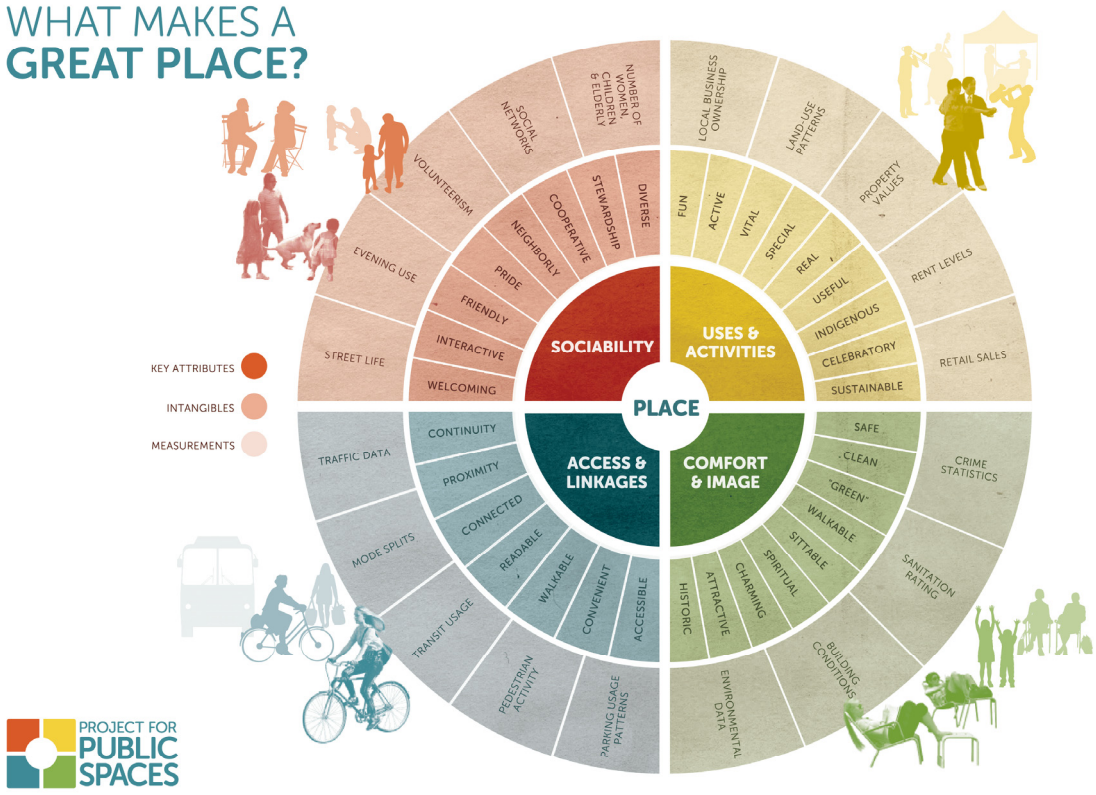


Figure 4: Key qualities of successful public space
Source: Project for Public Space (2000)

Therefore, the opportunity for socialisation also has a huge impact on the success of public space. The PPS (2000:19) argues that "when people see friends, meet and greet their neighbours, and feel comfortable with strangers [in public space], they tend to feel a stronger sense of place or attachment to their community".

2.7 Factors influencing the quality of public spaces

The quality of public space has long attracted the interest of urban design, planners, architects and scholars. Lynch's essays '*The Openness of Open Space'* (Lynch 1972) and '*Open Space: Freedom and Control*' Lynch & Carr (1979) highlighted the issue of accessibility, level of control in relation with social cohesion. Meanwhile, Whyte's (1980) study of urban plazas concludes with guidelines approved by the New York City Planning Department, where these guidelines became more common knowledge. Furthermore, more studies have pointed out a great knowledge about the uses in the public space and the natural elements such as town square, parks and streets (Anderson 1986; Moudon 1991; S Carr et al. 1992; Berechman & Small 1988; Fyfe 1998; Low 2000; Anastasia & Ehrenfeucht 2009; Mehta 2014b). Other studies have concentrated on certain groups in public spaces, such as adults, women, or disabled people. Even though architects and urban designers tried to develop different tools to measure public space, more studies need to give attention to the performance of the public space during the assessment process. Nevertheless, developing measuring and assessing tools is a complex process, as the reliability with which one measures the public space is based on the data collected through the observation, questionnaire and interview.

Two studies though gave attention to activities that occur in the public space by providing a clear image of which activities these are. The first study is about engaging the practical and research studies on public space, where Carr et al. (1992) provided a comprehensive explanation, pointing out that active public space is responsive, meaningful and democratic. The second study, providing a framework to clarify the relationship between the use and sociability and their relation to the quality of public space, Gehl (1987) classified the outdoor activities that occur in the public space into a three different level as necessary activities, optional activities and social activities. *Necessary* activities, such as walking, or sitting, occur based on the quality of the environment; *optional* activities, such as walking in the place in free time, occur when the condition of the environment is optimal; and *social* activities that occur need a high quality of environment with a high level of optional activities. In fact, Ghel's framework can categorise the quality of these public spaces, as ones which make the public space function and be used by the people, where the people can experience a good quality of place for more social interaction in the place. In addition, Carr's definition of public space, as well as Gehl's framework, can create a good foundation on which to enrich the research aim of developing a framework to assess and measure active public space. High-quality public spaces are accessible, reduce

the number of crimes and increase the feeling of safety, and in turn, contribute to the issue of the environment of comfort (Figure 1) These are discussed in detail below.

2.7.1 Physical and functional qualities of public spaces

Public space contains two conditions physical and functional, that a positive or negative effect on social interaction, comfort and feeling safe, which can gather individuals to congregate the place. The physical qualities and functions elements of public space relate to services, activities, accessibility, and criteria relating to the physical location of the place and the uses of the surrounding environment, which could enhance occurring activities in public spaces that affect their ability to promote social contact, comfort and livability. Understanding what the others have found in relation to the physical variables and functional in public spaces, they are able to identify the important needs that should be recognised in the streets, in relation to this matter as well as a methodology guideline for this research.

In fact, Whyte, PPS and Gehli (1996) found that there are certain factors which have an effect on public life and the vitality of squares, which can be useful to develop a theoretical aspect and direct the questions for squares users.

High-quality public spaces need to be qualitatively functional as they are able to promote a number of physical settings that can enhance public life. According to previous studies, most attractive places and gathering places for individuals are settings where individuals can interact with each other and enjoy the beauty of the surrounding environment. Such places provide furniture such as seats, and plant trees to make the places easily accessible for people and enhance the natural features. Previous studies show that retail and events in public space will attract people to engage together in urban space; such activities draw people to urban areas. The visibility increases the feeling of security in places, an extremely necessary criterion for the users (Whyte 2001). These physical and functional concepts contribute to the image of public spaces and affect the comfort and satisfaction of the users. In addition, they have an effect on an individual's attributes and the well-being of people in public spaces. Particularly Whyte (2001) stated that collecting data from users by using observation and interviews would clarify the attributes that affect the social life and the great place.

The positive development of public space needs to involve the active community, and require a strong redesign programme, according to the needs of users. Further,

management agendas appropriate to organise activities and events involving people in public space are required. The target is making people feel satisfied and increase their sense of belonging in the public space (Carmona 2014).

The Project for Public Space institution (Project for Public Space 2014) is given the place diagram which explains the question, What makes active place? The framework illustrates four key qualities:

1- Sociability 2- Use and activities 3- Access and Linkage 4 - Comfort and Image

Principally accessibility is meant to be linked to visibility of the place from far distance and location that are easy to reach. Therefore, easy movement in the place; the physical layout of the place is safe for the users and functions well. A friendly place promotes an accessible place for all people including groups such as children, and disabled people provides more space for parking and is easily accessible by public transport.

Image and comfort are linked to the quality of the physical layout of public space. Public spaces with good maintenance processes are in a positive condition, which can positively affect how users perceive their comfort and safety in the place. Subsequently, the criteria of public spaces become more acceptable and can gather more users to interact in the place. In general, these options offer places for walking or reading and enhance the positive local identity of society.

Uses and activities, when they are functioning well, can enhance users to visit public spaces. Neglected places which have no activities, can result in an empty and unused place. above all, public spaces should be able to promote and enhance the sociability in the place. Increasing the sociability between the users of public space, between friends, family or even strangers, can be an indicator of increasing the place attachment and community belonging.

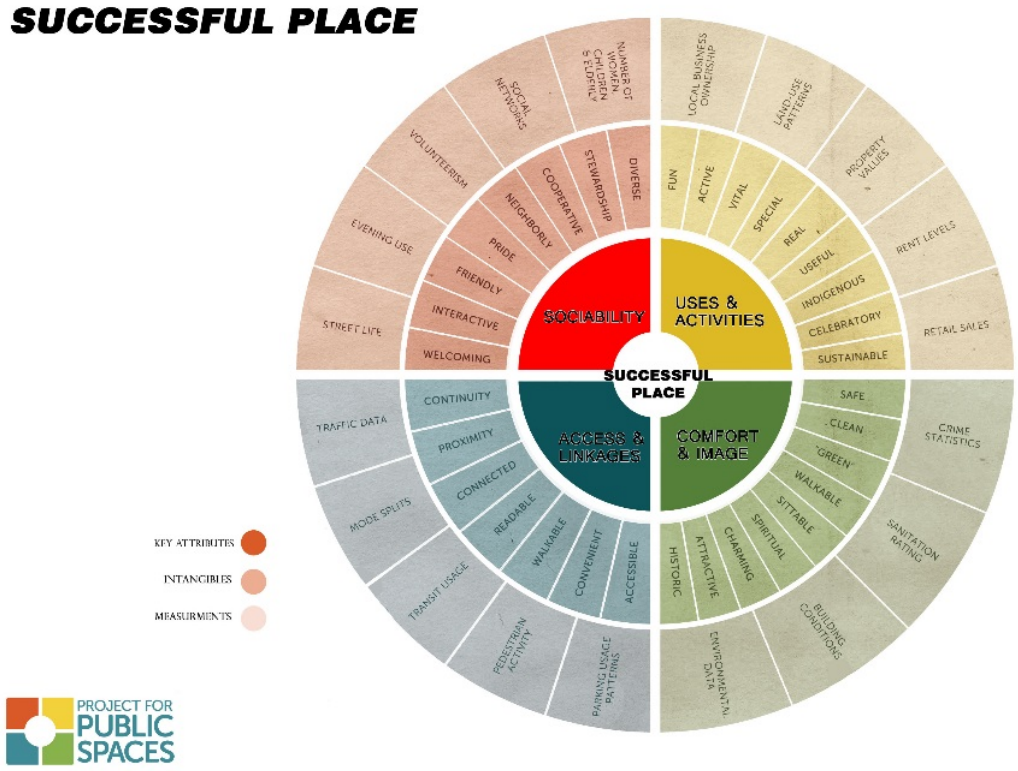


Figure 5: What makes a great place?
Source: Taken from Project for Public Space (2015)

Furthermore, William H. Whyte pointed out, “It is difficult to design a space that will not attract people – what is remarkable is how often this has been accomplished.” Nowadays, several public spaces seem sustainably and well designed, but most of them have not achieved what they are designed for. They are green, clean and empty of users as well – it seems that the design concept was, "no people, no problem!" But for us, when the public space fails to attract people and with lack of social interaction, this is certainly an indication of something wrong in the design process or management of the place, or maybe both. According to the Project for Public Space (PPS), the common problems that make a public space fail are:

- A place that does not provide a good sitting area
- A place without gathering points
- An inaccessible place with lack of surrounding connections
- Dysfunctional features.
- Bad path design that can lead users to the wrong place.
- The place has been dominated by vehicles.
- Lack of front-edge activities and blank walls.
- The wrong location of transit stops.

William Whyte's and the PPS' methodological approach are based on interview and observation. Individual attributes are the key to clarify the concept of public spaces, dynamics and functionality of public life. The findings of William Whyte have helped to identify a significant role in which criteria can make the public space active during this research.

The activities that take place in public spaces can be divided into necessary activities, optional activities and social activities that can occur under certain conditions in the place.

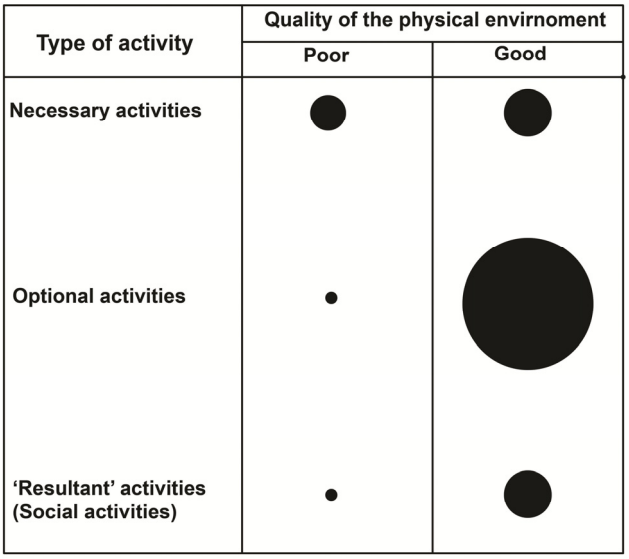


Figure 6: Activities that take place in public space according to (Gehl 1996).

The graphics illustrate the link between the activities that may occur in the public space and the quality of the physical environment.

According to Gehl, (1996) necessary activities are considered those basic and common activities for people, such as talking and sitting. Optional participation occurs, when individuals take part in voluntary activities and interact with social activities. They occur when the external conditions of the climate and place attract them. Most of these activities are based on the quality of public space and physical condition. Consequently, high quality of place encourages the necessary activities to happen over a longer period of time. Also if a number of optional outdoor areas are of high quality, necessary activities occur over a longer a number of optional activities will take place in the public space due to the fact that the place is welcoming and 'invite' people to practise their daily life activities. In conclusion, the three types of social activity can occur due to the interaction of people between each other and with the surrounding environment; for instance, the activities are caused by these two types of activity that take place naturally as a result of the bystanders being in the same public space.

Most public spaces have beautiful views that contribute to creating a sense of belonging to the place and engagement in different types of activities such as walking, jogging, and cycling. The presence of a place to play and exercise and presence of tables to sit around the area contribute to creating the sense of belonging and engagement in social activities

(Peters et al. 2010; Kaźmierczak 2013). In the UK, British people like to engage in many recreational activities such as walking, cycling, exercising and chatting in groups, which promote social interaction (Thompson 2002). Moreover, Sideris and Sideris (2009) found that people in the park engage in activities such as soccer, basketball and playground play. Public space in Turkey is perceived as an important element in the city and town that people utilise for passive recreational activities (Özgüner 2011). Therefore, public spaces are used for recreation, participation in activities, and interaction with others.

The physical and functional criteria of public space have the ability to enhance the social life and liveability in the places. The physical and functional conditions are the ones that encourage interaction, and feelings of safety, and comfort that enhance the optional activities that occur. Overall, those will improve the level of the quality of life in the squares. Identifying the activities and physical conditions can clarify the questions posed to people in this research. It is also possible to direct the development of new implications for the design of public spaces in relation to the functional and physical elements. This argument promoted valuable knowledge to classify the aspects of the functional and physical elements that influence social life.

Accessibility is one of the major qualities that determine the utilisation of urban public space. In view of this, public space is viewed to be accessible when it is designed in such a way that it is available to the majority of the people and does not limit any individual. Accessibility to public space is influenced by physical and visual connection to neighbourhood areas (Madden 2000), land uses and proximity to residential areas (Pasaogullari & Doratli 2004). Accessibility could equally mean people's ability to move around easily within the boundaries of public space. Sivam and Karuppannan (2008) noted that accessibility is one of the major indicators of the physical dimension of public space.

Social activities in public space may be constrained or facilitated by accessibility and this may equally influence the utilization and attainment of social interaction (Pasaogullari & Doratli 2004). Moreover, Lau and Chiu (2003) observed that urban space is considered accessible when it is physically connected to the surrounding landscape. According to the authors, this physical connectivity is achievable by connecting the public space with one mode or multiple modes of transportation. Thus, the greater the number of public transportation modes available, the higher the chances of public space utilisation.

The nexus between accessibility and the use of public spaces have been established in past studies. For example, a study in Sweden by Lindhagen (1996) reported that distance to the

recreational area is an important factor as 95% of residents stated that it influenced their utilisation. Similar studies equally showed that a relationship exists between the distance to recreation areas and the rate of visits to the area. An inverse relationship exists between the rate of visits and distance to the public space (Roovers et al. 2002; Schipperijn et al. 2010). In other words, an increase in distance of the public space from residential neighbourhoods is likely to bring about a reduction in the number of times residents visit the public space.

Hörnsten and Fredman (2000) reported that the maximum distance Swedish residents are willing to travel before getting to public space is one kilometre. The short distance between residential areas and public space enhances good utilisation (Troped et al. 2001), and people who live close to a public space or have easy access to transport, uses public space frequently (Hoehner et al. 2005). In another study on the public space accessibility and usage in Santa Cru, Bolivia, Wendel et al., (2012) reported that provision of public transport enhanced the visitation of public spaces that were too far to walk to, particularly for low-income families and young ones.

2.7.2 Sociability and Public Life

Designing High quality of Public space is a significant stage in providing different varies of activities for the community (Rasidi et al. 2012). Public space is able to promote a place for the people for social interaction between them. Zhou and Rana (2012) pointed out that public space has the ability to encourage social interaction in the community more than other places in the construction of the urban centre. Sociability is a significant experience during the use of public space, furthermore, the social interaction between the residents of the urban centre promotes an opportunity to communicate with their neighbourhoods (Rasidi et al. 2012). Moreover, Peter et al. (2010) demonstrate that most public space' users prefer to gather in these public space and meeting people and enjoy the surrounding environment, that can lead to increase the place attachment as well as a strong social cohesion.

In another hand, some people prefer to go to the public space and engage with others who know them by name, rather than engage with strangers, those people require a space with more privacy level for them. Creating their own space while enjoying watching people around them from afar. Lawson (2001) pointed out that those people who prefer to intact with their social group need to be approximately 4 meters far from other people.

Social and public life are two concepts that clarify the ways public spaces are used. Individuals' needs are the main elements in sociability which promote interaction between people and the surrounding environment. This relationship encourages people to participate in a system of social life, in order to achieve psychological comfort (Lang 1994). The social aspect is not just improving livability in the place but also encouraging the individuals to share knowledge. Sociability also has relations with public life; this matter is discussed later in this section. In fact, if the physical environment does not provide comfortability to its users or is neglected, for example, then sociability decreases in public space. Although sociability has a strong relationship with other aspects such as security, physical, functional and environmental issue, it cannot be studied separately without fully understanding the other factors. Therefore, activities in the place support and provide more opportunity to make the place more social; and other factors are favourable for interaction and people gathering in the place.

Once people meet their basic needs and feel satisfied, this feeling plays an important role in increasing the sense of belonging and an individual become a member of a group, which will offer them identity and support (Lang 1994). Specifically, affiliation needs of gathering people in public places are be based on the characteristics of individuals and groups, and therefore manifest themselves differently. Affiliation can also be identified through communications that occur between people and places. In terms of design, it is necessary that designers do not accept that the provision of the environment will dictate specific sociability. Understanding the factors that affect the sociability of the streets in the UK becomes a major issue which is addressed in this research because of the important impact it has on people's lives.

Furthermore, another significant element highlighted in this research is the concept of public life, which has a relationship with a social element in the place. The concept of public life means to involve different users of place together, for purposes of making the place better or worse. It also addresses the role of each individual in the society, to become part of the group to make more social contacts, and provide more political statements. Sharing knowledge allows people to discover new things and learn from each other's perspectives (Carr & Lynch 1968). The criteria of public life are based on the setting's characteristics; these include time activities in the place, the culture aspect, and the activities. Public life has the possibility of gathering individuals again in the place, where individuals can practice their freedom.

The improvement in public space depends on the level of public life in context. The power of change that forms public life is able to promote greater consideration of the criteria that affect the livability of public spaces. These factors are: (1) the environmental element of public space (including climate and topography), (2) the socio-cultural community, (3) the physical and functional characteristics of public spaces, (4) the political systems, (5) the economic systems, (6) recreational needs, and (7) health needs of a society. The environmental systems and in particular climate and topography influence the quality and comfort of the public life outdoors and nature of adjustments.

Warm climate plays an important role in public life; it becomes more dynamic, although public life depends on the climatic tolerance of the people and the capability of setting to shelter users from the natural elements. These natural elements in an urban area will keep enhancing and supporting public life, by making the structures built in a softer manner. The natural elements can also provide relaxation, pleasant experiences and the quality of remedies for individuals (Kaplan & Kaplan 1989). The socio-cultural characteristics, social elements and individual's beliefs have an effect on the way they communicate socially and gather in public spaces. Other elements are the existence of shared meanings and rituals in an urban area determined by cultural events and history that enhance and support the place attachment and sense of belonging to the community, as well as enhance the role of the society in shaping their public spaces. The nature of the community can define the public life of a society; its size and heterogeneity can also change the balance between the private and public sectors. In diverse societies, it can be hard to create contacts and integration. This can enhance the isolation and the creation of "tunnel vision", contributing to the "faceless anonymity of the city" (Stephen Carr et al. 1992).

Crime activity and fear of crime have a negative effect on public life in society due to the volume of criminal behaviour and anti-social behaviour that occur in the community. Consequently, architects, urban designers and planners need to address these criteria to provide a design that takes into account the safety element. The functional criteria of public space can foster the quality and quantity of the people attribute and provide integration.

The streets and town square are able to gather people again in the place or sometimes fail to bring them back, as well as classify the relationship between pedestrian movement and vehicle roads. Moreover, Appleyard (1981) illustrated that cars on the roads can negatively affect the level of public life. The socio-political system that affects the right to assemble

in public spaces and to identify the freedom level of expression and speech can also have an impact. The economy factor correspondingly affects the improvement and management of public space. Which will affect the new development of public spaces that will gather individuals and other activities to the place? In conclusion, the health factor of the community will define the utility of public spaces. Sports activities require open spaces which most of the squares and parks provide and thereby promote public life (Stephen Carr et al. 1992). These factors will contribute to the knowledge of the benefits of understanding the public life factor in public spaces. These criteria promote the knowledge that supports defining the methodology used in this research to direct the questions to ask and support the analysis of the emerging results.

The social aspect is not just improving livability in the place but also enhance the individuals to share knowledge. In fact, if the physical environment does not provide the comfortability to their users, the sociability decrease in public spaces. Although sociability has a strong relationship with other aspects such as security, physical, functional and environmental issue, it cannot study it separately without fully understanding the other factors (Gehl 2011b). Therefore, activities in the place support and provide more opportunity to make the place more social and other factors are favourable for interaction and people gathering in the place.

2.7.3 Psychological Dimension

One of the significant factors that contribute to the quality of active public space is the level of comfort that users of public space can feel in the place. Mainly the comfort factor is connected to the security and climatic aspects, which are considered two elements that reduce the number of users of public space or even create a neglected place. The next section discusses the relation of the climatic and security aspect with the comfort factor, and how those criteria affect the quality of public space based on different theories. Regarding the comfort in the public space, the priority is to define the concept of comfort and then develop a clear image of both climatic comfort and security.

Thermal comfort is a complex meaning of condition of climate and physical layout, behaviour, psychological aspect (Middel et al. 2016). The micro-climate aspect affected by different elements, for instance, green element, the location of the space, water element. These elements can improve the comfort conditions of public space. The green element can influence the thermal comfort of the public space, which has main three principles that

contribute to the climate: windbreak, shadow, humidity (Gherraz et al. 2018). However, the minimum level of human comfort has been defined by Lang (1994) p.221 as:

…. freedom from any pain on all levels of environmental experience. While the comfort definition in the biological aspect is about the assessment of the individual based on the body's stimulation that been subjected for (Lang, 1994 p. 221)

A related concept is a metabolic comfort (Lang 1994). This concept states that a person's metabolic comfort in the outdoors will depend on the individual's activity, the air temperature, humidity, radiation, air movement, and the clothing worn. The author discusses some issues of climatic comfort and security below, which are two important attributes of public spaces that affect the vitality and social life of public space.

Lang (1994) demonstrates the concept of metabolic comfort, which is about an individual's metabolic comfort in outdoor places based on how people are active. He also discusses the weather in terms of humidity and air temperature, the speed of the air and so on. Moreover, the following section highlights some climatic comfort and security issues, which are considered as important criteria that can affect the social life in the public space in Nottingham city.

a. Climate issue in an urban setting.

Unfortunately, many urban spaces in contemporary cities are designed without addressing the climate. Many urban designs and renovation processes of public spaces are developed with little consideration of environmental factors such as wind direction, sun intensity, and temperature. Some consequences of this lack of consideration are the creation of unpleasant streets for people and climatically unfavourable squares that are located on inappropriate sides of buildings

Nowadays, in many urban cities, the process public space process design fails to address the climate aspect; many public space projects and existing renovation projects are designed and improved with little consideration of the climate element in their designs, such as sun direction, air temperature and wind direction. This lack of consideration leads to the design of uncomfortable public space, and environmentally unfavourable town squares around the side of the buildings (Lang, 1994) This lack of consideration created outdoor public spaces which are uncomfortable for the users and do not meet the individual's physical needs.

The negative effect of the built environment and particularly urban spaces on human comfort in the outdoors has led to a number of studies related to bioclimatic issues. The most important factors affecting the metabolic comfort of people in public spaces are the levels of temperature, sun incidence, humidity, and snow. Climate considerations for Nottingham, therefore, must be related to minimising hazards from tropical storms and floods, minimising thermal discomfort from the intense sun and heat, providing adequate shadowing for outdoors surfaces and taking advantage of the prevailing breezes. Lack of consideration of the built environment and particularly on public space has a negative effect on human comfort in outdoor public space, which drew attention to the significance of bioclimatic matters. Several significant factors have a strong effect on the metabolic comfort of the users of the public spaces, such are the level of temperature, humidity, snow and sun. that is why the climate consideration need to be addressed to reduce the hazard from heat and incidence, promote pedestrian paths with more shadow and benefit from the prevailing breezes (Givoni 1998).

In fact, the weather factor over the public space can affect the number of users in the public space; moreover, humidity, particularly at high levels and high temperature, is creating a place that is uncomfortable for people to use (Nasar et al. 1994). Other elements such as providing trees, and water elements in the physical layout of the place can reduce the temperature and change the humidity level; also taking advantage of the breezes can limit the negative effects of humidity in the place.

Gherraz, Guech and Benzaoui (2018: 7) stated the effect of the green element (Vegetation) on the micro-climate and the quality of the public space:

'Vegetation can affect the microclimate in many ways; it reduces air temperature while providing shade. Vegetation brings aesthetic improvements to an environment otherwise dominated by asphalt and concrete' (Gherraz et al. 2018) p7.

The environmental psychology field has explained another effect of climate on people, which influence people's attitudes and behaviour in public space. When temperatures are severe in an urban environment, the effects will not only affect people's attributes or feeling of discomfort but will create stress and aggression in people.

Furthermore, another effect of the climate issue on the users of public space has been identified by the environmental psychology field, which has an effect on people's behaviour in the place. In particular, when temperatures reach high degrees in an urban

environment, this can also create stress and more aggression among users (Cassidy 1997). This effect contributes to the importance of addressing the climatic factor during the designing of the public space, as well as the psychological impact of different climate conditions on users' behaviour in the place.

Overall, the significant impact of the climate on the people's comfort level in public space is considered as one of the most significant elements in public space design. As previously discussed, the climate has the ability to affect people's capacity to experience and enjoy their urban environment. In this regard, studies in this field from academic institutions around the UK and around the world have increased. Subsequently, the climatic issue has become one of the most significant elements these days because of global warming.

b. Security in public spaces.

People's perception of their safety particularly at night is one of the major factors influencing public space utilisation. Molnar & Wagner (2004) reported that lack of security was a major factor that deterred groups from coming to public space. Similarly, Brussoni et al. (2012) noted that concerns about children's and parents' safety are one of the issues contributing to a reduction in public space utilisation. Nevertheless, in a study conducted in the United Kingdom, Özgüner et al. (2007) reported that perception of peace and safety are one of the factors that attracted people to use the particular public space. In view of this, safety measures through the provision of lighting after dark and security could encourage people to use public space, particularly at night (Gehl 2002). According to Wagner and Peters (2014) women are participating in public space when they feel safe about the space that attracts them to visit. This means that the safety factor that influences women's decisions to decide to visit or not visit a public space alone or with family members becomes an important concern for women.

In fact, when people's needs such as basic comfort and survival are fulfilled, other people's requirements such as safety and security started to emerge (Project for Public Space 2014). Moreover, two types of security have been identified that affect the design of active public space. The first need is the physical need, while the second need is the psychological one, which can enhance the place attachment in both social and geographic aspects. In order to achieve physical security, the users of public space need to feel safe from any types of crimes in the place. Moreover, psychological security can be achieved through managing and controlling the physical environment and social aspects in order to avoid the unexpected from occurring in the place. In this regard, the level of insecurity will be based

on how people perceive the place in terms of the crime rates, their need for feeling safe, and the level of capability of the sources of both crime and the environment. However, psychological security is a significant element that needs to be addressed by urban designers and planners to design a better place for people (Lang, 1994). One of the ways to provide a safe and secure public space is through the well-design urban environment to promote a safe and secure environment for the users. The security aspect is discussed in more detail later in the section.

One of the important criteria to study security in public space is to identify who the users of the place are and when to highlight any presence of undesirable' activities; homelessness, however, is rarely connected with the impression of crime and crimes number in the place. However, users feel less confident and nominate them in the place. They also cite equal access to the place for all people, and state that welcoming public space with different social activities provides great opportunity to mingle on a big scale in the community, therefore, encouraging more social cohesion and consequently providing a high level of perceived security in the place (Nasar et al. 1994).

Active public space should provide a feeling of security, as an important condition in their design, which is based on different factors. First, a number of researchers have pointed out that the visibility element in public space is an important element to enhance the feeling of security. The visibility type that is connected to the nature of surveillance (Crowe 2000) is the chance to increase the social contact due to that people can see each other also to obtain help in case any crime or assault happen. Obviously, in crowded public space, the feeling of security is higher than in empty places. This could clarify the need for increasing the level of feeling safe and secure in the popular destination and most visited public spaces. Furthermore, mixed-use facilities around the public space can enhance the connectivity and attract more people to be in the place for a longer time, thus, this provides more surveillance in the place in a natural way.

Overall, the ability of public space to promote different types of activities in the place, that can attract more people to visit the place, which can increase the level of feeling safe and also the visibility by others. Local events and markets that take place in the public space can enhance the users' enjoyment in the place, as well as encouraging the level of safety that leads to better visibility between the users in the place. On the other hand, less visible place and not knowing what comes ahead on the pedestrian paths can lead to a feeling of insecurity; therefore, promoting clear maps and sightlines will play an important role to

make public space more secure and safe (Wekerle et al. 1995). During the designing of public space, confined spaces that are neglected and have been isolated from the surrounding environment with no clear road or clear exit along walkways, need to be avoided. When designing pedestrian paths, it is important to provide pedestrians with flexible paths and different options of exits, which can prevent pedestrians from feeling trapped. Services such as emergency telephones or CCTV can help to provide more sense of safety and security in the place.

Furthermore, regarding the visibility elements, Wekerle and Whitman (1995) pointed out that the urban safety is also based on the level of awareness of the urban environment, and how easy it is to find assistance when it is needed. Moreover, these two elements of visibility are also important, to promote a safer environment and increase the sense of security in the place. In fact, the public space layout which can be understood by the users can be a more attractive place for people to feel confident and stay for a long time; when people can find the facilities in the public spaces easily and can recognise the surrounding area. This can be achieved through introducing lighting elements to the place, as it can reduce the feeling of crimes especially when the place is used at night, increase the visibility, and increase the utilisation of the public spaces during the night. This also includes the signs that can help users to get help, as well as the provision of a map site to direct the users to their destinations.

According to Atkins et al. (1991) and Cafuta (2010) demonstrate that adding more lighting in urban public spaces reduced the crime rate and equally increased the level of comfort users get from utilising those public spaces at night. Another study by Painter (1996) on public spaces in the London Metropolis, found that installation of new lights reduced the fear of crime among public spaces users and the people living nearby by 90%. In addition, women's sense of security and confidence was boosted while walking around public spaces. However, Holland et al. (2007) argued that the elderly are actively discouraged from fully utilising public spaces, especially during the night due to security concerns, inadequate transport facilities and lack of interesting activities or provision of venues in public spaces that caters for their preferences. However, this assertion that fear of crime deterred many people from using public spaces has been challenged by (Mean & Tims 2005).

The concept of security contains another factor, which contributes to the level of feeling safe in the place, which is the image of the place; the aesthetic value is an important

element to increase the sense of security in the place. In general, unaesthetic places with lack of maintenance, litter, and damaged facilities discourage the utilisation of the public spaces, which causes very low levels of feeling secure. The consideration of the image of the place also needs to be addressed by the planners and urban designers to provide public spaces with high quality and beauty as well as signage. to avoid confusion for the users. At the same time, as previously discussed in other sections of this research, even though it improves the image of the public spaces, the aesthetic approach alone to design in the public spaces is not the main achievement to ensuring safety in public spaces (Wekerle et al. 1995).

Various people have a different wealth of knowledge, money and time which together help in shaping their ability to access different places and spaces. Younger ones are restricted in terms of mobility and knowledge and tend to visit spaces that are closer to their homes. As a result, their lack of experience with other places or neighbourhoods seemed to generate fear. This perception is likely to continue into adulthood for most people. In addition, another factor is what authors regarded as the “reputation effect”. This is based on the poor reputation of safety gained from experience. On most occasions, this is exacerbated by people's limited mobility and experience outside their own areas or neighbourhoods. Such limited exposures make people perceive a public space located in that neighbourhood as being unsafe even when they have not visited it.

The factors that been discussed above give a clear indication of how the level of security and the sense of safety can be achieved in the public spaces. Understanding who is using the place, and being surrounded by other people in the place (visibility) increase the sense of security. Moreover, the image of the place and the level of awareness of the urban environment, access control and the chance of finding assistance in emergency cases are important factors that can encourage the level of safety and sense of security in the public spaces. In fact, to design a better place, some consideration needs to be taken into account during the design processes, such as identifying the reasons behind the fear of crime and solution to mitigate it. These factors have been used to develop the research questions that will target the users of the public spaces in our case study about Nottingham city centre presented in chapter 7.

2.8 Need in Public Spaces

The main target in public spaces is to achieve the level whereby people’s needs are satisfied. Understanding what the users need and what public spaces can provide to them

are important elements to identify what makes a public space active, what encourages individuals to visit public spaces, and, conversely, which criteria created a neglected place. Therefore, these considerations need to be addressed by urban designers, planners and architects to identify the important criteria for active public spaces. The concept of individuals needs is explained later on. The next section on finding and theories regarding people's needs in the place highlights the research questions that target the users of public spaces in Nottingham city centre, in order to identify the characteristics of a active place that fulfil users' needs.

Fulfilling people's needs illustrates a significant target in the urban design area (Lang 1994). During the design process, planners and Urban designers normally make decisions based on their knowledge about the people's needs with a lack of theoretical aspect According to Lang (1994).

"If the built environment is to serve human purposes, one must have a good model of human needs to use as the basis for asking questions about what should be done, what functions should be served in a specific circumstance" (Lang 1994) *p154*.

The importance of identifying people's needs in public spaces is not just due to their role in clarifying the use of the public spaces but also the importance of understanding the utilisation in the public spaces to design better place. However public spaces without consideration of people's needs can create unsuccessful and underused places (Stephen Carr et al. 1992) p. 91-92.

Nowadays, public squares are considered as part of the urban environment. They have a great impact on society that can encourage the satisfaction of the users, and their enjoyment of outdoor places. Mainly understanding the satisfaction of human needs which are identified by experts could provide good knowledge to clarify and analyses why some public spaces fail and why others are successful in the UK. Research has demonstrated that active places are those, which meet people's needs, these are; (1) comfort, (2) passive engagement, (3) relaxation, (4) active engagement, and (5) mystery and discovery (Stephen Carr et al. 1992). Moreover, the above needs could be achieved via providing mixed-use buildings around the place and enhancing different activities to occur in the place, providing an attractive quality as well as different service facilities in the place, a more secure place, and a climatically comfort place. In fact, *comfort* is about humans' natural needs for a drink, food, and home, while *passive* engagement is connected to the need for being in the place surrounding by people without being active or involved in the activities.

It is considered part of enjoyment and interest in watching other people in the place. Moreover, the relaxation needs are based on the psychological comfort of the users in the place, which is a condition for the users to relax. Furthermore, active engagement needs are different from passive engagement needs. Which are connected to the need to communicate with other people and the surrounding area? Which can be achieved through "triangulation" (Whyte, 1980). Lastly, mystery and discovery needs are based tapping into people's desire for stimulation (pleasurable experiences) and to discover the public spaces. This need also includes the need to experience something new which includes the feeling of surprise that excites, educates and delight people. (Stephen Carr et al. 1992).

The importance of addressing human needs in this study is because of the important impact on the design of active public spaces. Therefore, consideration of the human needs (comfort, passive engagement, relaxation and active engagement, as well as discovery needs) supported the development of the research questions. This research investigates which criteria can attract people to visit public spaces to achieve human needs in an urban environment.

Chapter Three: Place-making and the quality of public spaces

3.1 Place-making

The notion of active space that holds events is been known in urbanism since the 80s. Bernard Tschumi mentioned this notion in relation to the Parc de La Villette project. In fact, the only new adaptation to that idea was adding the active engagement with the community by enhancing the community role in shaping their place, as well as taking into account the local culture in the place-making agenda (Zarazaga 2015).

Bacon (1960,1963) illustrated that in the urban planning field there is an argument between observers who criticise the gap in understanding the physical elements in design aspects, an indication of limited urban designers and planners holding the design vision. It is commonly known that lack of expert exchange regarding ideas and planning concepts with the users and the communities, leads to a lack of relationship between the civic agencies and the communities (Silberberg et al. 2013). The initiative took in the US involving the community's opinion in the design process included (public hearings, feedback sessions, and reviews). In fact, these are essential to a certain participation method, because if urban designers and planners reduce the role of the users in designing their neighbourhood, that causes mistrust with civic agencies (Innes & Booher 2004). Issue and concerns of the community about updating the public on the final plan are rarely addressed via this process. This is due to the fact that the expert has identified a number of issues. In many cases, the final physical layout has designed active spaces; at the same time these spaces have not necessarily become active and livable places and the community does not have a sense of ownership of these spaces (Jacobs 1958; Whyte 1980; Madanipour 2006; Fuller & Moore 2017).

Public spaces that are easy to reach and participate in has a great impact on the users' wellbeing. "Placemaking" is considered a growing movement that allows residents to participate in shaping and creating public spaces in their neighbourhood. This enables, the residents to live there with the purpose of creating strong social contact between each other as well as with surrounding spaces they share (Project for public space 2014).

The concept of place-making has been identified thus: " Cities have the capability of providing something for everybody, only because, and only when, they are created by everybody." (Jacobs 1958). While currently, Project for Public Space demonstrates the strategy (The power of place) related to the awareness and consideration of social cohesion

that has been applied for a long time, few social theories have already been introduced to clarify the processes, including the psychological aspect of the community which has the ability to develop a theoretical concept of how the relationship between the individual and the community works to create and transform the public spaces (Toolis 2017).

Unfortunately, the processes of planning in the twentieth century have ignored the role of the communities to voice their ideas about the places they live in. The growing movement of place-making can reinstate the community's role in creating the place, and clarify for the urban designers and architects the benefit of this process. The PPS demonstrates that when planners and architects agree to involve the users of place and the community in the designing stage, they can achieve more successful place design. Very common issues such as neglect of places, traffic streets and pedestrians, and isolated development projects can be avoided by taking into account the concept of place-making which has a comprehensive vision of all criteria that make a better place rather than just concentrating on few criteria. (Project for public space 2014).

3.2 Theorising place-making

The place-making agenda process is person-centred, which enhance the collaboration between the people and the community for developing the liveability of the places (Markusen & Gadwa 2010). Moreover, these processes normally concentrate on the urban cities, but they also hold relevance for villages and rural areas and have been applied in different regions (Nicodemus 2014). In fact, creative place-making started in the past decade as a movement process that attracted funding and, support from non-profit organisations such as the "Project for Public Space". The attention concentrated on the roles of the cultural aspect and the arts in developing the social, physical and economic aspects (Lees & Melhuish 2015).

Nevertheless, the placemaking process has been criticised as it does not take into account the impact of the political and elite groups in the public spaces (Loughran 2014; Lees & Melhuish 2015). Also, the place-making agenda concentrates on creating a good clean image of the place and brings more investment through regenerating public spaces in the city, while at the same time, ignoring the ethnic and economic aspects in shaping the place. (Loughran 2014). In catering to elites and the "creative class," this restructuring can contribute to the displacement of marginalised residents (Doucet et al. 2011). Additionally, the concentration on the overlap more than the differences could hide the plural and more often contested nature of societies (Sharp et al. 2005). Despite, these challenges, however,

research recommends that the place-making process has the ability to enhance more social cohesion, sense of belonging to the community (Thomas et al. 2015) and respect the history of the potentially relegated groups (Baca 2005). It can also promote a strong form of guideline for organizing cooperative actions (Martin 2003). For these reasons, the research addresses the principle of the place-making process that promotes more social justice among the users of the public spaces and creates a place that is accessible for all different people, which in turn can encourage sociability in the place.

Even though the process of place-making has been studied in some areas such as architecture and urban design (Sutton & Kemp 2011), this research addresses the psychological approach to criticising the process of place-making that takes into account the impact of both the community and the quality of the place. Despite the high attention that been given to the place-making process in terms of their methods and output, to date, the process has only been theoretically criticised (Palermo & Ponzini 2015).

The purpose of this analysis is to advance a theoretical framework for "place-making," grounded in key concepts from environmental psychology, narrative psychology, community psychology and the co-constitution of person and place. In fact, the aim of this investigation is to develop a theoretical understanding of the place-making process, based on the meaning of community psychology, environmental psychology and narrative psychology. Moreover, identifying the concept of place is key to clarifying the human thoughts, their attributes and social relations. Meanwhile, the effect of the environmental aspect in the psychological process generally ignored the individual characteristics, what Shinn and Toohey (2003) called the "Context minimization error".

In contrast, environmental psychology is identified as a dynamic, co-constitutive, transactional approach to psychological processes, of which the basic unit of analysis is the organism-environment programme (Heft 2003). The earliest psychologist to point out the role of environment in clarifying human attributes and behaviour was Kurt Lewin (1943/1997); he proposed that human behaviour is about a function of the relation between the form and state of the human and also the physical layout.

The theory about the place that has the ability to inform the users on how they think and perform as the foundation of behaviour settings was introduced by Roger Baker in (1968) p.18. An attribute set "consists of one or more standing patterns of behaviour" that occur in the physical environment, naturally increasing through co-operative, co-dependent attributes in certain places with clear limitations (Heft 2003). Significantly, behaviour

settings are more individual; that means the form of behaviour in the environment has a comparatively stable characteristic regardless of the act of the individual within it. Toolis (2017) demonstrates the notion that behaviour is place-specific as well as the fact that both places and situations are equal or maybe contribute better of behaviour that individual characteristics would, as it supports the theoretical aspect to the place-making process to enhance the change.

3.3 Place-making and its need

Designing better places is a challenge for today's architects and planners. The need for successful public spaces in the city has raised the gap between the design principles that designers are basing their design on and the role of the users of these places. William H. Whyte identified the role of the good quality design of public spaces in the quality of life of the community. Willian Whyte and his photography research have illustrated a way of understanding people's behaviour in the place and their interaction with the surrounding (Behera 2017). Willian Whyte focuses on creating spaces that enhance the interaction between users and the community on a large-scale, furthermore, "*What defines a character of a city is its public space, not its private space. The value of the public good affects the value of the private good. We need to show every day that public spaces are an asset to a city*" (Porada 2013; Project for Public Space 2012).

Childs (2010) discusses how the built and unbuilt exist at all scales-building, open spaces, streets, neighbourhoods, cities. The notion of the everyday interaction between people and these spaces becomes the basis for redesigning the urban realm. Moreover, this interaction can transform spaces to become a place, adding another aspect to the urban planning field to further movement to a more successful place-based on human use.

Designing a better place needs to address different aspects. Nowadays, involving the community in designing the place is really fundamental, taking into account the user's opinion and understanding people's behaviour and what attracted them to the place is a crucial factor.

3.4 Place-making types

The place-making process is considered as another way to improve the quality of different places in the city; but still, the definition of placemaking remains confusing. This limits the value of this process in helping the society and communities in creating a better place in the future (Wyckoff 2014).

The placemaking process has extended the quality of public spaces to include different aspects of community health and safety, social, art and culture aspects, and so on to enhance the sense of belonging to the place. Wychoff (2014) identified the three types of placemaking, with the quality of public spaces as a common goal. There are different understandings based on how the observer prefers to assess and evaluate the process. Figure 7 illustrates the four types of the placemaking process, and demonstrate the relationship between the three specialized place-making types. It shows the relationship between physical form, social opportunity, land uses and functions in creating a quality of place.

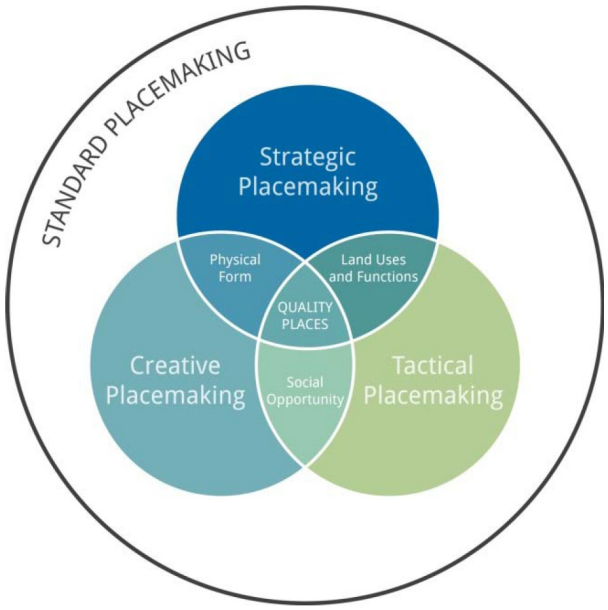


Figure 7: Four Types of Place-making
Source: Definition of place-making: four different types by mark A. wyckoff, faicp, Professor, MSU Land Policy Institute

3.4.1 Standard place-making

Considered as the universal term, this type of place-making is described as a way to improve with many separate projects or activities that could be achieved under supervision by the public section or private sectors over a specific period of time.

- *Projects*: park improvements, street and facade improvements to the buildings, or other small-scale multi-use projects.
- *Activities*: Events that take place in public spaces such as street, parks and waterfronts.

3.4.2 Strategic place-making

This place-making type concentrates on creating high-quality places that workers prefer to work, live and spend more time in. This type generates further job creation and economic

development in the city. These types of projects are located downtown and in the areas in transect locations with high-density populations; these projects have an impact on quality, pedestrian-oriented environments, and human scale.

- *Projects*: Green pathways in waterfronts and parks, mixed-use developments, social interaction by providing entertainment facilities around the corridor and nodes.
- *Activities*: Cyclical events targeted at talented workers along with other cultures, arts, and entertainment that can attract more users to the place.

3.4.3 Tactical Place-making

This is the process of creating quality places using a deliberate, phased approach to change through short-term, low-cost projects that target public spaces. Tactical place-making is comprised of two related but separate approaches these are Tactical Urbanism and Lighter, Quicker, Cheaper. Both seek to test new concepts through an action planning process that transforms underutilised spaces. These scaled-down and targeted efforts showcase the different possibilities and new uses for public spaces and encourage experimentation before making any substantial political and economic commitments.

- **Projects**: a road diet and other complete street projects, or the construction of new forms of neighbourhood dwellings such as a passive solar home.
- **Activities**: Chair bombing, pop-up cafes, parking spaces conversions into parklets, guerilla gardening and a variety of other activities designed to reinvent public spaces.

3.4.4 Creative place-making

This type brings new life to public spaces by applying arts, culture and creative thinking to all aspects of the built environment in order to stimulate activity and reawaken underutilized spaces. Bringing these arts and cultural activities and experiences to the forefront help shape community identity through increased social interaction and public engagement while also strengthening the sense of pride and connectivity among community members.

- *Projects*: Development that is built around and inclusive of the arts, such as museums, performance halls, public art displays or live-work structures for local artists.

- *Activities*: Outdoor town square concerts, sculpture loan programmes, public art contests or movies and plays in the park.

This research aims to redevelop a framework for measuring active public spaces by taking into account the new media and communication technology development in the twenty-first century. The impact of a place-making agenda in the design process of the place that involves the community and gives attention to the user's opinion has raised the significance of including the place-making agenda in this research of developing a framework to assess and measure active public spaces.

> *"Everyone has the right to live in a great place. More importantly, everyone has the right to contribute to making the place where they already live great."* - PPS President Fred Kent reflects on the inaugural Placemaking Leadership Council meeting (2013).

The next stage highlights the common and existing frameworks currently in place to assess the quality of public spaces and draws comparisons between three common frameworks to highlight the weaknesses and strengths of these existing frameworks that can contribute into the development process of the framework.

3.5 Better Public Spaces through Place-making

The process of place-making can turn the public spaces into a place with a sense of belonging to the community with more engagement and ownership, as well as ensuring that the design meets the function it was designed for. This can meet and fulfil the people's needs; this can be achieved through transparency from the bottom up (Project for Public SPACE 2012). The place-making agenda is a process that purposes to encourage people to engage and interact with each other in the place, in different ways than what traditional planning process does, which is based on the role of community more than experts.

In fact, the process of place-making asserts that the community is the only expert when it is about public places, due to the essential good local partnerships needed to create more dynamic public spaces, taking into account the health aspect (mental and physical) which can contribute to the city's overall well-being (Toolis 2017). Moreover, the Project for Public Space demonstrates that every place has different contents and different culture. The process of place-making needs to address the different characteristics of the place in terms of social, climate and, culture; for instance, what can work for South European cities

might not be able to work in North European cities. Anyway, each culture should use the method and approaches that best fit their needs.

3.6 Different Frameworks to assess the quality of public spaces.

Nowadays, assessing the quality of public spaces through the place-making agenda is important to identify the most important criteria to design active public spaces, and to enable the stockholders, urban designers and architects to plan further steps to improve the quality of public spaces, as well as enhance the role of the community (Wojnarowska 2016). A comparison between three well-known frameworks of assessing the quality of public spaces - (Green Flag Award, Project for Public Space, and Creating Successful Places) is a key element in this research to highlight their strengths and weaknesses and to redevelop a framework of active public spaces that takes into account these strengths and weaknesses.

3.6.1 Green Flag Award Framework

"Green space is often the one place that brings people from different backgrounds together, providing them with somewhere to meet and a chance to enjoy a healthy lifestyle" (Green Flag Award (2016). However, the Heritage Lottery Fund and the State of the UK's Public Parks published a report that illustrates that the number of regular visitors to parks in the UK is 34 million (Heritage Lottery Fund 2015).

The Green Flag Award is a vision to create public spaces by understanding the significance of green elements for the community in terms of health and wellbeing of the citizen. The accessibility element to the good quality of public spaces is important; it leads to an increase in mental health matters and reducing the feeling of isolation from the society where they live. Regarding these issues, the Green Flag Award supports the organizations to advance public spaces quality (Award 2016).

a. Green Flag Award Aims.

Katharine Ellicott (2016) illustrated the aims of the Green Flag Award as follow:

1- Everyone has the right to access quality public spaces as well as promote them with more healthy and livable life.
2- Well-managed public spaces to meet the needs of the users and their community that can enhance the sense of belonging to their community.

3- Good management of the public spaces by creating standards to manage the sites, as well as providing and enhancing better practice in these places.
4- Enhance rewards to the hard workers during the design process or management on the site for all managers, staff and volunteers.

b. The concept of the Green Flag Award

In fact, the most attractive and popular public spaces illustrate that they have been designed and managed well with the clear idea of what these places are designed for, and who they serve. The assessment process starts in the Green Flag Award by Award applicants who are examined on their understanding and awareness against 27 criteria about assessing the quality of public spaces, their active management plans, and their knowledge on three levels (users, site, management):

The users: Understand the users of the place, classification of the users, user's needs, the process of inviting the users and the community to get involved in the shaping their place and the management.

The site: The history and image of the place, soft and hard landscape, both physical and social and elements, and what these places try to achieve.

The management: Clear future development plan, safe and welcoming place based on the policy and legislation, and well maintained.

The Green Flag Award competition is based on the framework shown below in Figure 8 to assess the quality of the green parks in the UK against 27 criteria. The framework was designed as a guide for the experts and the community to apply these criteria in the assessment of their places. which can help them in shaping their future strategies in terms of the design and management of the place. This aim was to create guidelines to assess the quality of public spaces and, to encourage people to gather in the public spaces where the community has the role to manage and design these places.

c. The relevance of the Green Flag Award today

Currently, everyone has equal rights to access the public spaces which have relation to healthy living around the world, particularly the impacts on mental health and people's stress. For instance, experts illustrate the significance of natural play and freedom to play

for children, as well as the benefit of outdoor activities particularly for the children in terms of physiological development.

d. Assessment Criteria

A successful park in the Green Flag Award competition is illustrated through the assessment process of the quality of public spaces according to the framework below in relation to three levels (users, site, management). The Green Flag Award assessment criteria are listed below, Figure 8 concentrate on merely on design criteria.

SECTION 1: A WELCOMING PLACE	
This section recognises the culmination of everything done well. A welcoming place is one that invites and draws people into it. This means creating a space which, through its visual appearance, range of facilities, standards of maintenance and ease of access, makes people feel that they are in a cared-for place.	1. Welcome 2. Good and Safe Access 3. Signage 5. Equal Access for All
SECTION 2: HEALTHY, SAFE AND SECURE	
This section looks at how well managers understand their users' needs, encouraging them to enjoy healthy activities using appropriate, safe-to-use facilities and activities, and to feel personally safe and secure.	5. Appropriate Provision of Quality Facilities and Activities 6. Safe Equipment and Facilities 7. Personal Security 8. Control of Dogs/Dog Fouling
SECTION 3: WELL MAINTAINED AND CLEAN	
For aesthetic as well as health and safety reasons, issues of cleanliness and maintenance must be addressed, in particular: + litter and other waste management issues must be adequately dealt with; + grounds, buildings, equipment and other features must be well maintained; + policies on litter, vandalism and maintenance should be in place, in practice, and regularly reviewed	9. Litter and Waste Management 10. Horticultural Maintenance 11. Arboricultural Maintenance 12. Building and Infrastructure Maintenance 13. Equipment Maintenance
SECTION 4: ENVIRONMENTAL MANAGEMENT	
This section seeks to ensure that the way the site is managed has a positive impact on the environment, locally and globally, both now and for the future. Where choices can be made for future procurement, landscaping or buildings, they should aim to minimise energy and resource consumption and waste, and design in benefits to the local and global environment. Policies should seek to eliminate the use of peat and chemicals to control pests and as fertilisers. Horticultural and arboricultural decisions should reflect an understanding of the impacts of climate change.	14. Managing Environmental Impact 15. Waste Minimisation 16. Chemical Use 17. Peat Use 18. Climate Change Adaption Strategies
SECTION 5: BIODIVERSITY, LANDSCAPE AND HERITAGE	
Attention should be paid to the appropriate management and conservation of natural features, wildlife and flora; landscape features; and buildings and structures. Their particular character and requirements should be identified and appropriate management strategies put in place to conserve and enhance them.	19. Management of Natural Features, Wild Fauna and Flora 20. Conservation of Landscape Features 21. Conservation of Buildings and Structures
SECTION 6: COMMUNITY INVOLVEMENT	
This section examines the extent to which the managing organisation: + understands the community it seeks to serve; + actively and appropriately involves members of the community in making decisions about the site's development; + provides opportunities for active participation in site projects; and + ensures that there is appropriate provision of recreational facilities and activities for all sectors of the community.	22. Community Involvement in Management and Development 23. Appropriate Provision for Community
SECTION 7: MARKETING AND COMMUNICATION	
This section seeks to examine the ways that managers understand the key benefits of the site and how they use this information to promote it appropriately. They should understand who the main user groups are, could be or should be, and use a fitting range of interpretation and engagement techniques to communicate with them. This basis ensures that appropriate facilities, events and activities can be offered and most effectively promoted, and forms a solid foundation for development now and in the future.	24. Marketing and Promotion 25. Appropriate Information Channels 26. Appropriate Educational and Interpretational Information
SECTION 8: MANAGEMENT	
This section evaluates how well the management plan is implemented on site.	27. Implementation of Management Plan

Figure 8: Green Flag Award Criteria
Source: Framework to assess the quality of green parks (The Green Flag Award guidance manual).

3.6.2 Creating Successful Places framework

The Berkeley Group (2014) p.3 stated: *"We need to build a lot more homes in Britain, urgently. However, you cannot separate this issue from the social question of what kind of places we want to create. The physical and social fabric of a community are inextricably linked"* (The Berkeley Group, 2014) P.3.

The National Planning Policy Framework has raised a fundamental concern to the Berkeley Group about the social dimension in designing new housing projects and clarifying the benefits of social sustainability to the society. The Berkeley Group Institution worked with Tim Dixon, Professorial Chair in Sustainable Futures in the Built Environment at the University of Reading and Social Life to develop a framework to assess and measure the quality of social sustainability of new housing and mixed-use developments.

This framework is based on social sustainability and provides criteria to design new housing and mixed-use developments. Creating a successful place framework is judged against 13 criteria which have been created through drawing attention to the role of communities and users of the place, such as social contact with neighbours, accessibility, safety and fear of safety, identity and the ability to influence. These deal more with the physical layout of the design element and the sociability of the society (The Berkeley Group 2014).

The "Creating Successful Places" framework has been evaluated in four different places in order to measure and assess the quality of active public spaces and their performance. Two of these development projects are in London city centre, the Empire Square located in Bermondsey, and Imperial Wharf located in Fulham; the third is a suburban site, The Hamptons located in Worcester Park, and the fourth public spaces, Knowle Village was located in a semi-rural area near Portsmouth in Hampshire.

a. The framework

The framework is divided into three main categories as shown in Figure 9 and 10 below containing 13 criteria:

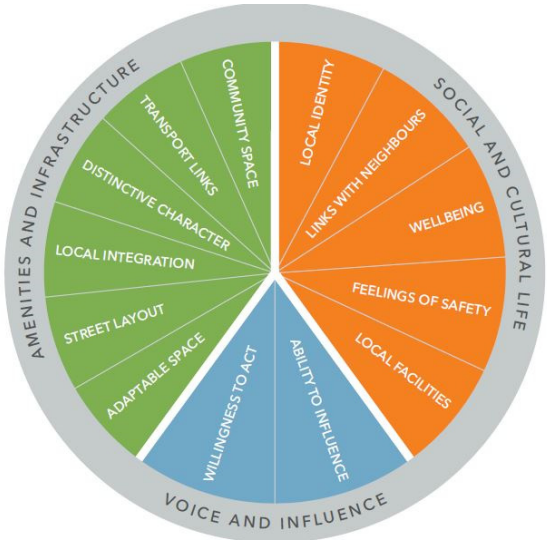


Figure 9: Creating a successful places framework
Source: Creating a successful place, A toolkit, Berkeley Group (2015)

Social and Cultural Life

1: Local identity

This is about creating a place where people feel like they belong and where they hope to stay.

- Invest in activities and services, not just infrastructure.
- Research and reflect local history in your plans, and do a cultural survey.
- Use local identity as focus for activities that bring people together, such as street naming.
- Design facilities and services that encourage people to identify with the area, and link existing neighbourhoods with new development.

2: Links with neighbours

This is about creating a place where people know their neighbours and trust each other.

- If you can encourage social interaction and social networks locally, this is strongly linked with lower crime rates and higher life satisfaction.
- Start by asking what would help people get on here: what would prompt people to stop and talk to their neighbours? Could you borrow things or ask for help?
- Design streets and squares so that they can be used as social and play spaces, not just a thoroughfare; think about the design and use of street furniture and benches, for example.
- Invest in neighbourhood projects which both new and existing residents will use, like a sports or social club, or a way for people to connect online.

3: Wellbeing

This is about people's day to day experience living on the development and their life satisfaction.

- Wellbeing is linked to people's satisfaction with their home and the local neighbourhood.
- Particularly strong evidence links the experience of knowing your neighbours, and of spending time outside, with higher levels of wellbeing.
- So think about investing in regular, formal events which establish a way for people to get to know each other (and raise the profile of a new development).
- Gardening in private or communal spaces also encourages informal day to day contact; you can support this with everything from window boxes and tools to allotments and clubs.

4: Feelings of safety

This is about whether crime is low and residents feel safe both during the day and at night.

- People's perceptions of crime are often different from actual crime, so it is just as important to make people feel safe (through lighting, for example) as to reduce actual levels of crime.
- Consider using bay windows and balconies to create natural surveillance.
- Ensure public space is properly overlooked and likely to be well populated.
- Avoid leaving indeterminate spaces which do not have a clear purpose.
- Create safe and interesting spaces specifically for young people: it supports them positively as well as reassuring others.

5: Local facilities

This is about having access to the facilities people need for health, education and a social life.

- Think about what is available to people of all ages, from children to grandparents; and take more time upfront to talk to people, understand the location and what residents want.
- Locate new facilities where the greatest number of existing and new residents can access them easily (even if this is on the edge of a new development).
- Facilities for eight to twelve year olds may be just as important as play space for toddlers.
- Consider the scope for co-design, involving residents directly in deciding what should be provided and how a facility should look and work.

Voice and Influence

6: Willingness to act

This is about creating a community in which people work together to manage and improve the neighbourhood.

- Community action often only happens when things go wrong. Instead of waiting for people to complain or campaign, proactively encourage involvement around positive issues or events.
- Set up governance structures early on which involve a broad, diverse spectrum of people, using a wide range of media.
- Control the process and agenda less, so there is genuine scope and reason for people to act.
- Make it clear where to go to if there is a problem - or an opportunity.

7: Ability to influence

This is about whether people feel they can really affect decisions about their neighbourhood, if they choose to get involved.

- Create a range of mechanisms that allow residents to have a voice - not just one association dominated by a single group or an individual with their own agenda.
- This can include formal channels (parishes, neighbourhood forums) and informal channels (frequent contact with managing agents and making sure people know their local councillor).
- Think seriously about giving the community control of some local assets - this is one of the founding Garden City principles.
- And always get the basics right - immaculate customer care while you are on site and highly responsive services, acting promptly on any issues people raise.

Amenities and Infrastructure

8: Community space

This is about the design and management of public space and providing community facilities when it is appropriate.

- Audit what already exists in the local area: shops, parks, schools, pubs and play space.
- Invest in community space early on - not at the tail end of development - even if it is in a temporary location or building.
- Create multi-functional public space and think through how people will use it in practice because of desire lines, sun-paths and to run events.
- Put the right management arrangements in place.

9: Transport links

This is about helping people travel easily and sustainably.

- Provide a range of transport options that help people travel easily to work, to school and to local facilities, and give residents information about them regularly.
- Encourage cycling - with bike paths and convenient storage space.
- Make walking a safe and obvious option - with direct footpaths and good signposting.
- Consider ways to maximise the number of homes built a short walk away from good public transport.
- Create enough parking in the right place for cars.

10: Distinctive character

This is about creating a place that feels unique.

- Distinctiveness is dependant on the relationship with the wider area.
- In places where the existing character is strong, it could make sense to reflect the local vernacular.
- In places where the existing character is bland or weak, there will be more opportunities to create a different look and encourage a greater sense of identity and belonging.
- Character can come from any combination of materials, heights, frontages, street layout and landscape design.
- It can also vary within large developments, which helps orientation and a sense of belonging.

11: Local integration

This is about connections to the surrounding area and ways to encourage social interaction.

- Use good urban design to ensure new and existing places connect to one another.
- Encourage different social groups to use the same space, regardless of their housing type or tenure.
- Think about facilities that can be used by people of different ages and by people living outside the development in the local area, such as public squares, sports facilities or a local shop.
- These can operate comfortably alongside private space or private clubs that you have to pay for.
- This helps new developments integrate into existing neighbourhoods and increases trust and perceptions of safety.

12: Street layout

This is about creating places that are easy to move around and navigate.

- Streets should be created by the position of the buildings, not the road.
- Design a place that is walkable, and give equal priority to pedestrians, cars and cyclists.
- The layout should allow people to move easily between the different spaces on a development.
- It should work well for people with disabilities and for parents with buggies.
- And allow people cycling and walking to share the same space.

13: Adaptable space

This is about creating public space that can be used flexibly now and could change easily in future.

- Design spaces that can be used for more than one purpose now.
- Often it means thinking about finishes and boundary treatments; could you install a marquee or let a service vehicle in, for instance?
- There might be scope for temporary uses or meanwhile space, during the development process.
- Looking ahead, the resident profile is bound to change, along with technology and the way we live; could the space also evolve and adapt to different lifestyles and demands?

Figure 10: Creating a Successful place Framework Criteria
Source: Creating a successful place, A toolkit, Berkeley Group 2015

3.6.3 Project for Public Space

Active Public spaces are those places where different types of events are held, social cohesion occurs, friend and families meet and spend time together, and culture mix. When these places are designed and work well, they serve the community and our public lives.

The Project for Public Space evaluated thousands of public spaces around the world, and raised the question of *what makes some places succeed while others fail?* It illustrated that to make place successful, place should match and be measured based on the following four categories: (i) Place is Accessible, make sure visitors are engaging in activities in the place, (ii) Comfort of the place (iii) Image of the place, and (iv) Sociability in the place. Figure 11 shows the framework of what makes a successful place.

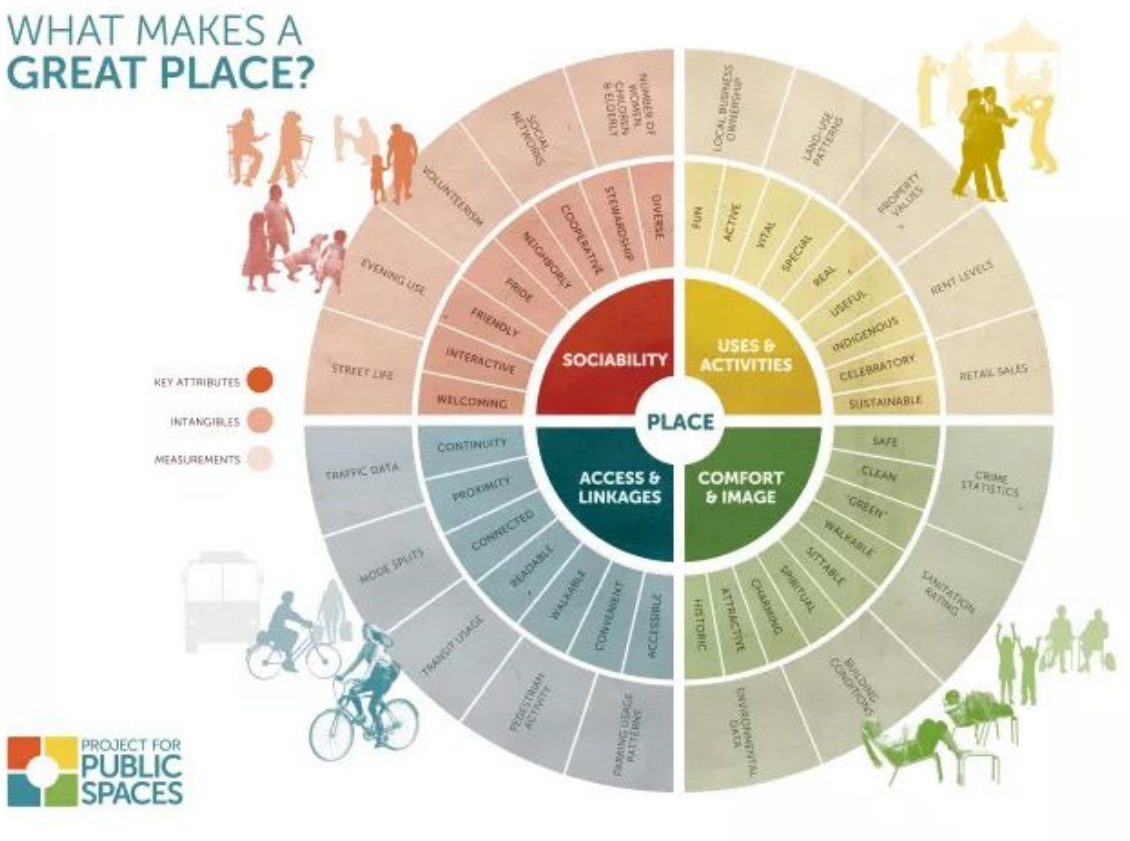


Figure 11: What makes a successful place?
Source: Taken from Project for Public Spaces (2014)

The PPS divided their diagram to assess and evaluate the quality of public spaces into three rings. In the first ring, there are four main categories. The diagram is divided into three rings and it can be measured if the place is a fail or success based on the main four categories in the first ring. In the second round is a number of criteria to judge and assess the quality of public spaces (qualitative aspects). The third ring illustrates the quantitative

aspects which can be measured through statistics or research (Project for Public Space 2014).

a- ***Access & Linkage:*** Accessibility in the place can be measured by its connection to the surroundings, both physical and visual connections.
b- ***Comfort & Image:*** Comfort is much more about perceptions of safety, cleanliness, and the availability of places to sit.
c- ***Use & Activities:*** Having something to do in the places enhances visitors to gather in the place and increase frequent visits. If public spaces are without activities, people tend to not visit the place and create empty spaces.
d- ***Sociability:*** When people meet their friends and communicate with their neighbours, as well as interact with strangers, that will lead to increase their sense of belonging to the place (Crabill 2009).

3.6.4 Comparative analysis of the existing frameworks

For a long time, the concern over assessing the quality of public spaces drew the attention of urban designers, architects, planners; the guarantee of designing active place was significant to develop a method that can achieve the aim of development projects. Lynch's (1972) essay 'The Openness of Open Space' and Lynch and Carr (1979) 'Open Space: Freedom and Control' highlighted the importance of the accessibility in public spaces, as well as the sociability particularly in providing the opportunity for more social contact between the people specially with strangers in the public spaces for more social and better place. Moreover, Whyte (1980) set guidelines in urban public spaces study which was approved by the New York City Planning Department and became more common knowledge for urban designers and architects to assess the quality of public spaces.

Many countries and organisations around the world have been working to develop a framework to measure and assess the active public spaces to lead the urbanisation agenda to achieve a better level of sustainability. However, the aim of this investigation is to draw a comparison between the most common frameworks which leads to a discussion about the main outcomes that been concluded in the review stage. Further, it is important to highlight and understand the overlap and differences between these frameworks in order to figure out the ability to apply such frameworks in a different place around the world. This, in turn, can create a strong foundation for 'successful place' through understanding their strengths and weaknesses to propose a new and effective framework to assess the quality

of public spaces in Nottingham city. The discussion focuses on the design aspect categories and criteria.

a. Categories and Criteria

Table 1 below demonstrates the main categories of the three frameworks. As shown in the table the Project for Public space framework has four main categories with 33 criteria, Creating a successful place framework has three main categories and 13 criteria, while the Green Flag Award Framework Assessment has eight categories with 27 criteria. The comparative analysis concentrate on merely the design criteria.

Table 1: Comparison between three existing frameworks

<table>
<tr><th>Project for Public Space Framework</th><th>Creating a successful place Framework</th><th>Green flag framework</th></tr>
<tr><td>Sociability (8 criteria)
A support community to enhance social interaction in the place</td><td>Social and Cultural Life (5 criteria).
It is about creating a relationship between culture and perception of people in the place</td><td>Community Involvement (2 criteria)
Dealing with management and involve a member of the community is making a decision about the site’s development.</td></tr>
<tr><td>Access & Linkages (7 criteria)
Accessibility in the place can be measured by its connection to the surroundings, both physical and visual connections</td><td rowspan="3">Amenities and Infrastructure (6 criteria)
Categories have merged between the comfort of the place and the infrastructure,</td><td>A welcoming place (4 criteria)
Creating space through its visual appearance, and ease of access.</td></tr>
<tr><td>Comfort & Image (9 criteria)
Comfort is much more about perceptions of safety, cleanliness and the availability of places to sit</td><td>Environment Management (5 criteria)
This category focuses on the relationship between site management and its impact on the environment. Providing trees and plants in the site can impact on climate change.</td></tr>
<tr><td>Biodiversity, Landscape and heritage
This category focuses on the green element, natural element, landscape element and their criteria that need to be identified.</td></tr>
<tr><td>Use & Activities (9 criteria)
Having something to do in the places enhance visitors gather in the place and visit it again. People tend to not visit a public place without activities, and space will be empty.</td><td>Creating a successful place framework
Has one criterion related to use and activities but in the amenities and infrastructure category
Adaptable space (this category is about how the place is flexible and can be used as mixed-used for today function and can be changed for a different function in future).</td><td>Health, safe and secure (4 criteria)
This category focuses on the level of management of the site that meets the user’s needs enhances people to enjoy and practice a healthy activity, enjoy safe-to-use facilities and activities, and to increase the safe feeling.</td></tr>
<tr><td>Four main categories
33 criteria</td><td>Three main categories
13 criteria</td><td>Eight main categories
27 criteria</td></tr>
</table>

Figure 12 below illustrates that the PPS framework places more emphasis on Use & activities and Comfort & image (9 criteria) and Sociability (8 criteria), and less on Access & Linkages (7 criteria). In general, all categories have almost the same number of criteria which means that all categories have almost the same weight in shaping the public spaces.

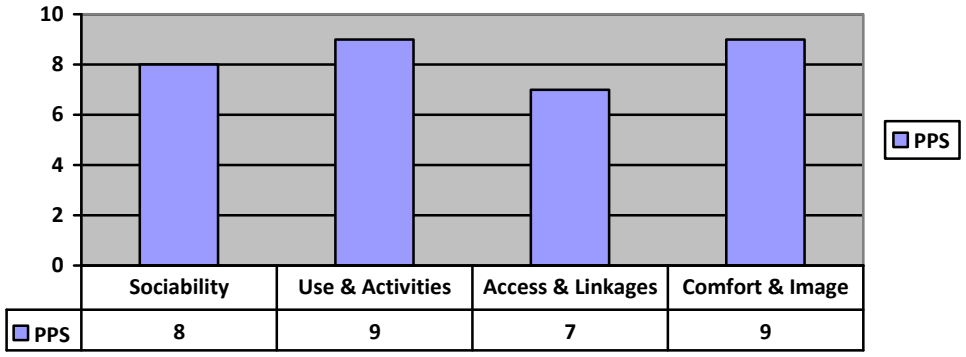


Figure 12: The main categories of the PPS framework with their criteria

The Green Flag Award Framework has eight categories; the two most significant categories are Well Maintained and Clean, and Environment Management which deals more with the impact of the image of the place and the comfort of the users in terms of climate. Meanwhile, Welcome Place, which is more about accessibility in the place and Sociability (healthy, safe and secure category) are both considered important categories with four criteria.

The Green Flag Award framework shows a number of categories compared with other frameworks, as there is an overlap in a number of criteria as shown in Figure 13 below.

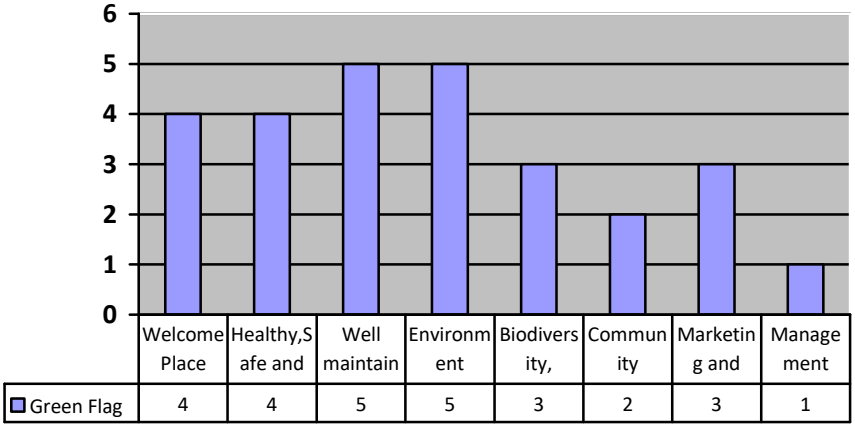


Figure 13: Green Flag Award framework

Creating successful places, on the other hand, considered Amenities and infrastructure as the most important category with 6 criteria, Social and cultural life category is the second most important category with 5 criteria, while the lowest number of criteria (2) belongs to the voice and influence category, see Figure 14 below.

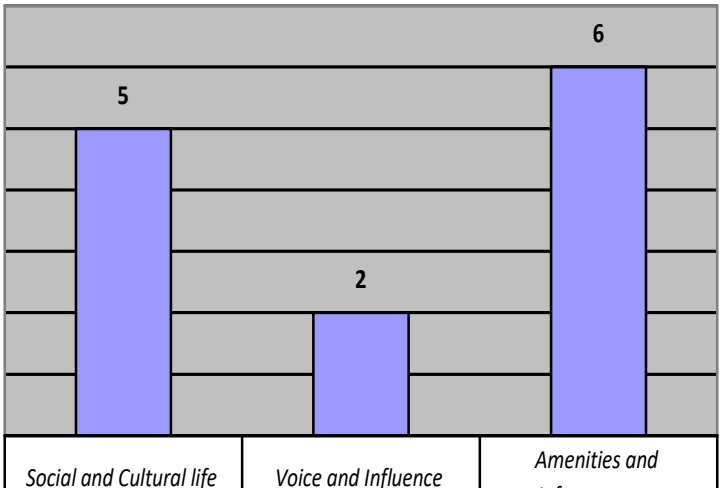


Figure 14: Creating a Successful Places framework

3.7 The rationale for the research.

Through this research, the quality of public spaces assessment raised the attention and the significant role that needs to be addressed to design a better place (Mehta 2014b). In fact, in recent times, the design of active public spaces and the place-making agenda have become an important topic for urban designers, architects and, planners. This trend emerged from applying the principle of sustainability with the increase in the quality of life (Wojnarowska 2016).

The most common and internationally well-known frameworks, (Project for Public Space framework, Creating Successful Places framework, Green Flag Award Criteria), were discussed above. These three frameworks show different tools and methods for public spaces quality assessment in the design aspect, as discussed above. The review section illustrates that there are a number of differences between the three frameworks such as the number of main categories and their criteria numbers, as well as the fact that some frameworks have weak points in covering the most effective elements that can affect the satisfaction of the users of the place.

For instance, the Project for Public Space (PPS) has four main categories; Creating Successful Places has three main categories, and the Green Flag Award has eight main categories. Furthermore, each framework concentrates on different elements and different aspects while ignoring other effective elements; at the same time, some frameworks

overlap in some criteria, but the difference is these criteria are considered in different categories.

In conclusion, although the researcher has argued that these three well-known frameworks have weaknesses and strengths, the most significant and common strength is considering the topic of the quality of public spaces in an urban area. For instance, the frameworks concentrate more on the environment element and their impact on the comfort of the users in the place as well as taking into account the issue of climate change and green infrastructure. Furthermore, the three frameworks have a more common focus such as the sociability and accessibility; and the frameworks illustrated the same interest in their strategies.

In contrast, the comparative critical analysis of the three frameworks above demonstrates a number of weak points. One of these weaknesses is the failure to address the user's perception of the place and how they feel; none of the frameworks concentrates on the mental health and well-being of the users. The "Creating a Successful Place" framework mentioned wellbeing as one criterion under the social and cultural life category (The Berkeley Group 2014), as well as ignoring the role of technology in shaping our place. The Project for Public Space framework mentions the social networks in the sociability category as new communication media, such as Facebook and Twitter. These social media are creating cyberspace for people to meet. Moreover, none of these three frameworks did take into account the effect of technology such as (Wi-Fi) on the physical layout of the place in real life. This research investigates which criteria can make public spaces active, taking into account the communication and media technologies.

Additionally, these common and well-known frameworks come from different countries, which have been applied and tested throughout the United Kingdom, the United States of America, and Europe. The above comparative analysis between the three existing frameworks highlighted the strengths and weaknesses in each of these frameworks, as well as suggesting new criteria that need to be addressed to assess active public spaces. To conclude the comparative analysis, the research will build on this analysis and develop a new framework to assess and measure active public spaces. The new framework will be designed based on the strong points of these common frameworks and will concentrate just on the design aspect of the public spaces, as discussed in Chapter One. The purpose of the new framework (list of criteria) is to construct an effective framework that can be applied in the UK. Its purpose is to concentrate on the quality of public spaces assessment that

meets user's needs and involves the community role in designing better place, including aspects of wellbeing and mental health that are incorporated into the framework as one of the main categories. The next section highlights the role of well-being in designing active public spaces and points out the criteria that can affect the quality of public spaces.

3.8 Wellbeing and quality of the place

The Commission for Architecture and the Built Environment (CABE) p.4 has recognised the relationship between mental well-being and high quality of the physical environment. which indicates the need for a new planning approach to consider the effect of the physical environment on mental wellbeing and the health; "Evidence increasingly suggests that the wider environment can reduce stress, encourage exercise and promote good health". The World Health Organization (WHO) (2006) identified the relationship between wellbeing and health as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity".

The users of the urban spaces experience two different realms, one is the *physical* realm which considers the tangible, material aspects of the built environment that can be touched, shaped and altered. The second is the *emotional* realm which considers less tangible aspect such as, people's perceptions of urban paces which are neglected in the design process, because of the clear impact of the physical realm. The emotional realm deals much more with the users of the place and how they communicate with each other, and with the surrounding area, as well as their sense of belonging to the community. Urban designer and planners must take into account the two realms to create urban spaces that contribute to a better quality of life and positive effect on the mental wellbeing (Adams 2013).

The quality of the physical environment plays an important role in mental capital and learning through life. Rachel Cooper et al (2008) identified the effect of the physical environment on mental wellbeing. For example, living in a poor quality physical environment has a negative impact on residents' mental wellbeing, while moving to a better physical environment has a positive impact. Moreover, living in an accessible place, with visual connection and strong links nature can have a positive effect on mental well-being, particularly for the elderly. However, negative perceptions of fear of crime and safety and some other issues such as noise, overcrowding, temperature, pollution, and high density can cause more stress and less social contact.

3.8.1 Defining well-being

In fact, there is no clear explanation of wellbeing and it often been used as a general definition for the quality of life (Dodge et al. 2012). The definition of wellbeing has considerable ambiguity. For instance, life satisfaction, quality of life, and happiness are terms that have been used as the definition of well-being (Allin 2007). Many definitions of wellbeing describe it as a dynamic process. For example, the New Economic Foundation (NEF) defined well-being as a dynamic process, which provides the people with a sense of how their lives are going. This sense generates through the interaction between the activities they participate in, their circumstances and mental capital.

> *"Mental wellbeing: a dynamic state in which the individual is able to develop their potential, work productively and creatively, build a strong and positive relationship with others, and contribute to their community. It is enhanced when an individual is able to fulfil their personal and social goal and achieve a sense of purpose in society." (*Cooper, Boyko & Codinhoto 2009)

Wellbeing can fall into two broad approaches in order to measure it: objective and subjective measures. It has been agreed that both categories are important. The first category is the objective measures which provide assumptions of individuals' needs and then clarify indicators for the evaluation of how far these needs have been achieved. The indicators of objective measures normally assess and cover three main areas:

Environment: air pollution, water quality.
Economic: GDP and household income
Quality of life: life expectancy, crime rates, educational attainment

Actually, an objective measure has been used for many years to assess well-being, but increasingly, the importance of including the subjective measures to measure wellbeing has been raised (Guillen-Royo & Velazco 2005). Moreover, subjective measures are based on asking people to evaluate their own well-being. In fact, in 2011 The New Economics Foundation pointed out that the only way to evaluate people's satisfaction and know if they are happy or not is by asking them. Furthermore, there are three broad approaches to measuring subjective well-being (evaluative, experience and eudemonic), while subjective measures allow for differences in people's values and preferences and are less paternalistic than objective measures. The three broad approaches are not subjective due to the fact that

people are self-reported, because of the question structure that asks an individual to evaluate and rate their feeling (Tinkler & Hicks 2011).

3.8.2 User's Experience of public spaces and Wellbeing

The users of public spaces experience two realms, the physical realm and emotional realm, these realms are related to each other and due to this interconnection, planners and urban designers should include them to create better public spaces that have a positive impact on the health and mental wellbeing of place users. (Adams 2013).

The green element is another criterion for creating public spaces that can impact a positive on the well-being of the users. It refers to "the combined structure, position, connectivity and types of green spaces which together enable the delivery of multiple benefits as goods and services" (Forest Research 2010). A study conducted in Amsterdam by Chiesura (2004) explored the significance of the green element for the people's wellbeing. The result of the survey was that Relaxation is the greatest motivation to visit the place. Another study was conducted in the Peace Garden in Sheffield to clarify the importance of the green element to relieve stress from the users of public spaces. The study confirmed the link between the wellbeing benefit and green public spaces (McClimens et al. 2012). Meanwhile, Rachel Cooper and colleagues (2008) documented that natural areas and environment can contribute to a positive impact on learning and mental capital.

Additional studies highlighted more criteria that can contribute to the health and well-being; these include accessibility, and that views on the natural element from the physical environment can enhance the positive impact on wellbeing by reducing the mental issues and stress (Kaplan 2001; van den Berg et al. 2003). Moreover, access to art, cultural and leisure amenities promote happiness, has a positive impact on wellbeing and increases social contact and community cohesion (Guetzkow 2002). Furthermore, green urban spaces are important for social cohesion and to enhance interaction between users, often leading to developing social ties (Huang 2006; Völker et al. 2007).

Other scholars identified several factors that can contribute to health and wellbeing. Safety criteria, feeling safe and walking around the public spaces during the day and at night can lead to happiness, stress relief and increase social connections with the community, which are considered powerful drivers of wellbeing (Leyden et al. 2011; Florida et al. 2013). Other studies also identified the influence of microclimate conditions such as (airflow, temperature, pollution, and solar radiation) in the wellbeing of the users of public spaces.

A comfortable thermal environment can encourage people to spend more time out in public spaces (Sharifi & Boland 2017). Meanwhile, providing people somewhere to chill can lead to more social contact between the users of the place, moreover, the calm place can contribute to less feelings of worry which increases people's desire to become involved in social activities that occur in the place (McClimens et al. 2012).

Physical outdoor activities often involve several types of activity in public spaces, such as walking and, socialising with other people in the place. Each activity has a positive impact on wellbeing and health. Walking activity is a peaceful experience and offers benefits for elderly people (Godbey 2009).

"*There is evidence that mental health may improve by the regular the practice of physical activities*" (Gomes et al. 2010).

The literature review has highlighted several factors that affect health and wellbeing with public spaces quality. Emerging from the user' experience and wellbeing is a central feature in terms of delivering a sense of mental wellbeing through designing a high quality of public spaces.

3.9 Conclusion

The literature review suggests that the physical and functional attributes of public spaces can affect the level of enjoyment, the social element in the place, feeling of safety and security, as well as the comfortability in terms of climatic change and level of security in the place. The development of public spaces should be based on social cohesion and, therefore, public spaces must promote environments that can foster the sociability element and increase community cohesion. Public spaces should satisfy the users' needs such as comfort, relaxation, passive and active engagement and fulfil the need for mystery and discovery.

Furthermore, the literature demonstrates many criteria that affect the social life and liveability of public spaces. Measuring well-being is key to understanding people's satisfaction. Most of the frameworks of active places did not consider well-being as the main factor to measure the satisfaction of users. This current research, however, considers well-being as a key element of measuring and assessing the success of public spaces. Urban designers, architects and, planners need to be more aware of and knowledgeable about these topics, as well as the vital need to apply these theories to their designs. The

review has informed the methodological approach development and structured the questions that have been used in the questionnaire presented in chapter five.

The summary of this chapter presents a list of criteria to measure and assess the quality of public spaces considering wellbeing as one of the categories. Table 2 illustrates the list of criteria for active public spaces.

Table 2: List of Criteria of Active Public Spaces

Categories	Criteria	Description	Applicability (Relationship with urban context)
Use & Activities	Active (Dynamically)	The more activities that are going on a place, the more people have an opportunity to participate in them.	Physical activity (Local Business Ownership)
	Vitality	A place that is well-used in relation to its predominant function(s). the most appropriate mix of use	Land-use patterns
	Usefully	Well-planned public space has a positive impact on the rent level of nearby properties	Rent Level
	Integration	How activities can come together form a unified space	Mix use
	Functionally	A place that functions well at all times	Rating public life Mixed-use of land
Identity & Image	Liveability	Liveable place reduces crime assault	Crime Statistics
	Safety	Somewhere that feels safe from harm	
	Walkability	A measure of how friendly is an area for walking	
	Sittability	The place provides people with the opportunity to stop and sit	Physical Layout (Furniture)
	Hygiene	The place is clean and free of litter (Waste Receptacles)	
	Aesthetics	Study of art and beauty of the place	Local culture or history
	Reflectively	Showing the history image of the place	
	Attractively	The way environment information can attract and gather people in the place	Environment Data
	Historically	Archived data of environment can give a clear image of the place	
Access & connectivity	Continuity	Continuing data processed for the purpose of the conveyance of a communication on an electronic communications network	Traffic Data
	Visibility	How people can get the information they need easily	
	Proximity	How accurate timing foreground information regarding traffic	
	Connectivity	How well different places are connected to each other using the transport system. If trains, buses and highways work more efficiently then the level of connectivity improves	Transportation Info (Mode Splits)
	Readability	The readability of the transportation schedule	Transit Usage
	Walkability	Activities in the street encourage people to enjoy their walking	Pedestrian Activity
	Convenient	Type of activities that suit people needs in the place	
	Accessibility	Providing different types of parking and how a place can be reached by users. A place that is easy to get to and move through	Parking Usage Patterns
Wellbeing	Calm	Feeling less worry; increase being part of social activities in the place	Social interaction
	Chill	Somewhere to chill out and have an opportunity for social contact	
	Accessibility	Getting access to art, cultural and leisure amenities promote happiness.	
	Safety	Feeling safe, walking around the place day and night and feeling socially connected with the community	
	Peaceful	Peaceful experience of the activities for elderly people	Physical outdoor activities
	Relax	Evaluate the satisfaction of physical exercise in the place	
	Green	Greener urban area displays more positive indicators of mental health which are associated with the physical activity level that will increase the sense of belonging	Community belonging
	functionality	The impact of art (such as dance, drama, music, visual arts) on mental health	Physical Environment
Sociability	Diversity	The use of place diversity of age and different groups in the place	Number of Women, Children, Elderly
	Stewardship	Providing each group's need in the place	
	Pride	Getting involved in social activities	Voluntarism
	Encouragement	Motivate people to contribute to knowledge between each other	Sharing Knowledge
	Friendly	Those places that ARE well used and loved by users	Evening Use
	Interactive	Multi-use of the place can gather people and make the place liveable	
	Welcoming	A place where anyone has a right to be in	Street Life
	Communal	Shared by all members of a community; for common use	Community (Ethnical Origin)
	Mix / Mixture	A mix of different diverse community groups in the place	

This list will be furthermore refined in chapter five (Users' experience and the quality of public spaces).

Chapter Four: Research Methodology

4.1 Introduction

This chapter describes the methods and tools applied to collect the necessary data in this research on assessing the quality of public spaces. Chapter four consists of sections that explain the research methodology.

4.2 Research Framework

The research investigation for any study is based on many factors, however, the most important factor, is the research methodology. Remenyi et al (2009) have described the research methodology as a general approach to sorting out a problem that been considered as an element in the process of the research, starting from the theoretical aspect to the data collection and analysis stages. Furthermore, Collis and Hussey (2003) point out that the research methodology is considered as all the procedures that have been used to conduct the research. The research methodology concentrates on the problem that any researcher face to investigate and achieve the research objectives and aims, and those methodologies are different from one study to another. Each research needs to choose the most suitable methodology that can respond to the research questions and research objectives. While other researchers may recommend that the research investigation may concentrate on qualitative or quantitative frameworks to respond to requirements (Sarantakos 2013). Other research investigations require more information and data to be collected; therefore a mixed methodology is more suitable to be applied. This mixed-methodology approach is considered best suited to the current research. Sapsford (2007) p.175 stated that "The methodological framework is guided by a research process that follows a step-by-step development alongside research tools and procedures to be adapted into the research".

In fact, a better understanding of the project can be achieved by providing a clear explanation for the theoretical and ideological aspects of the research, which creates a better research design through providing a clear basis followed by discussion and the outcomes analysis (Sarantakos 2013). Positivism is considered as a philosophical theory pointing out the positive knowledge related to the natural phenomena. As the positive knowledge content of two strategy approaches, the first approach is experimental and the second approach is non-experimental. On the other hand, phenomenology contains three approaches (case study, ethnographic study, grounded theory study). In addition, the research methodology can include the research strategy, research method and, research

philosophy. Figure 15 below demonstrates the research onion that has been applied in this research.

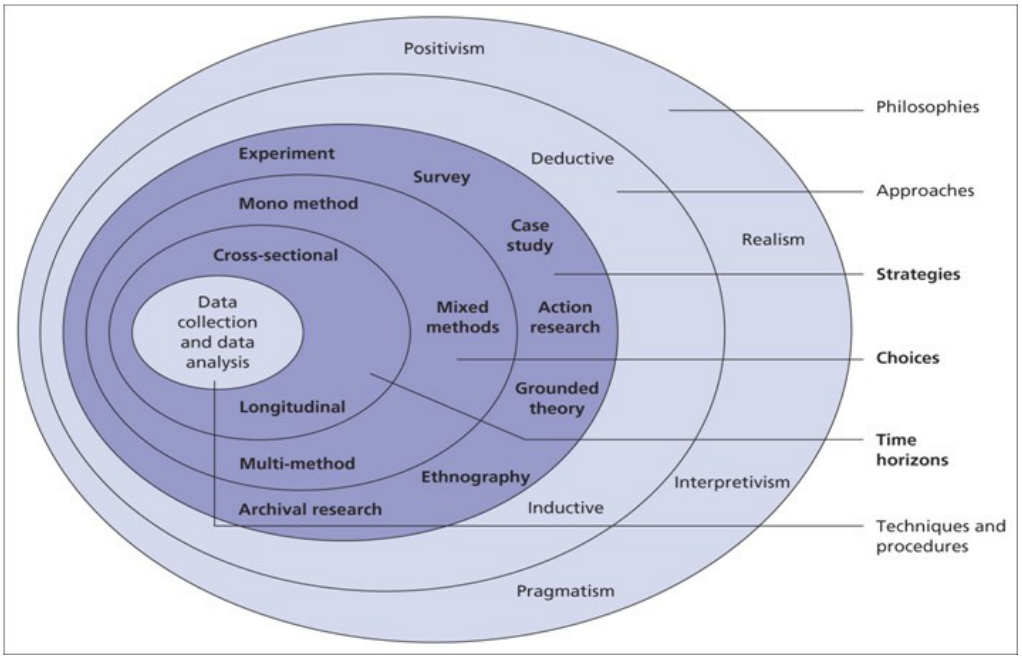


Figure 15: Research onion
Source: (Saunders et al. 2007) p.138

Figure 15 illustrates the flow in the process and the link between the research stages, Here, all the research methodology levels are connected and informed by each other; the research methods are supplied by the research strategy; and the research strategy has been informed by the research approach, while the research approach has been constructed by the philosophy of the research. Consequently, the research onion by Saunders et al. (2007) identified that the philosophy of the research summarises the research theoretical aspect (Keraminiyage et al. 2005). In addition, based on the same principle, the research approach demonstrates how theory can be applied to respond to the research questions, while the research strategy is assessed and purposed to sort out the research problems, for instance, mixed methods, case study, and so on (Creswell 2013; Johnson & Onwuegbuzie 2004). Finally, the research method is considered as a method or tool to collect data through the research strategy to achieve the aim (Sarantakos 2013).

4.3 Research Philosophy

The research area has diversity in terms of different factors. The diversity between the epistemology and ontology lead to clarify which methodology to controls the research. In fact, methodologies follow a theoretical structure with different epistemology and ontology prescriptions, which cause to produce different research designs. Epistemology and ontology impact the structure of methodology which guide the selection of the research

design (Sarantakos, 2005, pg.29). Social research has been affected by which methodology will guide the research in terms of the structure and organisation. This effect is known as the philosophy of science study (Machamer and Silberstein, 2002).

Crotty (1998) defined philosophy as the investigation of the truth, the knowledge's elements of being a component of a specific area (Crotty, 1998). The selection can be from one of these aspects, metaphysical, moral or natural. The concentrate on the general issues, more or less on the branch of the study. Furthermore, Grix and Creswell illustrate the elements, methods on how the research can be conducted (Grix, 2001; Creswell, 2003). that will give a clear explanation of the methods principles, hypotheses and theory that been selected and used in the research. Moreover, this will lead to better understanding the questions of the scholar's research, also techniques and methods which adopted, and also the outcomes or finding are more likely to be determined in these theories (Van De Ven and Johnson, 2006).

4.3.1 Ontology: Nature of Reality

Research methodology guided by ontology, based on the nature of reality. It illustrates the theory of life (Sarantakos, 2005, pg.23). The Ontology is a theory which is linked to what is known to build reality (Grix, 2001). The aim of ontology is to address questions and link them to objects which are existing or the ones possible postulated to exist, in addition, classify the objects or subdivision based on relationship and differences. (Grix, 2001; Hay, 2002, pg.3). Ontological assumptions alone that respond to questions in relation to what type of reality exists. Which type of political and social reality to be studied? (Guba and Lincoln, 2005). In fact, ontology is divided into two main aspects, subjectivism and objectivism.

Subjectivism: is about a social experience that is improved through the resulting activities of social groups concerned with their presence. It is described as "understanding the connotations that individuals assign to social events" (Saunders et al., 2009).

Objectivism: is much more about the existence of social objects that free of social actors. It shows that social objects are having an important truth apart from those common actors related to their life (Crotty, 1998).

4.3.2 Epistemology

Epistemology demonstrates "an ability to interpret and justify the philosophy that how we know what we know" (Crotty, 2003). Moreover, epistemology is known as the study of understanding or a rational theory that defines the validity of knowledge (Daymon and Holloway, 2011). Epistemology is divided into three types of philosophies; positivist, realist and interpretivism. (Saunders et al. 2012) as follow:

- ***Positivism Philosophy:*** the practices of the environmental scientist are more likely to be adopted by the researcher, taking into account the theoretical perspective. "Researcher[s] choose to perform in an evident group reality in order to deliver the end product such as principles like generalisations parallel to those delivered by the natural experts" (Remenyi et al., 1998).

- ***Interpretivism Philosophy:*** the difference between human as a factor in the sociability, the significant idea for the researcher to identify the differences between humans as social actors which raise the need to be studied. This highlight the importance of studying the people, not focus on objects such as machines and vehicles. (Saunders et al., 2009).

However, epistemology gives attention to understand the interpretive beliefs more than the outcome of the positivist stance from several conclusion of researchers in the disciplines architecture and urban planning area.

4.4 Methodology: Systematic Manner to Solve Problem

Crotty (2003, pg.45) defines methodology as "the plan of action, the approach, design or process behind the preference and application of certain techniques and in order to obtain the desired milestones, the research is likely to integrate the use of techniques with the preferences". The research work has been conducted by applying one of the three methodologies choices, based on the relevant literature review: qualitative, quantitative or mixed methods, which are explained below:

- **Qualitative Research:** defined as "the research in which the contents and interviews are explored in order to determine important samples so that a specific event can be illustrated significantly" (Auerbach and Silverstein, 2003).

- **Quantitative Research:** it is d described as a technique or strategy that the research significantly concentrates around figures and facts rather than unfolding the connotation (Thomas, 2003).

- **Mixed Methods Research:** the combination of both qualitative and quantitative techniques to be applied together in one study, moreover, Mixed Methods is known as the 'Triangulation' method. Gill and Johnson (2002) describe the application of two or more research methods (qualitative and quantitative) as a triangulation technique in research.

In fact, through the explanation and review above that the methodology philosophy selecting triangulation technique or mixed methods (qualitative and quantitative) which the most suitable technique to be adopted in this research work. Table 3 below

recommends that epistemology, ontology and methodology have the same nature and structure into paradigms which, together with methodologies, create the domain which the research work conducted (Patton, 1990).

Table 3: Theoretical structure of the research

	Addresses	Positivism	Symbolic Interactionism, Phenomenology and Feminism.
Ontology	The nature of reality ASKS: What is the nature of reality? Is it objective (out there), constructed, subjective? OR BETTER: What does research focus on?	Realism/Objectivism	Constructivism
Epistemology	The nature of knowledge ASKS: How do we know what we know? What is the way in which reality is known to us? OR BETTER: What kind of knowledge is research looking for?	Empiricism	Interpretivism
Methodology	The nature of research design and methods ASKS: How do we gain knowledge about the world? OR BETTER: How is research constructed and conducted?	Quantitative	Qualitative
Research	The execution of research designs	Fixed Design	Fixed/Flexible Design

Source: Sarantakos, 2005, pg. 30

4.5 Research Approaches

Researchers applied diverse tools and methods to undertake a comprehensive analysis of data collected. Many studies on assessing the quality of public spaces and placemaking are mostly achieved through photographs and recordings (Rishbeth 2010). Moreover, Woolle and Rose (2004) raised the fact that there are a number of approaches to landscape and urban design of the public squares, three of which are applied in this research. The first of the three approaches concentrate on the quality of physical layout of the public spaces; the second approach related to the social components and their relation to the quality of physical layout and the third approach related to the image and attractiveness of the place. Most of the studies nowadays concentrate on the quality of public spaces because of the significance of the provision for people to spend more leisure time. Therefore, these studies that focus on the quality of public spaces end up with recommendations related to the quality of public spaces, which will support planners and urban designers to create a better place for people to use.

How to measure active public spaces and, which criteria can make better public spaces are the main subjects of this research, which is about *assessing the quality of the public spaces in the design aspect*. The research employes mixed methods to identify the criteria that make active place. However, Gehl (2011) used a questionnaire survey and interviews to analyse which criteria best attract people to interact in the public spaces. This study chose to follow Gehl's methodology which is a more suitable method to provide a clear understanding of how to measure active public spaces.

Mixed methods are adopted in this research as a research strategy. Mixed methods research is considered as a mix of qualitative and qualitative techniques to answer the research question (Johnson & Onwuegbuzie 2004) p.17.

In this research, the significance of the site observation is to understand density patterns and pedestrians' behaviour. This can help to assess different criteria that make public spaces better (Stephen Carr et al. 1992). The quantitative approach used the online questionnaire survey to target the users of public spaces in the City of Nottingham in the second iteration with the results from the literature review of which criteria can make public spaces active. The qualitative approach used the Delphi method as the third iteration, targeting experts to enrich and develop the list of the criteria. Experts were asked to develop and agree on the list of criteria and give weight to the final list of criteria to clarify which criteria are the most important and least important. Figure 16 illustrates the research methodology.

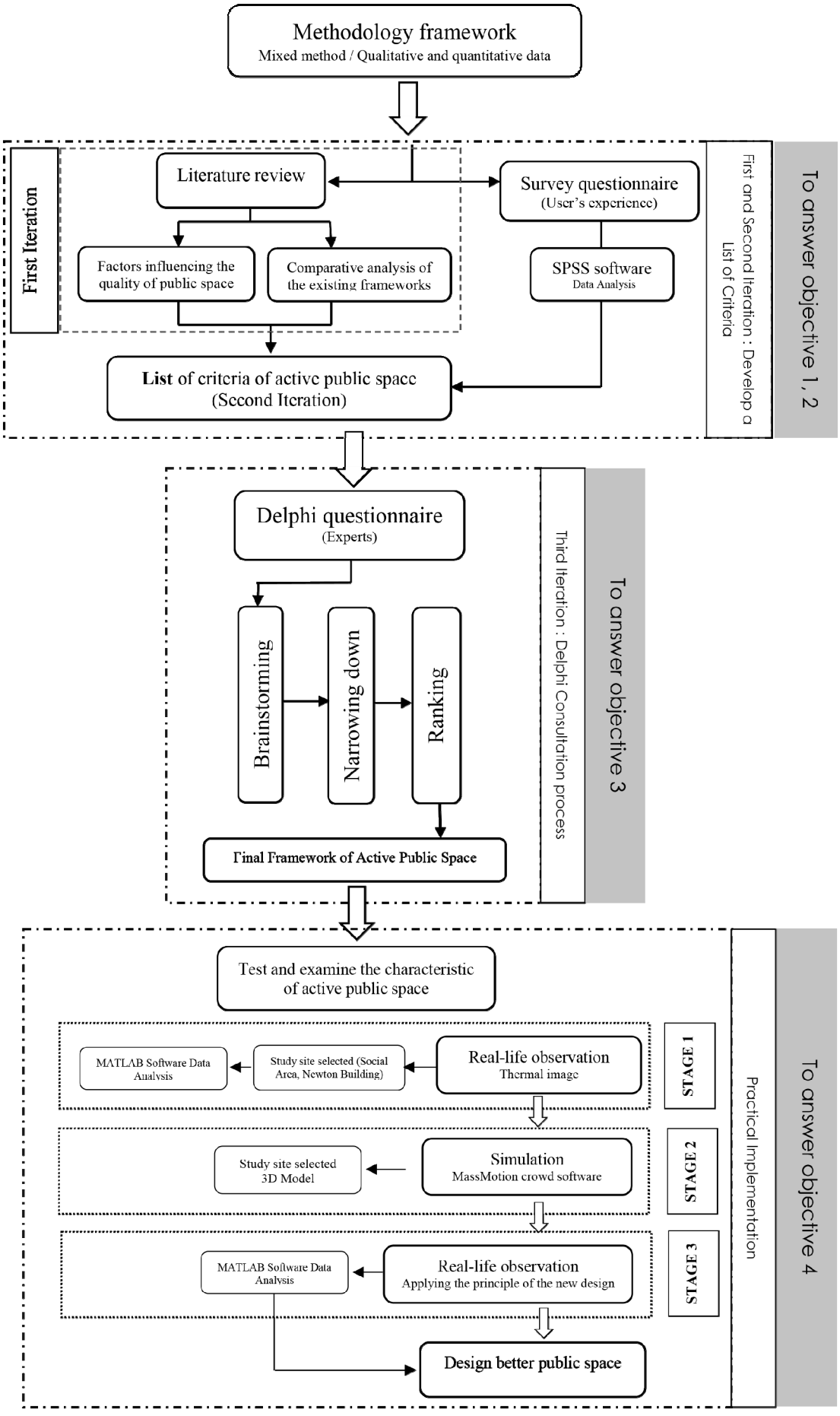


Figure 16: Methodology framework

4.6 The selection of the site

One of the research objectives is to test and examine the framework of active public space as well as indicators and benchmarks for measuring active implementation. Criteria from the framework were selected based on their level of importance according to the outcomes from the Delphi consultation process. The target site (semi-public space) is located in the city campus of Nottingham Trent University in the city of Nottingham; the site in the heart of the Newton building, as shown in Figure 17 below. Designer Hopkins Architects (2009) illustrate the design concept of the project, the redevelopment of the 1877 Arkwright Building and 1950 Newton Building which has created a vibrant new social heart for the city-centre campus. The project was based on the concept of merging the historical with modern to provide extensive renovation and modernisation of inefficient and incoherent spaces.

Figure 17: Social area (Target site)
Source: Hopkins Architects Website, 2017

Hopkins Architects (2009) state that the design idea of Newton Building is to create a link between two building to provide a new main entrance and gateway for the surrounding communities, additionally to provide space for social and teaching spaces opening onto a covered central court and linked buildings. The social spaces will be used for experimentation in this research to measure the density and pedestrian movement. Redundant engineering workshops defining the large central forum space were redesigned to promote more interaction between students and visitors that flows into space at all levels.

Figure 18: a Social area in use
Source: Hopkins Architects Website, 2017

The target site (Social Space) in Newton Building provides users with a place where they can have their lunch, drink coffee, meet their friends, and relax. The social space is surrounding with different facilities such as a café and, Santander bank, and the Student Services Centre is also conveniently located there. Figure 18 above presents the social area in use. Furthermore, the place has resource rooms available for PC use, and the place has light and airy central hub, so the users can enjoy the sun and get fresh air without leaving the building. (Nottingham Trent University 2016). In addition, different social events, exhibitions, cultural celebrations and, international showcases, which are open to public and surrounding communities to attend, are taking place in the social space.

Figure 19: International Showcase in the social area
Source: NTU Website 2016

Figure 20: Cultural celebrations in the social area
Source: NTU Website 2016

4.6.1 Regeneration project for Arkwright and Newton buildings

Nottingham Trent University has created a vibrant new social area for the city campus. The project of redeveloping both the 1877 Arkwright and 1950 Newton buildings created a good connection between the two buildings as shown in Figure 21 below. The new regeneration project of the Newton and Arkwright buildings provided a mix of traditional and modern architecture, liveable spaces, and more social activities. The Grade II listed

Newton and Arkwright's buildings are different in terms of their shape and the structure (Nottingham Trent University 2016).

This project involved the alteration and sympathetic refurbishment of two buildings to provide modern teaching and academic space for the users. In fact, this redevelopment takes into account the long-term future of both buildings as well as providing a new heart to the city centre university campus, by redeveloping the space between Arkwright Building and Newton Building to provide a new main entrance to the University opening onto a covered central court and link building (Fernandez 2011).

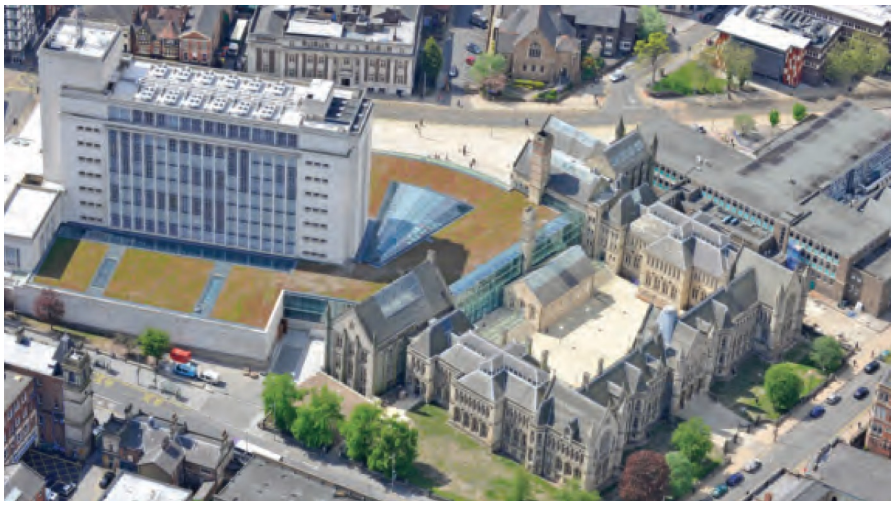


Figure 21: Picture from above for Newton and Arkwright buildings
Source: Nottingham Trent University Website (2017)

The Arkwright and Newton buildings are considered two of the best-known landmarks in the city of Nottingham and are also well known for their influence on the cultural, social and educational life that shapes the city of Nottingham. The buildings were built in a different era and they represent a different era of architectural character as well as their role in higher education. The idea that both buildings can work together was never intended; only their historical side was originally looked at.

In 2005, Nottingham Trent University began a comprehensive regeneration project to upgrade much of its estate. The city centre campus is identified as a landmark as shown in the master plan in the city centre. The benefit of this transfer encouraged a new cultural quarter. The University aimed to make the campus more accessible, welcoming, and inclusive to local people, as well as enhancing the role of the community to be part of the activities in the city centre campus. Because of these needs of the University and the community as a whole, and the intention to create a modern cultural quarter, existing circulation and building maintenance problems had to be resolved (Fernandez 2011).

Fernandez (2011) highlighted that the changes had to be sensitively detailed so as to keep the traditional character of the Arkwright Building, and to provide the city campus with the new main entrance. In fact, linking the two building was a big challenge to the design team. As both buildings have different levels, providing convenient access between both, and improving navigation around Arkwright had to be addressed.

The Newton and Arkwright buildings are two of the most famous and best-known buildings as landmarks in the city centre of Nottingham, as both buildings have played a significant role in creating the education identity of the city as well as its cultural and social life. Figure 22 below demonstrates the design concept of Newton and Arkwright Buildings Project (Nottingham Trent University 2016).

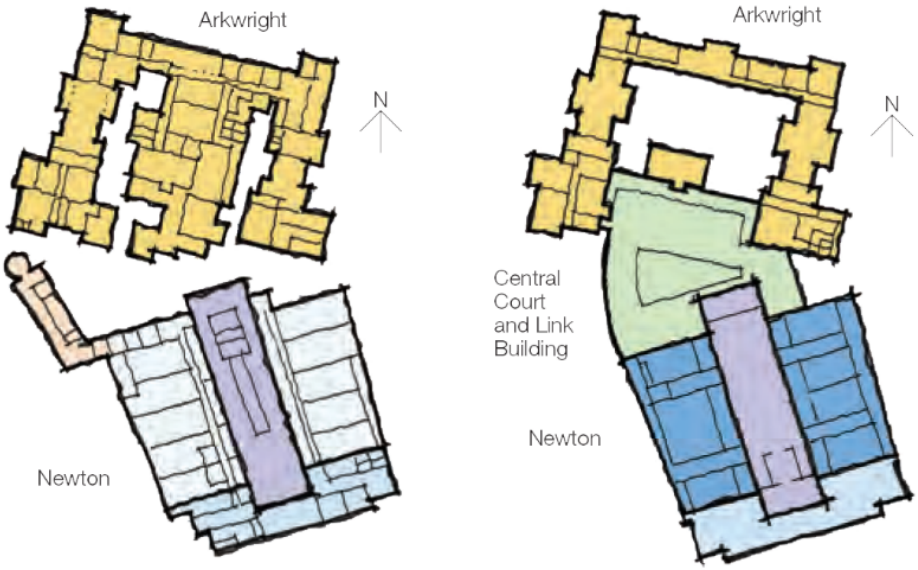


Figure 22: Design concept of Newton and Arkwright Buildings project
Source: Arup Journal (2011)

a. Arkwright Building

The first foundation stone was laid in 1877, and the construction to complete the buildings ran between 1877 and 1881 with an elaborate Gothic design of gables, arches and pinnacles. In the past, the Arkwright Building was used for University College Nottingham, also the building had been used as the city library and a natural history museum (Nottingham Trent University 2016).

In fact, the Arkwright Building was opened in 1881. In the beginning, the building faced some issues during the first two years. In fact, part of the Arkwright Building was founded on soft fill material, which caused movement and significant cracking. This problem caused the building to close in 1883, and it did not re-open until 1890. The building has

been reconstructed due to the damage it sustained during the Second World War on the north-west corner (Fernandez 2011).

Hopkins (2017) illustrated that the new regeneration included demolition and substantial modification of the building as well as external and internal changes to provide a new space. The central area as a secure semi-public open space where different events and recreation were held had some major problems between the two buildings. English Heritage had given their advice about an element within Arkwright's central wing; that the Chemistry building needed to be built as a free-standing structure.

The lecture theatre was accommodated instead of another part of the central wing of the Arkwright Building, and demolition of this exposed the gable wall immediately behind Arkwright's north-facing principle entrance and thus facing south into the new Quadrangle. The gable wall had to be incorporating reclaimed arches from the demolished buildings (Fernandez 2011).

Meanwhile the other parts of the wings the front, west and east wings had all non-original accretions and historical internal removed, with the materials salvaged and re-used for elevation alterations and repairs. The issue of different levels between both buildings was addressed by installing new staircases and lifts in order to develop the accessibility in the project (Fernandez 2011). Arkwright Building was refurbished as a new centre for NTU administration offices.

b. Newton Building

The neighbouring Newton Building was added in 1956-8 as part of the expansion of what by then was the Nottingham and District Technical College. The Newton Building at that time was an example of mid-twenty-century architecture and was the tallest building in Nottingham. HRH Princess Alexandra of Kent opened the building in 1958 (Nottingham Trent University 2016).

There were concerns about the redevelopment of these two historic landmarks and the main challenge was to create successful and sustainable architecture solutions which take into account the historical side of both buildings including the modern architectural principal in layout design and the facilities. The project has ended up with buildings that respect the historical side of the two building and promote sustainable design that meets the forward-thinking ethos of the university (Hopkins 2017).

The Newton Building was constructed in the 1950s. The building was constructed of the steel-framed tower with white stone, while the Arkwright Building is approximately 100 years older than the Newton Building and is of Victorian appearance, with an ornate masonry and fair-faced brickwork façade. Linking this individually distinctive structure together required a medium that would transcend from one to the other seamlessly. An in-situ fair-faced concrete frame fitted all the criteria needed to produce this link (Winner 2010).

The concept of the project is using the empty space between the two buildings to design a place that attracts and gathers the surrounding society as well to convert the Arwrikgh and Newton buildings into landmarks in the city centre university campus. This approach was achieved through cooperation with English Heritage, and principal contractor Bowmer and Kirkland, to design a sustainable building addressing the environmental aspect (Nottingham Trent University 2016).

The purpose of creating an open space located in the central area of the Newton building, as the covered court, is to create space for more social cohesion and a teaching area for the users, as well as to promote continuous informal academic interaction. The project team occupied the two lower floors in Newton Building which were to become the lecture theatres and teaching rooms. Figure 23 below shows the basement floor of the Newton Building.

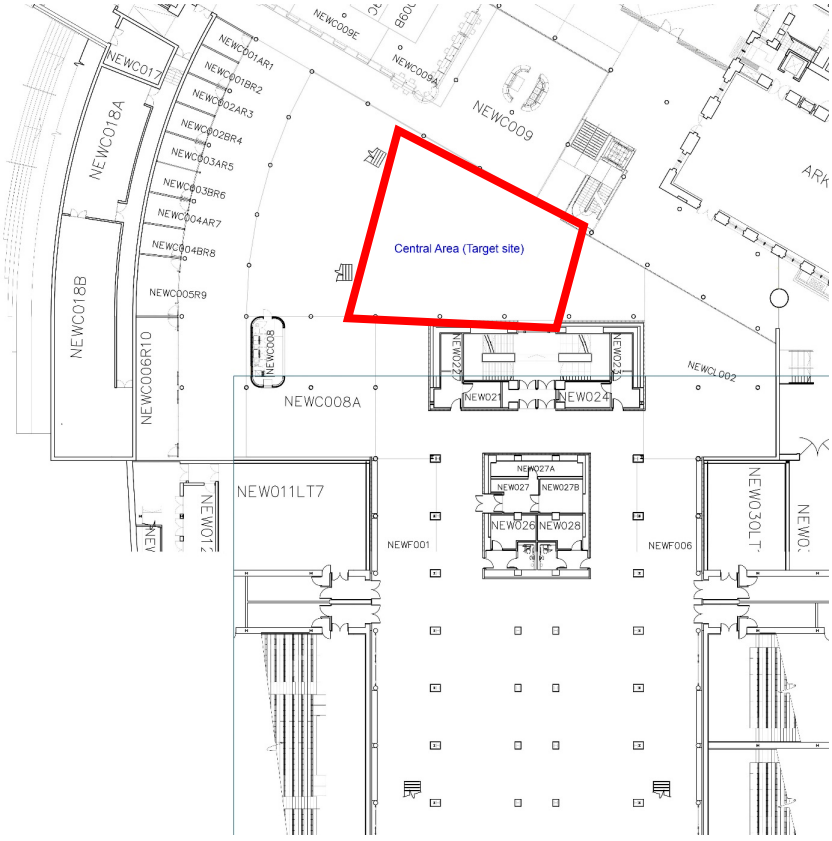


Figure 23: Basement floor of Newton Building
Source: Nottingham Trent University, IT Team (2017)

The upper levels have been reconfigured and extensively refurbished and refitted to address the building's inherent environmental problems and provide flexible spaces for teaching and academic offices. The existing basement and ground levels were also totally reconfigured.

Redundant engineering workshops formerly occupied these lower levels, but these barrel vault structures have been demolished and replaced with state-of-the-art lecture theatres adjoining new large central spaces, the Newton Forum. This is designed to promote informal academic interaction and study and flows at both levels into the new Central Court and Link Building, which occupies the area between Arkwright and Newton.

The researcher selected the social place (indoor semi-public spaces) due to its multicultural nature. He observed the users' behaviour within this indoor semi-public spaces and their engagement with each other in diverse activities. He observed the different age groups and gender attending the public spaces and spending more time during the events. Figure 19 and 20 demonstrate some of the celebrations and events held in the social area.

4.7 Data Collection

Research data can be collected and analysed by one of two main methods (Saunders & Lewis 2012) Secondary data are considered as the first method as they have flexibility in terms of accessibility and are easy to collect. Secondary data can be collected from books, articles, journals, newspaper and websites (secondary sources). Figure 24 illustrates this clearly. Meanwhile, primary data are the second form; these can be collected from interviews, surveys and questionnaires (see Figure 25).

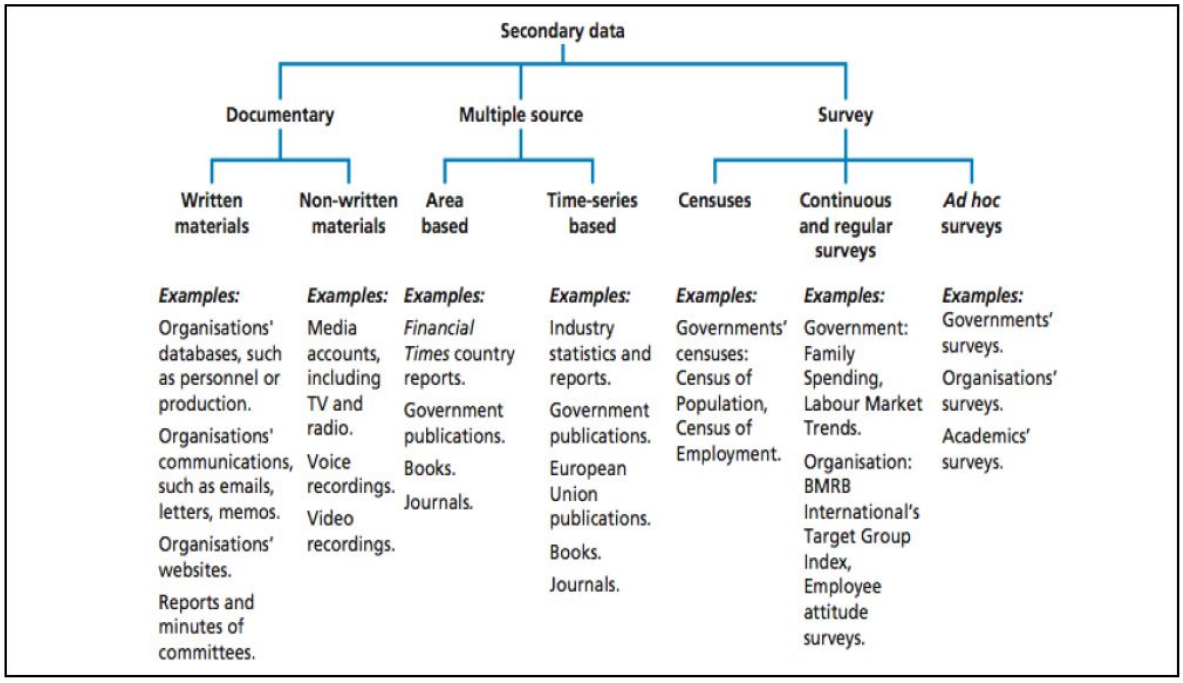


Figure 24: Secondary data and different technique to collect data
Source: Saunders and Lewis (2012; 259).

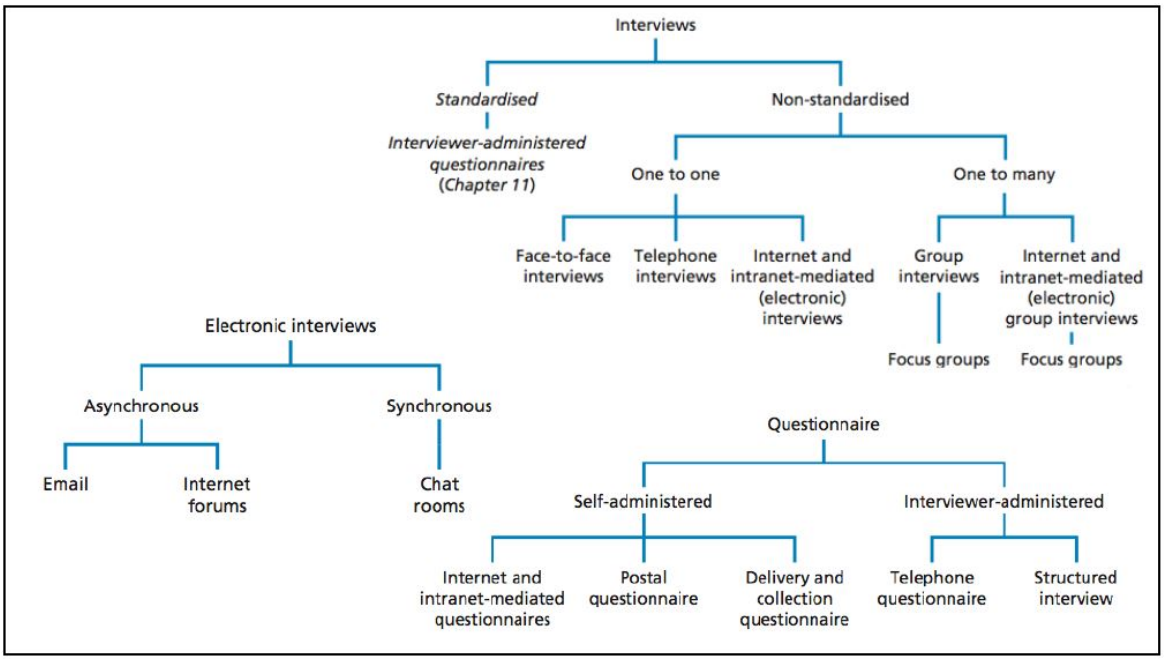


Figure 25: Primary data and different techniques to collect data
Source: Saunders and Lewis (2012:321).

The data collection method selected (secondary or primary) is based on the research aim and data availability (Naoum 2007). The primary data collection tool for this research is an online questionnaire.

4.7.1 Survey Questionnaires

The questionnaire was distributed in the city of Nottingham targeting users of public spaces. It was in the form of an online survey, and many users of public spaces in Nottingham city participated. The strategy of the chosen online survey is to enable

respondents to be more confident in terms of accessibility, the researcher did not face any difficulty with participants in terms of communication with them, and this is because the survey strategy was to provide participants with clear questions which were easy to answer.

The questionnaire (online survey) in this research is one of the main parts of the methodology. The survey was designed according to the output that was explored during the extensive review of previous studies. The aim of the survey is to find out the user's satisfaction in the public spaces, based on their experience, in order to achieve the objectives and aim of the research. The questionnaire is designed in two sections to answer the aim and the objectives of the study, these are:

Section 1: Information about your visiting public spaces in Nottingham city centre, which is much more about how many times you visit public spaces, how you travel to the public spaces, whether you visit the place alone or with a group, and which criteria make people more comfortable in the place.

Section 2: Participants' demographic information, connection to the city of Nottingham, age, gender, marital status, and occupation.

The content of the list of criteria to measure active public space was carefully designed based on the output from the literature review and comparative analysis of three existing and well-known frameworks of better place as the first iteration; while the second iteration involves data from the questionnaire (online survey) which targeted the users of public spaces to enrich the list of active public spaces. Moreover, the output of the questionnaire was analysed by using the SPSS software.

The online survey (questionnaire) contained a section related to the information about visiting public spaces in Nottingham city centre, such as how often do you visit public spaces and what do you usually do when you visit? How do you normally travel to public spaces? Finally, do you visit public spaces alone or with a group?. Thus, respondents are required to choose one answer from the provided list of multiple-choice questions or add a new answer if needed in the survey questionnaire. The questionnaire included a section about participants' demographic details such as gender, age, connection to the city centre, marital status and occupation. Thus, participants are required to answer questions by choosing.

The study only concentrated on which criteria make public spaces active in the design aspect. A total of 100 participants answered the questionnaire; there were no missing data, due to the structure of the questionnaire in, which all questions were required to be answering to complete the questionnaire. Google form website was used to design the online survey. the participant's sample was selected randomly. online questionnaire's link sent to different public online pages related to Nottingham city, furthermore, several public spaces in Nottingham city centre been visited to collect data from the users by using iPad and tablet during different days in a week and different times in a day. the online survey technique has been used to give the participants flexible access, so they can respond to the questionnaire from home or when they have free time, some participants asked for the questionnaire's link to participate when they have free time.

The aim of this research is to develop a framework to assess the quality of public spaces, due to the influence of the place-making in designing better public spaces, which based on enhancing the community and the users' engagement. The online survey asked the users of public spaces about which criteria make you visit public spaces in Nottingham city centre? The researcher's interest was to attract users of public spaces to participate in the survey.

The researcher joined a public spaces activities group to recruit more users to participate in the online survey; this action generated many participants who responded to the questionnaire. A brief background about the research topic was given to the users of public spaces in order to encourage more users to participate and to give a clear understanding of the survey questions. The survey was carried out online and a link to the questionnaire was sent to participants to respond while visiting the public spaces in Nottingham city centre. The researcher worked closely with participants and replied to their questions related to the study area and the online survey; he also expanded on the study area. Questionnaire data were collected at different times of the day, during weekdays and at the weekend.

This research investigates the users' perceptions of the public spaces in Nottingham city centre, regarding their experience in the place, socialisation and, accessibility aspects, and the image of the place. Use and activities categories were measured in the questionnaire. People evaluated the public spaces which provide a good place to interact between the users; participants expressed their knowledge based on their experience in the public spaces in the city of Nottingham, and participants provided the criteria that made them come to visit the public spaces in Nottingham city centre. The data from the survey

enriched the output from the literature review and further developed the list of criteria identified in the second iteration.

4.7.2 Observation

Observation is described in social sciences studies as methods to collect data of cultures, people and processes. The observation method is known as the hallmark of many research conducted in social science and other areas. “Observation is the systematic description of the events, behaviours, and artefacts of a social setting” (Marshall & Rossman, 1989, p. 79). It is been used in several times as a method to collect students opinion in the schools by teachers, also by social employees in the community, also by architect and psychologists to observe and record people’s behaviour (Kawulich, 2012).

Observation as a research method is divided into two types, Direct Observation (Structured observation) which involves observation of the target site without involving or interacting with people or objects in the target site (Kawulich, 2012). Furthermore, Saunders and Lewis define Direct observation as “is quantitative and is more concerned with the frequency of those actions”. (Saunders et al. 2009) p.288. While the second type of observation is the Participant observation which is involved and interacting with people or the objects is part of this process in the setting under study as both observer and participants (Kawulich, 2012). While Saunders and Lewis define the Participant Observation as “ is qualitative and derives from the work of social anthropology early in the twentieth century. Its emphasis is on discovering the meanings that people attach to their actions” (Saunders et al. 2009) p.288

The position of the researcher in the observation process is really important for the validity of the study. the quality of collected data and the reaction of those who are being observed, both of them are affected by how you position yourself in the research study. The main element of the Covert observation is those people or objects which are being observed are unaware of the observation process. However, there is the possibility of involving in the activity through the observation process can gain a better understanding of the site in some studies. On the other hand, it could be combined between both observation types being involved in the activity, participant observation may be in order. In any case, observe the surrounding area, give attention to the activities that occur in the place, and typing the notes of what you have learned in the setting will be a significant part of the data collecting process (Kawulich, 2012).

- ***Observational data from the perspective of the subject, not the researcher***

Nowadays, the idea of sharing videos or compiling them through the internet (social networks) becoming more popular between people. considering this way of publishing these data as method opens up a new area of observational research, as it provides information from the subject of the research, not from the researcher. As this type of data can be used to enhance and support the in-depth interview stage. For instance, the observation method illustrates the advantage and the role of technology to improve our ability to do observation in the research as a perfect example, which called a 'traditional' sense (Lee and Broderick 2007). Furthermore, Traditional observation based on how the researcher describes the events and activities in the target site when using video recording as a tool, as the researcher focus on how activities and events been recorded. The outcome is a partial record (the video) of a partial point of view of the reality (researcher observation). The combination of both methods the video diary and data recorded by the subject has a significant impact to improve the level of understanding of what is going on in the target site.

- ***Advantage and disadvantages of both types of observation method***

Participant observation has a number of advantages and disadvantages based on research's type and how this method been used to collect data. According to Saunders and Lewis (2009), p 299 demonstrates both of the advantages and disadvantage in table 4 below using participant observation technique in the social science study.

Table 4: Advantages and disadvantages of participants observation

Advantages	Disadvantages
• It is good at explaining 'what is going on' in particular social situations. • It heightens the researcher's awareness of significant social processes • It is particularly useful for researchers working within their own organisations • Some participant observation affords the opportunity for the researcher to the experience 'for real' the emotions of those who are being researched. • Virtually all data collected are useful	• It can be very time-consuming. • It can pose difficult ethical dilemmas for the researcher. • There can be high levels of role conflict for the researcher (e.g. 'colleague' versus researcher). • The closeness of the researcher to the situation being observed can lead to significant observer bias. • The participant-observer role is a very demanding one, to which not all researchers will be suited. • Access to organisations may be difficult. • Data recording is often very difficult for the researcher

Advantages and disadvantages of participant observation
Source: (Saunders et al. 2009) p.299

In fact, the structural observation provides the advantage of non-intrusiveness to the researchers and the reduce the possibility of affecting the people behaviour or the objects

in the target site. Furthermore, it mentioned the possibility of using webcam technology in the observation process, even though its uses are limited nowadays (Saunders et al. 2009). Table 5 below summarised the advantages and disadvantages of structural observation.

Table 5: Advantages and disadvantages of structural observation

Advantages
• It can be used by anyone after suitable training in the use of the measuring instrument. Therefore, you could delegate this extremely time-consuming task. In addition, structured observation may be carried out simultaneously in different locations. This would present the opportunity of comparison between locations. • It should yield highly reliable results by virtue of its replicability. We deal with threats to reliability on page 308 but suffice it to say here that the easier the observation instrument to use and understand, the more reliable the results will be. • Structured observation is capable of more than simply observing the frequency of events. It is also possible to record the relationship between events. For example, is the visit to the retail chemist's counter to present a prescription preceded by an examination of merchandise unrelated to the prescription transaction? • The method allows the collection of data at the time they occur in their natural setting. Therefore, there is no need to depend on 'second-hand' accounts of phenomena from respondents who put their own interpretation of events. • Structured observation secures information that most participants would ignore because to them it was too mundane or irrelevant.
Disadvantages
• The observer must be in the research setting when the phenomena under study are taking place. • Research results are limited to overt action or surface indicators from which the observer must make inferences. • Data are slow and expensive to collect.

Advantages and disadvantages of participant observation
Source: (Saunders et al. 2009) p.299

The observation method been used in this research to assess pedestrian behaviour and measure the density pedestrian movement in the target site, InfraRed camera used to record the target site, video records (collected data) used to understand the current situation of how people interact between each other and engaging with the surrounding physical environment in the first stage of the test and examine the character of active public space framework stage, the collected data been analysed by MATLAB software to measure the pedestrian movement density in the site, to identify the high-density area that attracts users to stay more time in the site. Both outcomes, quantitative and qualitative results provides a clear image and better understanding of how the place been used by the people and the level of interaction with the surrounding physical environment, these outcomes been used to develop the site in the next stage of the test and examine the characteristic active public space framework, by using a simulation method to design better public space. Again, the observation method used in this research, to assess and validate the new design of the public space, which the new principal of the new design of the target site been applied to the site, InfraRed camera used again to record the site again to assess and measure people behaviour and pedestrian movement density.

4.7.3 Simulation as a method

The simulation technique used as a method to collect data in this research, the logic behind using this method is to test and examine the character of the framework of better public space, (Series & Floridi, 2015) "Simulation modelling and analysis is a technique for improving or investigating process performance. It is a cost-effective method for evaluating the performance of resource allocation and alternative operating policies. It may also be used to evaluate the performance of capital equipment before investment. These benefits have resulted in simulation modelling and analysis projects in virtually every service and manufacturing sector (Series & Floridi, 2015).
In the social sciences studies, the concentrates or the target is always a dynamic entry, which changing over time and reflecting its environment which has both behaviour and structure. That means the simulation model should also be dynamic.

- ***Designing a model***

Each simulation model is simple sometimes a drastic simple of the target site to be modelled. the hardest stage in the designing process of the model is identifying the important and less important elements that need to be included. the more elements left out from this stage, the greater conceptual required between the outcomes from the simulation and their interpretation related to the target site. Moreover, the more elements or parameters included, the more need to measured or assessed, and each of them can affect the validity of the outcomes which are obtained. What is real hope is to have a model with a minimum number of expectations, but what applies as general as possible to many different circumstances. Overall, the level of accuracy in terms of the data points number and assumptions create the simulation model is really significant when the aim is a prediction, meanwhile the simplicity is significantly important when the aim is just to understand. (Axelrod 1997a). Simulation as a method.

the attraction is to create a simulation model with more detailed than what it supposed to be. Apart from the hard work of collecting data and inserting of a huge number of data points, there is a risk from adding the complexity to the model, which cause more complexity of dealing with analysis and validation stages to be carried out. Also, this can affect the valid outcomes which will be difficult to conduct from the research.
At another hand, starting from the continuum of inserting details and to abstract modelling, there is research on 'artificial societies'. which is a simulation process without relation with the real world. the aim of the study is the set of social reality, of which actually the

world that we live in is just one (Conte and Gilbert 1995). Fukuyama, Epstein and Axtell (1996: 4) write:

> *"We view artificial societies as laboratories, where we attempt to 'grow' certain social structures in the computer – or in silico – the aim being to discover fundamental local or micro-mechanisms that are sufficient to generate the macroscopic social structures and collective behaviours of interest".*

In fact, there are several packages for different styles of simulation to be used in social science research. In this research, the simulation method used to redesign the target site by taken into account the outcome of the observation of the current situation for the target site, MassMotion crowd pedestrian movement simulation software used to test and examine the characteristic of active place framework, and to redesign the target site to better public space, the design principles of the new design been applied to the site in the real life.

4.8 Research Design

The aim of this research is to develop a framework to measure active public spaces taking into account the new communication media and technologies developed in the twenty-first century, the researchers rely on the main research question, How can active public spaces be measured? that need to be addressed and to achieve the research objectives. The most important for any research is that the author(s) need to have a clear aim and objectives before designing the questionnaire for the research. (Mitra & Lankford 1999) Table 6 illustrates the aim, objectives, research questions, and the relationship between them.

Table 6: Relationship between aim, objectives, and research questions

Aim	Objectives	Question	
The aim is to develop a framework for measuring active public spaces by taking into account the new communication media and technologies development in the twenty-first century	1. To understand and critically analyse the concept of place and place-making agenda	1- What is the concept of public spaces in the digital era? 2-What are the most significant indicators and assessment tools used to measure the quality of public spaces? 3- What are the gaps in the current frameworks for assessing the quality of public spaces and how can these be improved?	**First Iteration**

	2. To analyse the role of digital technology in shaping the future of public spaces.	4-How new Communication media (the Internet) affects the future of public spaces?	**Second Iteration**
	3. Develop a set of criteria to assess and measure the quality of public spaces and propose a framework more adapted to the digital era;	5- How active public spaces can be measured and assessed?	**Third Iteration**
	4. To test and validate the characteristics of active public spaces, using real case scenario.		
	5. Summarise the research output and identify the areas of future research.		

As stated above, this research adopts a mixed-methods approach, whereby it collects data through quantitative and qualitative methods as recommended by (Creswell 2013; Meissner et al. 2011). This research investigates the experience of users in the public spaces and which criteria make them visit these places.

Yin (2009) defined the research design plan as "*a logical plan from getting from here to there, where here may be defined as the initial set of questions to be answered, and there is some set of conclusions (answers) about these questions*" (Yin 2009).

The research design plan is considered a guideline for the research, which highlights how the study can be conducted (Thomas 2003). However, Gill and Johnson (2002) discussed the point that the *" research design provides a blueprint that enables the researcher to structure a research problem in such a way that the outcome is the production of valid, objective and replicable answers*" (Gill & Johnson 2002).

Regarding this research, the plan of research design is based on three phases; the first phase is a much more theoretical stage that, concentrates on the criteria that make public spaces fail or succeed by comparing the different existing frameworks of active public spaces to address the research gap. Furthermore, the questionnaire was distributed in the first phase to investigate the users' opinions regarding their experience in the public spaces in the city of Nottingham, as well as the criteria that make them visit the public spaces. The output of both the literature review and the questionnaire was used to do the second iteration to create a list of criteria of active public spaces.

The second phase of the research used Delphi method technique to enrich the output of the second iteration and continue developing the list of active public spaces, in cooperation with experts (architects, planners, social and more). The sample consists of 40 experts, who answered questionnaires in rounds. The aim of this stage is to evaluate and validate the proposed framework of active public spaces. After each round, the researcher summarised the experts' responses from the previous round including their explanations based on the experts' opinions. Thus, participants responses, during this process believed that there will be more narrowing to the agreed answers. Finally, the number of rounds in the Delphi technique is based on pre-defined stop criteria such as consensus achievement between responses, stability results, and median scores or mean of the final rounds after achieving consensus between expert's responses to identify the outcome of the characteristics of active public spaces. The results of the Delphi technique survey are discussed later in the third iteration section.

The purpose of this phase is to develop a set of criteria to assess and measure the quality of public spaces using the Delphi method technique. The discussion was held with a number of experts to enrich the list of criteria, as well as to investigate the weight of each criterion to identify which criteria are most important and which are less important.

The third phase is the practical implementation stage; the main purpose of this phase is to test and examine the final framework of active public spaces, which were built up based on the three iterations in the first and second phases. The practical implementation is based on using different methods to assess and measure the quality of public spaces to achieve better design. The methodology used to test and examine the characteristics of active public space framework is based on three stages. The first stage is based on observation of the current situation of the target site (social area-Newton Building at Nottingham Trent University campus), to understand people's behaviour and measure and monitor the people's density movement by using an *infrared camera*. The infra-red camera was set up in the main (social) area in the Newton Building at Nottingham Trent University (city campus) as a case study in the research. The camera was fixed at a high position and far from the crowd, to ensure that the users' characteristics could not be identified. The collected data were analysed by using the Matlab software.

The aim of the second stage is to redesign the current situation of the site for a better place based on the results from the first stage. This redesign process used *MassMotion* pedestrian simulation software to assess pedestrian movement and measure the density of people in

the place to inform the design of a better place. The outcome of this simulation was applied again in a real-life setting. The physical layout of the social area (target site) has been changed based on the new design of the simulation process.

The aim of the third stage of the experiment is to assess and measure the quality of the new design based on the simulation outcome. This process is based on applying the principles of the new design from the simulation process, through observing the site again by using the Infrared camera to measure the density and assess the pedestrian behaviour to validate the new design. The collected data were again analysed by Matlab software, and thermal imaging provided a clear understanding of users' attributes based on pedestrian movement in the site.

4.8.1 Stage one: The Literature Review

This phase is considered the most significant stage of any research, and researchers should consider it as an important part of the research study (Tranfield et al. 2003). A literature review phase is when the references and citations are examined based on the study area (Weissberg & Buker 1990). This is one of the research priorities; it is important to complete the review before proceeding to other stages of the research. Furthermore, Anderson (2013) summarises the significance of the literature review below (see Figure 26):

- Position the investigation.
- Examine the context of the problem or issue.
- Identify relevant concept and issue as well as methods of enquiry.
- Devise a framework for the analysis of your information.

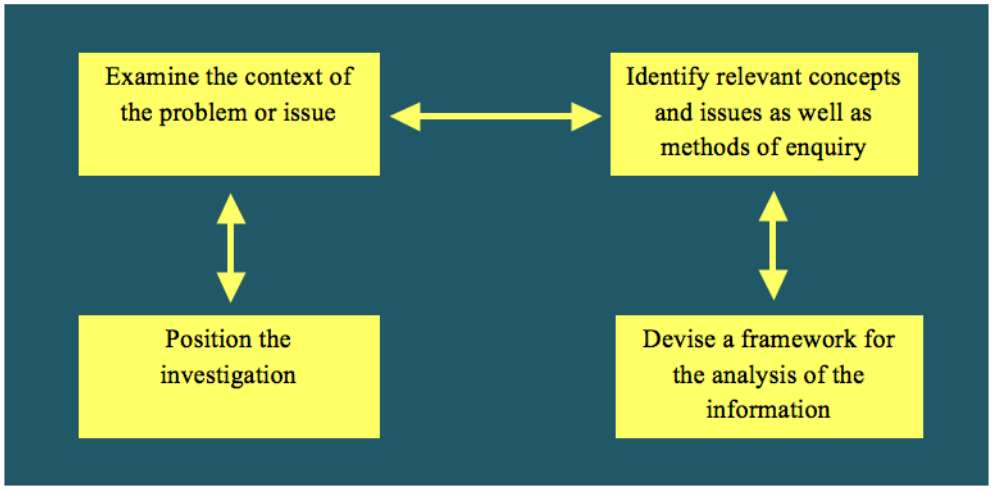


Figure 26: The significance of the literature review
Source: (Anderson 2013)

Research problems develop through the literature review stage, as the review helps the researcher to identify the topic area and also its dimensions (Weissberg & Buker 1990). Also, researchers in the literature review stage start with general information about the study topic which narrows down to the specific area to clarify the main focus of the study and study each area separately. Reviewing previous works has many purposes that are highlighted in many types of research. The key aims are highlighted by (Gall et al. 2006) and summarised below:

- Supporting the researcher in clarifying their objectives and research questions.
- Raise the possibilities of the study area, and find the research gap.
- Find out past studies in research that provide researchers with reasonable validation for their objectives and research questions.
- Researchers will be able to avoid the repetition of previous research.
- Publishing research vision in professional journals to highlight the concept of the research questions and objectives.

The literature review provides a vision for the researchers to review different techniques, strategies, and research approaches to find a suitable way for their research questions and objectives.

Saunders et al. (2003) assert that " *The process can be likened to an upward spiral, culminating in the final draft of a written critical literature review*" (Saunders et al. 2003).

The literature review process is shown in Figure 27.

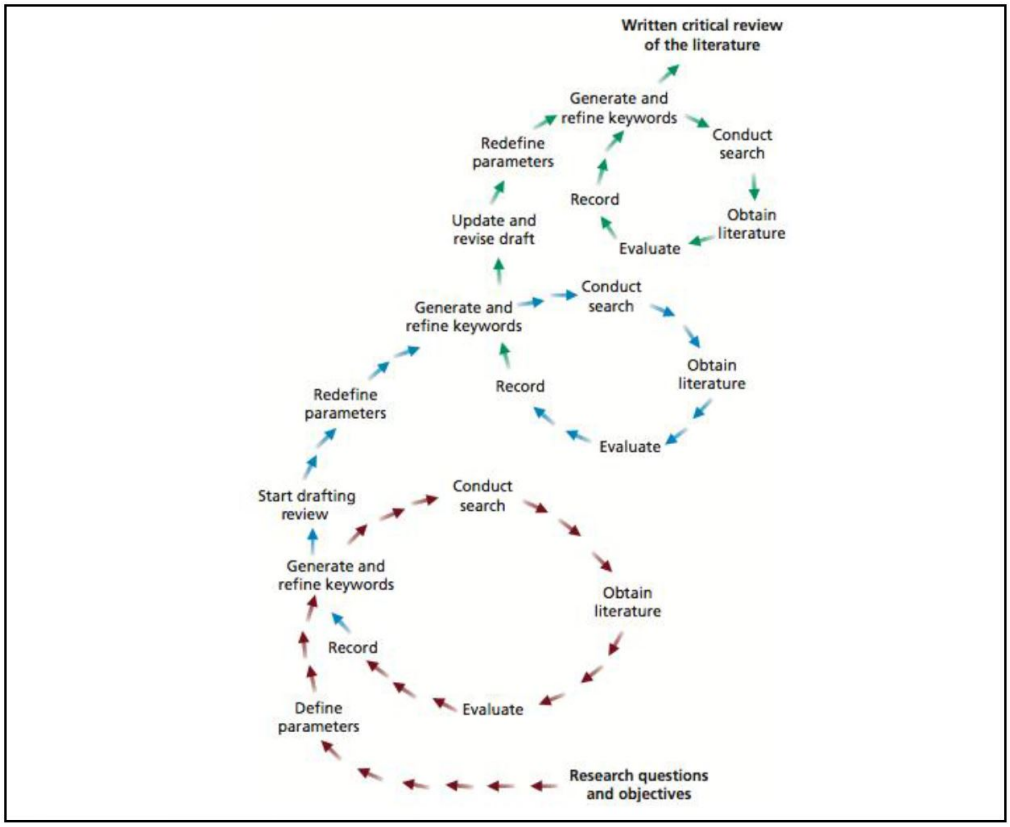


Figure 27: An upward spiral process of the literature review stage
Source : (Saunders et al. 2003) p.60

The benefit of the literature review is not just to provide a clear understanding of the topic, but also to highlight the critical issues and how important the topic is. The literature review provides more details of criteria that make public spaces active, and different opinions related to the quality of public spaces assessment, which reflects on the concept of active public spaces.

4.8.2 Stage Two: The Delphi Technique

According to Hanafin (2004), *"The Delphi technique is a research approach used to gain consensus through a series of rounds of questionnaire surveys, usually two or three, where information and results are fed back to panel members between each round"* (Hanafin 2004).

Moreover, Okoli and Pawlowski (2004) describe the Delphi method as a group discussion tool. Participants (experts) should have experience related to the issue, as they need to have good knowledge of the topic. The Delphi Technique has a number of types that have been used in practice the Decision Delphi, the Policy Delphi, and the Real-time Delphi (Keeney et al. 2001; van Zolingen & Klaassen 2003). The Delphi technique is used in this study to classify opinions of experts in order to enrich a framework to measure and assess the quality of public spaces and to achieve consensus between the experts' responses regarding

a number of categories and criteria in the frameworks. The technique is also employed to give weight to each criterion to create weigh the list of all criteria of active public spaces framework, which criteria are most and least important. Therefore, the approach of the Delphi technique survey takes more than round in this research. The experts were professionals, from different areas (social science, architects, planners, urban designers, health and more) and were chosen according to their experience in their area. The purpose of gathering experts from a different area related to the research topic is to establish ideas so that agreement can be achieved (Hanafin & Bowles 2005).

The Delphi method as a procedure must take into account four aspects: (i) privacy of participants information, (ii) repetition, (iii) controlled feedback and (iv) the statistical aggregation of participants' responses (Rowe & Wright 1999; van Zolingen & Klaassen 2003). Schmidt (1997) proposed the approach of giving weight or "ranking-type" in the Delphi survey, in order to create the questionnaire, collect the data and check the validation of information. Many scientific papers have referred to the use of the Delphi technique (Schmidt et al. 2001; Powell 2003b; Pawlowski, Suzanne D, Okoli 2004). The Delphi method or the process of collecting data in the survey using Delphi technique is divided into three rounds: (i) brainstorming; (ii) narrowing down, and (iii) giving weights to the data. Each round is clearly explained in the following subsections.

The purpose of using the Delphi technique in this research is to gather experts' opinions regarding the proposed framework of active public spaces, as one of the objectives of this research is to develop a set of criteria to assess and measure the quality of public spaces and propose a framework that represents an interaction of virtual and physical public spaces. The Delphi method is used because this research topic is much more about assessing the quality of public spaces and developing a list of criteria that can make public spaces active. This is a crucial matter and thus needs highly experienced experts who have good backgrounds in the social, environment, planning, architecture, health and urban design matters.

a. Overview of the Delphi technique

The Delphi technique is considered as research methodology and has been variously used as a 'questionnaire' (Wang et al. 2003), 'procedure' (Rogers & Lopez 2002), 'method' (Linstone & Turoff 2002) and 'technique' (Broomfield & Humphris 2001). The method is employed in this research as 'technique' because it seems to be the most common tool used in the research (Hanafin 2004). The Delphi method derives its name from the ancient

Greek oracle which at that time offered the future's vision to those who need to advice (Gupta & Clarke 1996) p.185. as Gupta and Clarke (1996) illustrate that there is agreement that the first use of the Delphi technique by the RAND (Research and Development) Corporation for the American military in 1944 was in technology forecasting studies. Since that time, the Delphi method has become a more popular way of gathering different opinions from experts. Researchers have been developing and modifying the use of the technique in their research over the years.

Linstone and Turoff (1975: 3) defined the Delphi technique as

> *"a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem"* (Linstone & Turoff 1975) *p.3*

b. Types of Delphi

Hanafin (2004) describes the different types of Delphi technique which have been identified. Furthermore, Gupta and Clarke (1996: p189) state that 'practitioners are often willing, and sometimes even eager, to modify Delphi'. Different types of Delphi are reported by (Keeney et al. 2001) these are 'Classical Delphi', 'Policy Delphi' and 'Real-time Delphi' and these have been used in many studies. Meanwhile, the next categorisation, illustrated by (van Zolingen & Klaassen 2003), has a broad appeal:

- **Classical Delphi**: this type of Delphi contains five features as follows: participants information privacy (anonymity), iteration, controlled feedback, statistical group response and stability in response among those with expertise in the specific issue. Survey's participants in this type of Delphi are giving their opinions based on their experience in the study field to achieve stability in the total responses on a specific issue.
- **Policy Delphi:** stability of the responses is not the purpose of this type of Delphi technique but to provide alternative policies by using public discussion. This type of Delphi is a way to develop policies and enhance participation through gathering as many divergent opinions as possible. It contains 'selective anonymity', iteration, controlled feedback, gathering group response and structured conflict. Anonymity here may have another meaning referring to individual participant's responses; it may also mean that participants come together as a group discussion in the meeting.
- **Decision Delphi:** this type of Delphi is been used to make decisions on a social issue. In real life, a group of decision-makers is providing value to experts

responses compared to the ad-hoc decision of a small group of people. The most important aspect of this type of Delphi is that decision-makers participate in the developing process of the issue using the Delphi technique. Decision-makers are selected based on their hierarchy among all decision-makers concerned and the purpose of this is to create discussion in order to achieve the stability in their responses. The significance of using this technique is lack of 'anonymity' where participants information is named and known to the public from the beginning, while in questionnaires the participants are anonymous.

The Delphi method is used in this research to create a group discussion around the study area for assessing the quality of public spaces, so experts can achieve stability in their responses.

c. Purpose of the Delphi technique

The significance of adopting the Delphi technique in the process of decision- making is to create a structured plan for the process of data collection, while the other available could be anecdotal or an entirely subjective approach (Broomfield & Humphris 2001). The structures of the main four elements of the Delphi technique (anonymity, iteration, statistical group response) can reach the consensus can be reached even when information or inconsistent information to lead to effective decisions (Linstone & Turoff 1975; Goodman 1987; Keeney et al. 2001). On the other hand, other techniques such as nominal groups (Carney et al. 1996), focus group (Morgan 1997), and brainstorming (Keeney et al. 2001) are used to achieve the consensus during decision-making but these techniques are found less suitable to progress to the establishment of a set of wellbeing indicators (Hanafin 2004). The main disadvantage of these techniques during decision making is that participants can be affected by other group members (Fein et al. 1997).

Hanafin (2004) pointed out the situations in which the Delphi technique can be particularly useful:

1- When analytical techniques cannot solve the problem the Delphi technique can provide the benefit from judgments on a collective basis.
2- The difficulty of gathering a number of experts to interact face-to-face or finding issues to organise group meetings.
3- Communication issue between experts from different fields and different occupations when it is not direct.
4- Where ethical or social dilemmas dominate economic or technical ones (Linstone & Turoff 1975; Gupta & Clarke 1996).

In this research on how to assess the quality of public spaces, the researcher found it really difficult to gather a number of experts from different fields (such as social science, architects, health, politics, urban designers, and planners) to communicate in group meetings. The number of experts appears to be too large to organise for a group meeting (face-to-face meeting) while using the Delphi technique provides flexibility for participants to see other opinions and respond individually to the problem without attending a group meeting or being affected by the group decision.

d. Justification for the selection of the Delphi Technique

One of the most significant issue in any research is the selection of suitable techniques to achieve the objectives and aims of the research. Different consensus methods were reviewed in this research to drew comparisons between them and find out the most suitable technique to be used in this research. This research aims to develop a framework for measuring active public spaces by taking into account the new communication media and technologies developed in the twenty-first century, the Delphi technique is used to explore the opinions of the experts who have experience related to the study area.

The comparison process illustrates that the Delphi technique is the most suitable method for this research compared with other techniques and tools such as Spaceshaper technique, Interacting Group technique, and Nominal Group Technique (NGT) these are briefly described below.

1. Spaceshaper Method:

This is considered a workshop-based toolkit, which has more ability to adapt to local settings. The Spaecshaper process is based on trained facilitators, who are in charge of running the workshop. People who have an interest in the space, both professionals and users, are invited to participate. However, this method suffers from the site visit approach, where all participants are asked to visit the site for group discussion to participate in the questionnaire and get to know each other. Sometimes it is difficult to arrange a group meeting due to geographical limitations, as well due to the fact that Spaceshaper facilitators may not prepare well enough to be ready to run the workshop. (CABE 2007).

2. Interacting Group:

The Interacting Group method is more commonly known as the “focus group”. This technique is based on gathering participants in one location or using technology tools at the same time for focus group meeting and interactive brainstorming (Powell 2003b). In fact, the idea of gathering experts in one place or even at the same time for a meeting via using

telecommunication is not easy to arrange due to geographical limitations. In addition, the Delphi method encourages experts to express their opinions and make decisions without the stress of being in a group or interfacing with other members. Also, Interacting group may suffer from bias in the results as well due to the non-privacy the experts feel by not being anonymous. Furthermore, there is the possibility that one expert or one group can exert dominance over the others (Hallowell & Gambatese 2010).

3. Nominal Group Technique (NGT):

This technique is also referenced in previous studies as "Brainstorming". The Nominal group method is based on small group discussions to reach consensus on the result. Moderator-participant discussions are the way data are collected using the NGT. In the next stage, the participants are asked to give weight to the collected opinions from all individual discussions (Hallowell & Gambatese 2010). Both the NGT and the Delphi technique use similar procedures, while an inductive meeting is used to get feedback from the participants, which raises the issue of geographical limitations to gather all participants again in the same location or even via telecommunication. Meanwhile, with the Delphi technique, there is no need for participants to attend the meeting. Another disadvantage of the NGT that discussions are limited, which means that key information may be overlooked compared with the Delphi technique because of individual moderator-participant discussions. Moreover, Rowe and Wright (1999) pointed out that the greatest disadvantage of that the NGT is its biased output and conformity.

The traditional survey method can be used in this study to collect data from experts' groups related to assessing the quality of public spaces. However, the Delphi technique is found to be a more suitable methodology in terms of the fact that outcomes from experts are more comprehensive. Okoli and Pawlowski (2004) compare the approaches between the traditional survey and the Delphi technique in terms of weaknesses and strengths; see Table 7.

Table 7: Comparison approaches between the traditional survey and the Delphi Technique

Evaluation Criteria	Traditional survey	Delphi technique
Representatives of sample	The researchers use statistical sampling techniques to randomly choose a sample, which represents the population of interest.	The queries addressed by a Delphi study are of a highly doubtful and speculative nature. For this reason, a general population might not adequately and correctly answer the questions.
Sample size for statistical power and significant findings	The researchers are required to select a sufficient sample size to get a generalised result for a large population. This will help in determining statistically important effects in the population. To determine the suitable sample size, power analysis is performed.	To achieve an accord among experts, group dynamics is used to determine the Delphi group size. This size is not derived from statistical power. Therefore, 10 - 18 experts are recommended by the literature for a single Delphi panel.
Reliability and response revision	Reliability of procedures is a significant criterion to assess a survey. Generally, researchers ensure this by pretesting and retesting to guarantee test-retest reliability.	In the Delphi method, although pretesting is a vital reliability reassurance measure, still, test-retest reliability is irrelevant. This is because the researchers anticipate respondents to modify their answers.
Construct validity	Vigilant survey design and pretesting ensures construct validity.	Delphi technique can perform extra construct validation by requesting the professionals to authenticate the researcher's version and classification of the variables. This validation practice is possible as unlike many surveys, Delphi is not anonymous to the researcher.
Anonymity	The participants are not only anonymous to each other at all times but are also mostly anonymous to the surveyor.	Participating experts are anonymous to each other but always known to the researcher. This allows researchers to communicate with them for additional explanations.
Non-response issues	To be sure that the sample remains representative of the population, researchers need to explore the chances of non-response bias.	Generally, in Delphi surveys, there are very little chances of non-response as most researchers have attained declaration of participation in person.
Richness of data	The framing of the questions and the opportunity of follow-up, such as interviews are the factors on which the richness of data relies. In cases where researchers fail to find the respondents, follow-up is often limited.	Traditional surveys undergo richness issues while Delphi studies essentially supply richer data due to their numerous iterations and their response review due to feedback. Also, the experts taking part in Delphi are positive towards follow-up interviews.

Source: Okoli and Pawlowski, 2004 pg. 123

The Delphi technique was chosen for a number of core reasons, as discussed above. One of the key reasons is that this research is concentrating on identifying the number of criteria that make public spaces active. This matter is crucial and needs experienced people from diverse areas such as social scientists, architects, urban planners, and health practitioners of the place to develop the list of criteria that makes for better designing of public spaces. The Delphi technique could be more accurate in answering the questionnaire (survey).

Another advantage of the Delphi technique is being more desirable tools than other forms of group decision such as social judgment analysis and nominal group (Rohrbaugh 1979). The Delphi technique has another feature that makes it more flexible; there is no need for respondents to attend the meeting in one location (it is difficult to gather professionals in one place at the same time) (Paliwoda 1983). Furthermore, the Delphi technique is more flexible and provides the researcher with the opportunity to follow up interviews.

This research aims to develop a framework to assess the quality of public spaces to provide a valuable list of criteria that make public spaces more successful. As well as to identify the most significant criteria in the framework. The Delphi technique is found to be useful in providing valid data to the researcher, as is leads to a deep understanding of different categories and diverse criteria in each category of the framework. These advantages of the Delphi technique prove that it is the most suitable technique for collecting data and confirmation of information.

e. Data Collection and analysis method

In the first stage of preparing to administer the Delphi questionnaire, invitations including an introduction to the research were sent to the experts, via email, asking them to accept to participate in the survey. A questionnaire was structured via SurveyMonkey (online survey), which was really important in terms of time management during collecting data while using the Delphi method. However, Delbecq et al. (1986a) point out that research that uses the Delphi technique can take on average from 45 days to five months to complete data collection. In this case, all respondents had expertise in the same area and the questionnaire was sent via post. Using technology decreases the time taken for each round in the Delphi questionnaire, to share data, as it is more flexible for participants to respond to the questionnaire from different countries. Experts from different countries participated in this questionnaire; because the survey was online, it was easy for them to respond and reply to each round of the Delphi questionnaire. It took some time for them to complete the Delphi rounds related to the quality of public spaces assessment. Each round

took time as the researcher could not send out the second round until he had received and assessed all the responses from the participants.

The invitation email was sent to experts from different areas such as Social Sciences, Health, Politics, Architects, Urban Designers, and Planners. The second stage was to send an email with the questionnaire including a brief introduction related to the study area to the experts who agreed to participate in the online survey.

Gordon (2002) pointed out of the benefits of using SurveyMonkey compared to other survey software and questionnaire tools; SurveyMonkey is considered an excellent survey website as it has highly efficient assessment tools for online learning, which is good for research in this field. The researcher initially reviewed a number of survey software packages such as SurveyMonkey, Google Form, and QuestionPro in order to identify the most suitable questionnaire tool for use with the Delphi technique in this research. Each software has a different character; there are differences between them in information type and, question structure. From this review, the researcher found that SurveyMonkey software is the most suitable questionnaire survey to be used with the Delphi technique, as it is a popular tool, with advanced survey methods.

According to Waclawski (2012), "Survey Monkey is an internet programme and hosting site that enables a person to develop a survey for use over the internet". Furthermore, Gordon (2002) pointed out that SurveyMonkey can provide different formats to create questions; for instance, closed-ended, or open-ended question and multiple choice. The survey offers the basic subscription with just 10 questions, 13 different types of question, 100 responses, 15 template themes and fine analysis features. SurveyMonkey provides the option of tracking the participants in case the researcher needs follow-up interviews with any of them, without bothering other experts who already participated. SurveyMonkey also allows the transfer of data from each question individually into analysis programs such as SPSS (SurveyMonkey 2015). Because of all previous points, SurveyMonkey was chosen to use with the Delphi technique during each round of the questionnaire of the study.

Schmidt (1997) proposed the approach of the "ranking-type" Delphi questionnaire, in fact, this method was referred to many scientific papers (Schmidt et al. 2001; Powell 2003a; Pawlowski, Suzanne D, Okoli 2004). The Delphi questionnaire process is divided into three rounds, (i) brainstorming for the most important categories, (ii) narrow down the number of criteria in the list to the most important ones, (iii) give weight to the list of criteria. See Figure 28.

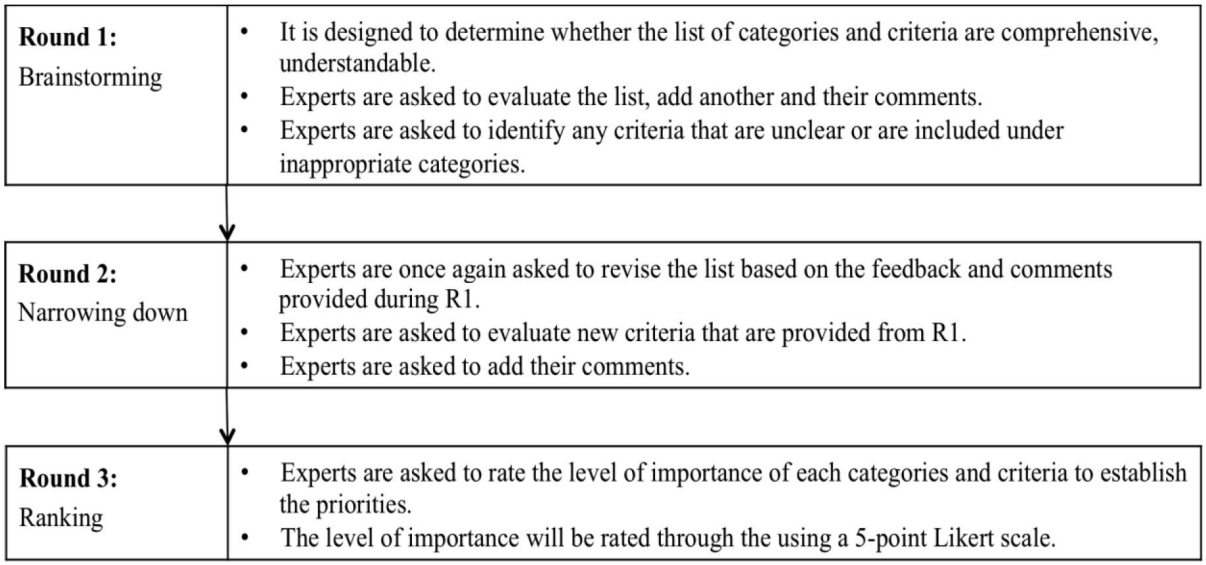


Figure 28: The process of the Delphi method

Source: (Okoli & Pawlowski 2004; Schmidt et al. 2001)

The process of the Delphi method starts with a first-round which includes a questionnaire that contains open-ended questions. This encourages participants to explore particular data related to the study area (Custer et al. 1999). The advantage of this structured round is to provide experts with the opportunity to suggest extra criteria to the proposed list (Okoli & Pawlowski 2004). The experts are required to evaluate the categories and their criteria in the framework of active public spaces in this research.

Hsu and Sandford (2005) mentioned that in each participant in the Delphi questionnaire is provided with another questionnaire in the second round of the Delphi survey, in order to review and analyse the responses of the other experts from the first round. In this round, experts repeated the review of the lists from the first round and give their opinions related to the new suggested criteria from the first round. The participants were asked to finalise the categories and their criteria by given weight to these criteria from most important to least important to move to the third round. the purpose of the third round is to construct a final ranking of the most and least important criteria (Okoli & Pawlowski 2004).

In this research, the technique used in the Delphi questionnaire is based on the three stages described above (Schmidt et al. 2001; Okoli & Pawlowski 2004). Experts were given opportunity during the first round of the Delphi questionnaire to get clear understanding about the study area in the first part of the survey, and were then asked to evaluate the list and suggest criteria to add or remove from the list, and also give weight to each category and their criteria of the proposed framework of active public spaces. In the second round, participants were asked to review the other experts' opinions and respond to the suggestions from the first round by agreeing or disagreeing. This informed which criteria

were added or removed from the list, and also added weight to the list of criteria until consensus was achieved.

The experts were invited to participate in the Delphi questionnaire based on their years of experience. Different methods were used to send the invitations; some sent via email, while some experts were asked to participate in person. The invitation includes an overview of the study area by explaining the objectives and the aim of the research on how to measure active public spaces.

4.8.3 Stage three: Test and examine the framework of active public spaces.

Nowadays, reliable data on pedestrian movement is required in modern cities to evaluate the users' behaviour in public spaces (Nicolas et al. 2016). Furthermore, Nicolas et al (2016) pointed out that studies in microscale pedestrian movements are more challenging as they request accurate information for people on the site who may move closer together, and where the movement of pedestrians depends upon interactions with others as well as on the physical layout of the place and attractors in the spaces traversed .

This stage aims to validate the practical application of the final framework of active public spaces in this research. Kennedy et al (2005) illustrate that the testing process is considered as the most significant part of any development framework, which raises the confidence in these frameworks, for providing the study with valuable and applicable meaning. Different tools can be used in the testing process, such as comparison with other frameworks, or animation. The main purpose of the testing process is to check the validation and applicability of the final framework of active public spaces.

This stage of the research is considered as the practical implementation, in order to assess some criteria of the final framework of active public spaces. Here, the quality of public spaces is assessed by using different tools to measure criteria from the final framework. The Infrared Camera (real-life) is used to measure density and pedestrian movement of the current situation in the site, and simulation using MassMotion software to assess and measure the flow of people in a 3D model of the site. The purpose of this stage is to represent an interaction between real-life and simulation, comparing the outcomes of the two techniques in order to design better public spaces. as one of the objectives of this research is to test and validate the characteristics of active public spaces framework, using real case scenario.

a. Improve the site through infrared thermography

The most significant aspect in designing well-functioning modern cities is to know how public spaces are being used by the users, and how these users of the place move in and through the place. The traditional way to gather data on pedestrian movement and density in the city is to count the number of people at points of interest several times a year and conduct qualitative analysis (Bauer et al. 2009). Due to high developments in computing and networking technologies, a range of new techniques for detecting data on pedestrian movements has become available in recent years (Gehl & Svarre 2013). In this stage observation method used to understand people behaviour and to measure pedestrian movement density in the site, Infrared camera used to record the current situation of the site to assess the level of interaction between users of the site and their engagement with the surrounding physical environment.

- *A brief history of infrared thermography*

The Infrared spectrum was first discovered by Herschel (1800). Reducing the brightness from the image of the sun was the priority to find a new optical filter (FLIR Systems 2014). In 1929 the first infrared-sensitive camera was used by the military in Great Britain for anti-aircraft defence (Lisowska-Lis et al. 2011). Hugh development progress of photodetectors and image converters was made between World Wars I and II (Kylili et al. 2014). In the 1950s, the US Military and Texas Instruments developed the first single-element detectors, which allowed the scanning of scenes and produced line images. Barreira et al. (2012) pointed out that the IR camera in the late 1960s was available for the public and thermal imaging became more accessible, not only to the military.

- *The purpose of using a thermal camera*

Computer vision technologies have a great advantage in the concept of the future city. By using cameras, recording data of pedestrian is possible even from a far distance and in real-time as well. Moreover, some types of camera have an issue in collecting data, such as a regular RGB camera in terms of the deterrent effects of surveillance and control caused by the camera is high. Many problems emerged with the RGB camera, which does not always achieve what is required, while the thermal camera, the issue of privacy is eliminated. The thermal camera has the ability to capture the long-wavelength infrared radiation; all objects reflect and radiated the temperature above zero. Thermal cameras gather radiations in an image which visualise the temperature of objects in the place. Thermal cameras can detect pedestrians and objects in the place with a temperature different from the surrounding area

both in the day and during the night (Gade et al. 2016). Figure 29 illustrates a thermal image for an outdoor public space.

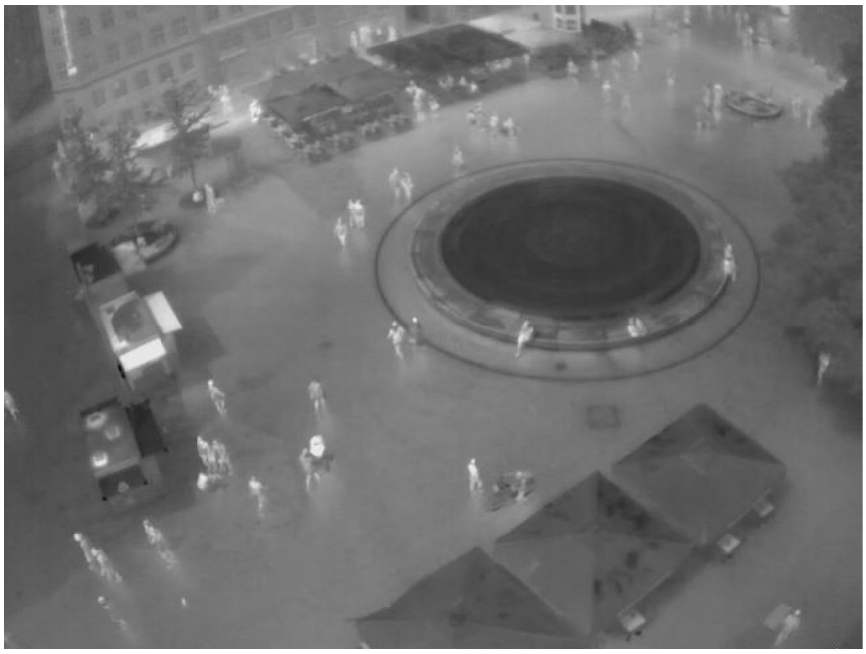


Figure 29: Thermal image of outdoor public spaces
Source: (Gade et al. 2016)

The purpose of using Thermal Camera in this research to observe the people's density movement and pedestrian behaviour in the central (social) area in the Newton Building as a case study. The current situation of the site has been evaluated to achieve better design for the social area (target site), and Matlab software was used to analyse the collected data. The outcome (thermal images) from Matlab software allows the researchers to identify the areas of the high density of people in the place, to clarify the flow of pedestrians in the site.

The thermal camera (FLIR A3100) was fixed in the site in a high location, far from the users of the place. Privacy of the pedestrians is ensured during the experimentation and it impossible to identify the users characteristic. Involving a thermal camera in this research is to validate the result of redesigning the physical layout in a real-case scenario. The collected data (video record) used as observation method to understand the user's behaviour in the site, how the users interact with each other and they communicate with the surrounding physical environment. While Matlab software used to analyze the same collected data to measure the density of people in the site, to identify which area gather people and which one attract users to spend more time, also to identify the pedestrian movement in the site, users crossing the site and their interaction with the sitting area in the site.

b. Pedestrian movement simulation

Modern cities have huge developed economies which have led to the transfer of business activities out of the city centres in recent years. However, the city centre is still significant to different areas such as health and more often to social, economic and cultural aspects of the town. (Haklay et al. 2001). Moreover, understanding pedestrian movement in the town centre is an important element to identify the different functionalities of the town centre (Geofutures Ltd 2004).

Pedestrian modelling is a comparatively new area of research in transportation modelling, crowd simulation model enhance the predicting of pedestrians' movement efficiency and the issue of performance during the design process of buildings and public spaces, (Sarmady et al. 2014). Pedestrian movement modelling simulation was first introduced by (Schelhorn et al. 1999). Crowd movement tested the functionality in terms of urban form and trip agents. King et al. (2014) pointed out that the built environment has a different area to study which is related to pedestrian flow. Also, the author has shown that the study of crowd movement simulation has become more important because of the daily occurrences and architecture such as route choice.

In fact, many types of crowd patterns can be detected during pedestrian movement observation. On the other hand, most pedestrian movement types can be described according to a successful movement toward the target (Sarmady et al. 2014). MassMotion crowd movement software is used in this research to assess and measure density and pedestrian movement. Many studies have assessed the appropriateness of the parameters for pedestrian (agent) behaviour (Rivers et al. 2014). The agent speed profile is one of the key parameters which has an impact on the movement of the agent, Peacock et al. (2012) explained that parameters are generated with a randomly pre-set range. The speed of the agent (pedestrian) is assessed against factors such as crowding function and slope of the floor. These are factors that adjust the speed of agent when going up or downstairs or ramps according to (Fruin 1971). The agent speed was validated using simulations for high-rise buildings.

The walking speed of the agent was assessed using the simulation for a high-rise building. In 2011, MassMotion software validating was conducted using the Transbay Terminal in San Francisco (Morrow 2011). The result from using MassMotion pedestrian software in terms of accuracy and realism (as demonstrated by the aforementioned calibration studies) was a high motivator and a good reason to select the MassMotion software in this research.

- *Model of pedestrian crowd simulation*

MassMotion crowd simulation software is a 3D crowd movement modelling software developed by Oasys, a division of Arup. (King et al. 2014) stated that. " the software uses a modified Social Forces, including an attractive force to their destination and repulsive forces produced by stationary obstacles and other agents" When creating a model in MassMotion Software there is no need to define an agent's path. Agents decide a path direction according to the minimum function time, and automatically navigate their path between origins and destinations based on free and blocked spaces, or when agents face each other, which provides the agent opportunity to react dynamically in a different environment, such as congestion. MassMotion software has been used in many projects around the world, such as redesigning the Union Station in Toronto, and the JetBlue Terminal 5 at JFK Airport. (King et al. 2014). MassMotion software is developed to provide designers and planners with professional tools to test and analyse the pedestrian movement in different types of environment. The software allows users to create and modify the 3D model, providing opportunities to create different scenarios of pedestrian movement, performing dynamic simulation and employing powerful analysis tools (Oasys Software Ltd. 2017).

When creating a 3D model in MassMotion software, the process is based on building up 3D geometry on top of a 2D CAD file imported via the software in 3D windows, or importing 3D modelling from other software and using MassMotion to assess the quality of design. Agent profile in MassMotion software adjusts the physical characteristics such as walking speeds and, size which is set at defaults, and also can be changed if needed (Oasys Software Ltd. 2017). The agent has the opportunity to even perform different actions during their trip from origin to destination. (King et al. 2014). Based on the above discussion, a scale 3D model of the indoor public spaces in the Newton Building was generated.

4.7 Summary

In this chapter, a methodological approach is illustrated to explain the assessment of the quality of public spaces. This chapter provided an explanation of the different approaches in general and more specifically of the selected approach and philosophy that were used in this research. The reason for using the research methodology is explained in detail throughout this chapter.

This chapter concentrated mainly on the research method. The mixed-method included survey questionnaires and the Delphi technique to collect the data, as well as observation and simulation of the target site to test and examine the final framework of active public spaces. The mixed-method used to enrich the research and increase the validation and reliability of the research finding. During the survey questionnaire, a sample targeted the users of public spaces in the city of Nottingham and participants were randomly selected using an online survey (Google Form Website). Different criteria were assessed in this survey, participants answered the questions related to what makes public spaces active, A total of, 100 users of public spaces in Nottingham city participated in the online survey. The majority of the respondents were aged 25-34 years old. Data were collected during the weekdays and at weekends, because of using the online survey which provided participants more flexibility to answer the questionnaire without accessibility limitation.

The collected data from the online survey were analysed by SPSS software to identify users experiences in the public spaces. Using mix methods in this research strengthens the data collected to ensure that data are valuable and reliable.

The practical implementation process used different techniques and technologies to test and examine the framework of active public spaces, and the assessment process was based on three stages. The first stage (observation) was to view the target site by using the Infrared camera to measure the density and asses the pedestrian behaviour, in this stage, the collected data been analysis in two phases, video record used as direct observation to understand the users behaviour (qualitative data), while Matlab software used to measure the people density and movement of the users in the site (quantitative data). Furthermore, the second stage applied simulation for the target site to redesign the current situation for better design which is based on the outcomes from the observation process. The third stage applied the new principal of the new design of the target site by changing the physical layout of the site and observing the functionality of the new design by using the Infrared camera again to validate the applied criteria against the site.

The use of the Delphi technique in the questionnaire strategy section was discussed. A brief background of the Delphi technique was given in this chapter. Finally, this chapter highlighted the validity and reliability of the research; this stage checks the strength of the final proposed framework of active public spaces. The idea for this process was discussed which was to check the validity of the proposed framework. The Validity and Reliability of Research stage basically assessed the results of both stages the first stage: Literature

review and the second stage: Delphi questionnaire. The validity and Reliability of Research are discussed in detail in Chapter six.

Chapter Five: Users' experience and the quality of public spaces

5.1 Introduction

This chapter discusses the analysis and results of the users' experience questionnaire, the outcome of this stage supplying the second iteration between the results from the literature review and the data from the questionnaire as mentioned in Chapter three. The chapter presents the results of the online survey carried out between March and April 2016, and the output discusses the assessment of the quality of public spaces, town squares, parks, and streets in Nottingham city centre, based on the users' experience and taking into account the role of new forms of communication media in our daily life. The chapter is divided into three stages: the first stage describes the collected data; the second stage deals with the analysis and the outcomes of the collected data using SPSS software, and the third stage discusses the users' experience in the public spaces, so the outcome from each category is discussed individually.

the participant's sample was selected randomly. an online questionnaire sent to different public online pages related to Nottingham city, furthermore, several public spaces in Nottingham city centre been visited to collect data from the users by using smart devices such as iPad and tablet in different days in a week and different times in a day. the online survey technique has been used to give the participants flexible access, so they can respond to the questionnaire from home or when they have free time, some participants asked for the questionnaire's link to participate when they have free time.

This section responds to the research question, How does new communication media (Wi-Fi) affect the future of public spaces? How active public spaces can be measured and assessed? To assess which criteria can make public spaces active the very essence of this chapter is to analyse the role of technology in the form of the future of public spaces. The outcomes of this stage enrich and develop the list of criteria from the literature review stage to finalise the proposed framework of the active public spaces.

5.2 Sample Demographic, Participant information

Participants' demographic information namely gender, age, occupation, connection to the city, and marital status are explored to study the impact of which criteria make public spaces more successful in the design aspect. A total of 100 participants living in Nottingham city took part in the online survey (google form) website.

Reliability (Cronbach's Alpha) test was carried out to check the reliability of the survey data. The result of the reliability test for all 38 questionnaire elements (Cronbach's Alpha) was 0.733; according to (Mohamad et al. 2015) reliability value ranging from 0.67 to 0.80 is fair. This means that the value of the questionnaire data is reliable and valid enough to be measured, and participants understood and responded to the questions in the online survey clearly.

5.2.1 Gender

Figure 30 illustrates the percentage of the participants by gender who use public spaces in the city centre of Nottingham. The results illustrated a big difference in percentage between males and females participants in the survey. The majority of participants, 62% were male, while 38% were females. The perceptions held by females are almost half the percentage of males; however, female participation in the survey is fair which adds more value and diversity to the questionnaire data.

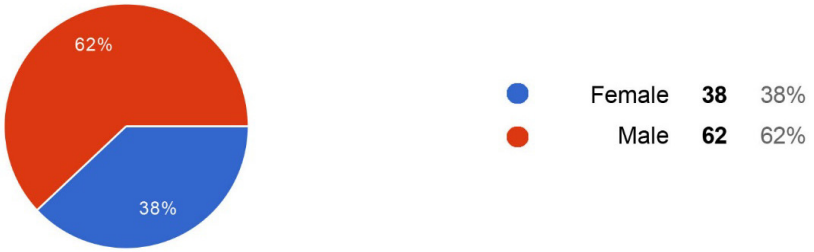


Figure 30: Gender of respondents participating in the survey

5.2.2 Age

Figure 31 demonstrates the age groups of the users of the public spaces in Nottingham city centre who participated in the questionnaire.

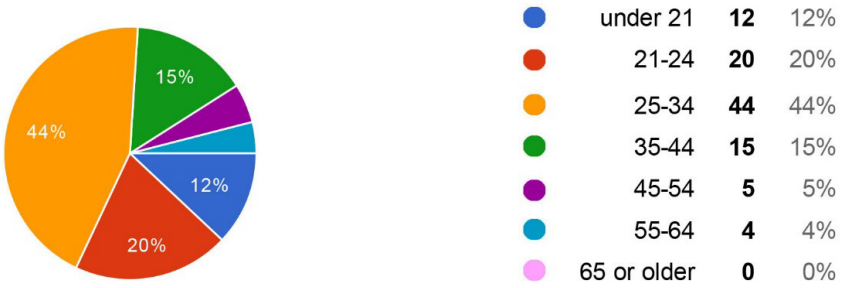


Figure 31: Age of respondents participating in the survey

The result in Figure 31 demonstrates the age groups of the participants who use public spaces in the city centre. The result illustrates that all the participants' aged groups were among the frequent users of public spaces. The majority of the participants' age group was

the adult' group aged 25-34. This age group is more active compared to other age groups in using public spaces. The result in Figure 28 demonstrates that the percentage of participants aged 21-24 was 20% as the second-highest percentage of the participants. Moreover, the percentage of respondents aged 35-44 was just 15%, while the age group under 21 years old was 12%. Lastly, the percentage of participants aged 45-54 was 5%; meanwhile, the percentage of the age group 55-64 was the lowest percentage at just 4%.

5.2.3 Occupation

Figure 32 demonstrates the percentage of the users of public spaces based on their occupational status in the Nottingham city centre. The result in Figure 29 demonstrates that the highest percentage of respondents was students. This high percentage is most likely due to the location of the education buildings in the city centre, where Nottingham Trent University is located in the heart of Nottingham city centre. There are also a number of schools and colleges in the city centre, which can be public spaces in the city centre are target places for students to spend their free time particularly after school hours. The result also shows the percentage of employees is 31% of the participants as the second-highest percentage. Lastly, the result shows that the lowest percentage of the participants were retired people at 3%.

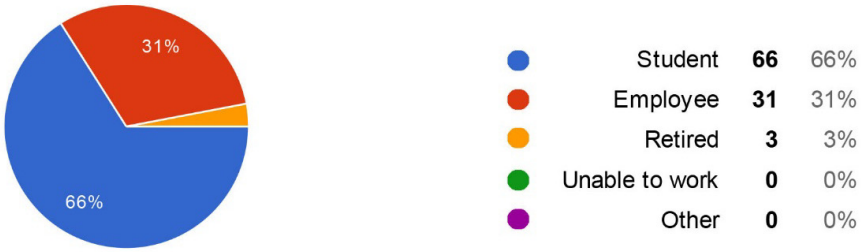


Figure 32: Occupation of respondents in the survey

5.2.4 Marital Status

Figure 33 illustrates the marital status of the users of the public spaces in the city centre who participated in the questionnaire. The results demonstrate that the majority of respondents were single with 53%, while the second-highest percentage was married at 45%. The difference between these percentages (single and married) is not hugely different; this reflects the diversity of the users in the public spaces in terms of the social interaction between different groups of people. Lastly, the lowest percentage, just 2% of the respondents was divorced.

Figure 33: Marital status of respondents in the survey

5.2.5 The connection to Nottingham city centre

Figure 34 demonstrates the connection of participants in the questionnaire to the city centre of Nottingham. The results illustrate that the highest percentage, 63%, was living in Nottingham city which explains that people have a good connection to the city centre of Nottingham. The results further demonstrate that the second-highest percentage was studying in the city centre with 41% of total participants in the questionnaire, so the purpose of visiting the city centre is education. The results in Figure 29 relating to the occupations of the participants shows that the majority was students; this explains the second-highest percentage of the connection to the city centre.

While 23% of participants are living in the city centre, actually living in the city centre gives a strong connection to people to visit public spaces. Moreover, the results showed the lowest percentage related to the connection to Nottingham city centre is those people who work in the city centre with a percentage of just 12%.

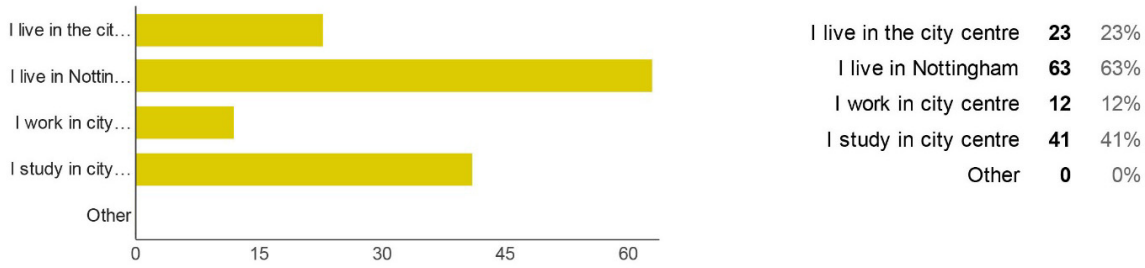


Figure 34: Connection of participants in the survey to Nottingham City Centre

5.3 Information about visiting public spaces

This study was carried out to investigate which criteria can bring people to the public spaces in the city of Nottingham based on the user's experience. A total of 100 participants responded to the questionnaire relating to public spaces use in the city centre of Nottingham. Participants were asked to respond to a number of questions in the online survey in order to develop a list of criteria that make public spaces more successful.

5.3.1 Frequency public spaces visit.

Figure 35 shows the percentage of how often participants visit public spaces in Nottingham city centre, based on their experience. The results illustrate that there is a slight difference in percentage between the first three highest percentages, as participants visit public spaces every weekend as the highest percentage of 30%, and 26 % of participants responded to visiting public spaces once a month, while just 23% of participants responded to visit public spaces several days per week. The percentages of visiting every weekend, once a month and several days per week are 30%, 26% and 23%, respectively. This indicates that users of public spaces are frequently visiting the city centre. Meanwhile, just 15% of participants responded that they visit public spaces every weekday. Finally, just 6% of participants responded to visiting public space once a year, as the lowest percentage in the result.

Figure 35: How often participants in the survey visit public spaces

The reliability test was administered to test the reliability of survey data on the utilisation and activities of the public space; the percentage value of data reliability (Cronbach's Alpha) on the use and activities in the public spaces has a range of 0.701, which is good and reliable. According (Mohamad et al. 2015) a reliability value ranging from 0.67 to 0.80 is fair. This confirms the validity and reliability of this survey's data.

The participants responded to the question: When you use public spaces, what do you usually do? The question was multiple responses, so participants can respond to more than one answer, based on their experience. The result in Figure 36 demonstrates the percentage of the responses to the public space's utilisation and activities. The results demonstrate that the participants responded to Sit and Relax during their visit to the public spaces in Nottingham city centre as the highest percentage with 60%. This indicates that the majority of participants prefer to sit in the public spaces and spend time rather than just passing through, which can encourage the participants to become involved with the activities in the public spaces. The results show that there is a slight difference between the second and the third highest percentages of total responses; the percentage of participants who prefer to 'Eat/Have coffee outside' is 51% as the second highest percentage of the responses in total,

while the percentage of ‘Socialise/ spending time with Co-workers / Friends / Family’ is 48%.

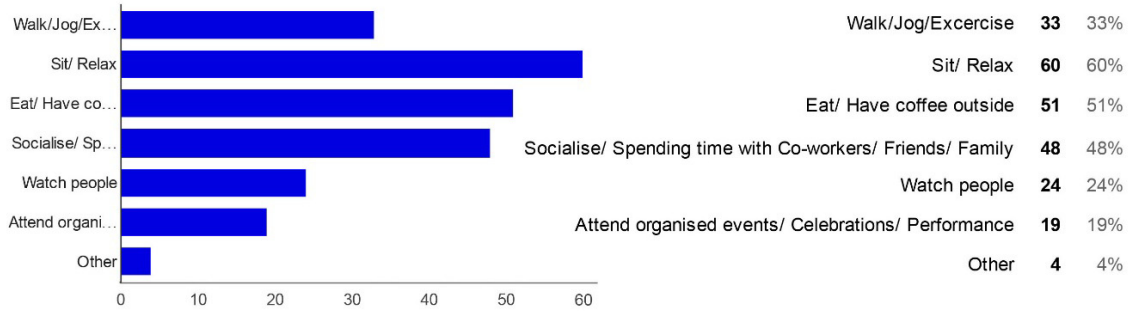


Figure 36: Use and activities of participants in public spaces

Both percentages show that participants prefer to meet up for socialising in the place with friends, family or even with co-workers, having coffee outside during their visit to the public spaces in Nottingham city centre.

Moreover, the result illustrates that 33% of participants prefer to walk, jog and do exercise during their time in the public spaces; this is an indication that respondents prefer to be involved with activities in the public spaces for more socialising or to do exercise during their visit to the public spaces. Meanwhile, 24% of participants prefer to go to the public spaces just to watch people, enjoy the atmosphere and be among people, which can encourage users of the public spaces to spend more time in the place. Watching people around you, what other people do, talking to each other or sitting in the place, these different activities provide the users with the opportunity to increase the sense of the place and become part of those activities in the place.

The results in Figure 36 also show the percentage of participants who prefer to attend organised events, celebrations or performance with 19% of the total responses. The percentage illustrates that organised events or performance attract fewer people to use public spaces, while previously the results showed that participants prefer to meet their friends, families, co-workers in public spaces. Finally, the results also demonstrate the percentage of responses who suggest adding new utilisation and activities in public spaces with just 4 %. Their answers were ‘shopping – do some work in the bank – play sports – listen to music’. These new responses have a connection to some existing answers already in this question in the survey such as play sports, which has a connection to ‘walk/jog/exercise’, which 33% of participants responded. Exercise in public spaces can be playing football or doing another sport; this explains that participants want to be more specific about which exercise they can do in the public spaces and gave this example. Both of ‘shopping and do some work in the bank’ can connect them to the same option

'walk/jog/exercise', because walking in the public spaces can be visiting the surrounding area of public spaces, could be walking to restaurants or shops, or even crossing the public spaces during shopping. Finally, the answer 'listen to music' explains that the participant prefers to be in public spaces and listen to music while enjoying the surrounding area and watching other people. All new answers explain that participants tried to be more specific while choosing their answer to the question *What do you usually do during your visit to the public spaces?* and provide answers with more detail, which have a strong connection to the provided options in the questionnaire.

Table 8: Cross-Tabulation between Use & Activities and Age

			Age						
			under 21	21-24	25-34	35-44	45-54	55-64	Total
Q2 use and activities [a]	Q2_walk_jog	Count	4	6	14	5	2	2	33
	Q2_sit_relax	Count	4	14	25	10	4	3	60
	Q2_eat_coffee	Count	6	12	25	3	4	1	51
	Q2_socialise	Count	2	11	21	6	5	3	48
	Q2_watchppl	Count	1	6	9	5	3	0	24
	Q2_attend_event	Count	2	4	5	3	3	1	18
	Q2_other	Count	0	0	1	1	0	0	2
Total		Count	12	20	42	17	5	4	100

Percentages and totals are based on respondents.

a. Dichotomy group tabulated at value 1.

Table 8 demonstrates the cross-tabulation between the participants' age groups and the utilisation of public spaces and activities. As shown previously in Figure 33, the majority of responses was 'sit/relax' with 60%; the highest percentage between age groups of participants were aged 25-34 with 25 responses to 'sit/relax'. Furthermore, both age groups '21-24 and 35-44' responded to 'sit/relax' with 14 and 10 responses respectively. In addition, the lowest percentage of responses was all other age groups (under 21 & 45-54 & 55-64) with percentages of 4%, 4%, and 3 %, respectively.

The result in Table 8 above also demonstrates the percentage of responses of participants' age groups on the second-highest utilisation of public spaces, 'eat/have a coffee outside' as shown in Figure 36. The highest response between age groups is age 25-34 with 25 responses, and the second-highest response is age group 21-24 with 12 responses. Attend organised events/ celebrations/ performance scored the lowest percentage of the utilisation of public spaces, responded to by participants' age groups with almost the same percentage. The responses were divided almost equally between age groups; five responses for the age group 25-34; four responses for the age group 21-24, and three responses each for age

groups 35-44 and 45-54. Lastly, both age group under 21 and 55-64 responded with two responses and one response respectively, on 'attend organised events/ celebrations/ performance'.

The results in Table 8 above explain that participants' age groups responded to different utilisation and activities during their visit to the public spaces in Nottingham city centre. Age group 25-34 responded to both 'sit /relax & Eat/Have coffee outside', with 25 as the highest percentage, while age group 21-24 responded to 'sit/relax' with highest responses. Also, the age group 35-44 responded to 'sit/relax'. The utilisation of 'socialise/spending time with co-workers/friends/family' was responded by the age group 45-54. Elderly participants responded to both 'socialise/spending time with family and co-worker and sit/relax' with the same responses. Finally, those aged under 21 prefer to 'eat/ have a coffee outside'.

The result above explains that all age groups use the public spaces in a different way; each age group prefers different activities; the diversity of utilisation of the public spaces and activities by different age groups offers enough evidence that public spaces in the city centre are vital and active. The physical activities in the urban context make public spaces more dynamic and active; that is, the more activities that are occurring in a place, the more people have an opportunity to participate in them.

a. Correlation coefficient test of Use and activities

A correlation coefficient test was carried out to determine the degree of association between the utilisation and the activities in the public spaces with other variables that make public spaces more successful. Table 9 below present the results of the correlation coefficient test, which demonstrates a number of correlations between the use of public spaces (socialize/spending time with co-workers/friends/family) and other variables.

Table 9: Correlation Coefficient (Socialise/ spending timeout)

Correlation coefficient Test Q2- socialise/spending time with Co-workers / Friends/family		
Q6_landscaping /garden	Pearson Correlation Sig. (2-tailed) N	.322** .001 100
Q6_lighting	Pearson Correlation Sig.(2-tailed) N	.311** .002 100
Q6_food_carts	Pearson Correlation Sig.(2-tailed) N	.300** .002 100
Q6_markets	Pearson Correlation Sig.(2-tailed) N	.331** .001 100
Q5_children	Pearson Correlation Sig.(2-tailed) N	.311** .002 100

According to Figueiredo Filho et al. (2013), the correlation coefficient value (r) is of statistical significance at 0.5 and P-value ≤0.05 (Figueiredo Filho et al. 2013). The results from Table 9 above illustrate that there was evidence of relationship (the moderate positive relationship) between socialising as used in the place and landscape/garden element (r = o.322, p = 001), that means landscape and green element can encourage participants to use the public spaces for socialising and meeting their friends, family or co-workers. Meanwhile, the table above shows an indication of the relationship between Lighting element and Socialise in the public spaces; (r =0.311, p = 002, p≤0.005), Lighting element has a moderately significant correlation with Socialise; this indicates that providing public spaces with lighting can enhance sociability in the place, so users can gather and spend more time with their friends, family, and co-workers.

Meanwhile, the correlation coefficient test in Table 9 illustrates the relationship between socialising and both 'food carts/ Trucks' and 'Pop-up stores/markets'. There is an indication of a relationship between them. Correlation coefficient value (r) for 'food carts/Trucks' is statistically significant at (r = 0.30), that means food carts and socialise have a positive moderate significant correlation, while the P-value is (P = 0.002, P≤0.005). 'Pop-up stores/markets' has a relationship with socialising; as shown in the table above, there is evidence of positive moderate correlation coefficient (r = 0.311, P-value = 0.002, P-value ≤0.005). This is an indication of the role of providing food and markets in the place which enhance the users to visit the public spaces and enjoy their time there. Diversity in the use and activities in public spaces give opportunities for users to experience different functions of the place. The term 'functionality' is applied to the place that functions well at all times, as these elements support vitality in the public spaces in terms of land-use patterns, as a place that is well used in relation to its predominant function. The most appropriate mix of use.

Figure 37: Types of activities that occur at different times

Figure 37 demonstrates the types of activities that occur at different times. The results show that most of the activities such as sit/relax which is the highest percentage among other activities (previously shown in Figure 36) occur mostly at the same time 'several days per week' and 'every weekend'. Moreover, 'eat/have coffee outside' and 'socialise/spending time with co-workers/ friends/ families) are occurring almost at the same time 'several days per week and every weekend' with a lower percentage than 'sit/relax' activities. This explains that a number of activities occur at different times. People walking, eating, playing, and relaxing at the same time and, having something to do gives people a reason to come to a place and visit it again. That is the best measure that public spaces are attracting different age groups and becoming a more sociable place.

Figure 37 also illustrates that the public spaces in Nottingham city centre are in use most of the time. Different types of activities occur several days per week and every weekend, which gives a clear understanding that the public spaces being used by people most of the week and are not empty.

5.3.3 Access and connectivity

The percentage value of the data survey reliability statistic (Cronbach's Alpha) on travelling to public spaces has a range of 0.808, which is a good and reliable value. This provides validity and reliability to the survey data, which can be measured.

Figure 38 below illustrates how participants normally travel to public spaces. The results show that the percentage is almost the same between 'walking' and 'taking the bus' to visit public spaces in the city centre. The majority of the participants, 35% prefer to walk to the public spaces in the city centre of Nottingham representing the highest percentage. Meanwhile, 34% of participants prefer to use the bus to go to public spaces; both percentages show how participants prefer to travel to the city centre. These percentages can be explained by connecting them with the previous percentages of the connection to Nottingham city centre in Figure 31. In this case, 63% of participants were living in the city of Nottingham as the highest percentage while both second and third highest percentages were 41% for studying in the city centre and just 23% for living in the city centre. This indicates why the participants prefer to walk and use buses to go to the public spaces, due to their connection to the city centre.

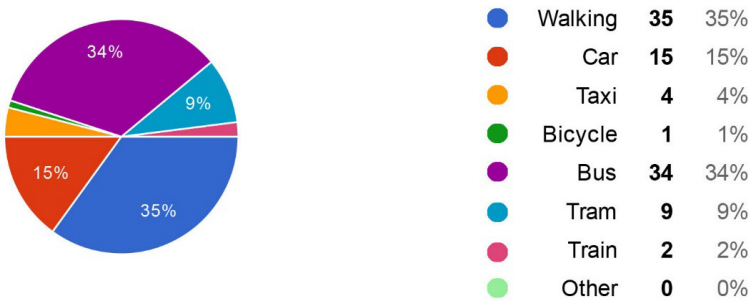


Figure 38: How participants would normally travel to public spaces

The results also show that 15% of participants prefer to use 'car' as the way to visit the city centre, while just 9% of participants prefer to use 'tram' to get to the city centre. Only 4% of participants prefer to use 'taxi' to travel to the city centre; meanwhile, 'train' (2%) and 'bicycle' scored the lowest percentages in the results.

In fact, the three highest percentages were divided between walking (35%), travel by bus (34%) and travel by car (15%). This means that participants use a variety of transportation options to reach the public spaces in the city centre which reflects how the public spaces in the city centre are accessible in different ways of travel. Furthermore, 78% in total of responses (walking, Bicycle and Bus) illustrates the high percentage of mobility to reach the city centre.

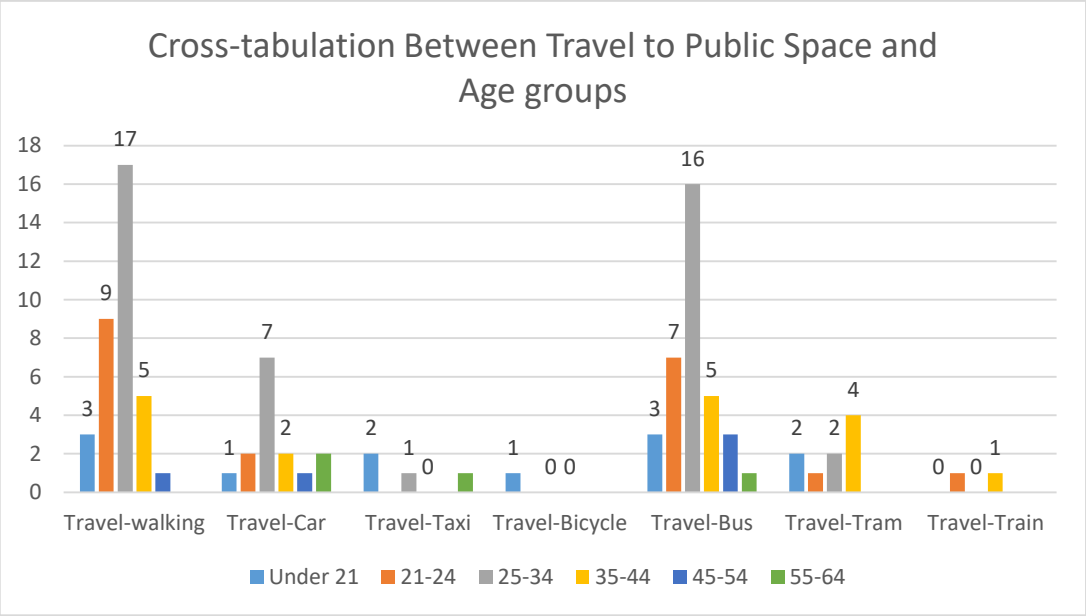


Figure 39: Cross-tabulation between Travel to Public Spaces and Age Group

Figure 39 above demonstrates the cross-tabulation between different age groups of participants and which transportation modes participants prefer to use to visit the public spaces in the city centre (Access and connectivity). The results from Figure 39 illustrate that the 25-34 age group prefer to walk to the public spaces as the highest percentage for this group with 17 responses, while the second-highest percentage use the bus with 16 responses. This means that the 25-34 age group demonstrates almost the same interest in walking and using the bus to visit the public spaces. Meanwhile, the age group 21-24 has the same interest in the way they travel to public spaces, Figure 39 demonstrates that the 21-24 age group prefer to walk as the highest percentage with nine responses, while the second-highest percentage for this age group is to travel by bus with seven responses. This means that walkability and public transportation are playing important roles to gather people together in public spaces in the city centre.

In fact, the 35-44 age group between has the same percentage on both walking and using the bus with just five responses, reflecting the highest responses in this age group, while four responded that they used tram as a way to travel to public spaces in Nottingham city centre. The results show that this age group prefers to walk as the first option and use public transportation to visit the city centre as the second option. The responses from the under-21 age group were divided randomly around all options of travelling to the city centre; this age group responded to walking with two responses, travel by car with just one response, travel by bus had three responses, Traveling by tram had two 2 responses, and using bicycle had one response.

The results show that the different age groups can easily reach public spaces in the city centre, which means that public spaces in the city centre are functioning well and walkable. The second-highest percentage, travel by bus shows that heavy traffic is not a problem during their visit to the public spaces in the city centre, and the city is connected well by public transportation.

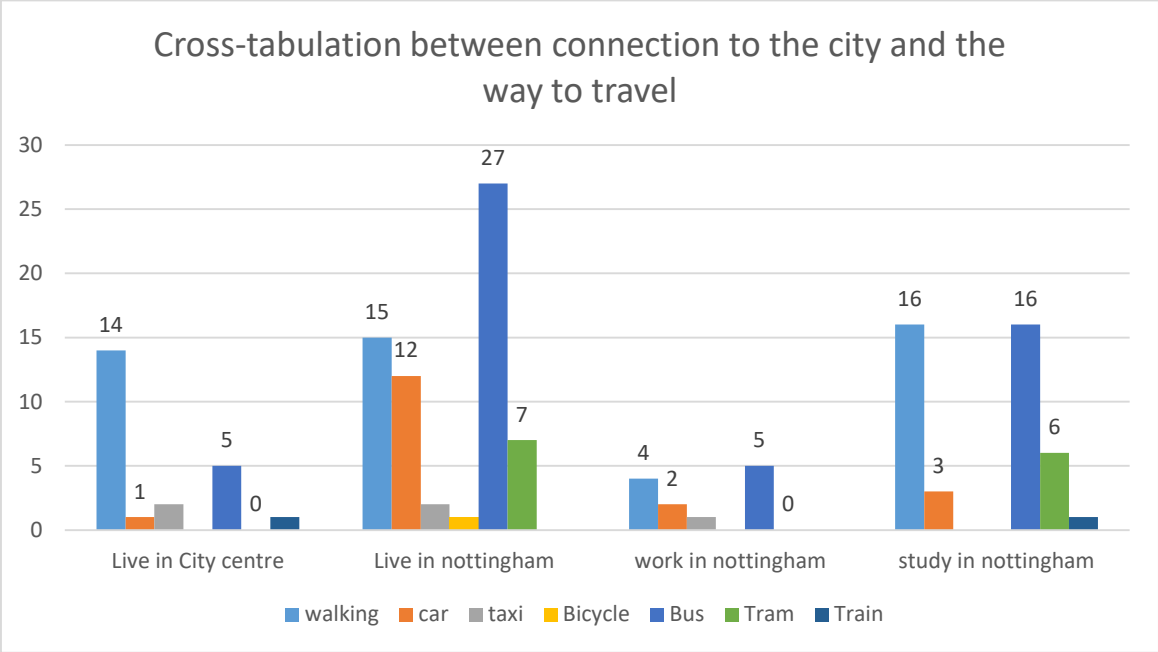


Figure 40: Cross-tabulation between connection to the city and Travel to the city

The results from Figure 40 above illustrate the cross-tabulation between how participants normally travel to public spaces and their connection to Nottingham city centre. The majority of participants (63%) were already living in Nottingham city as previously shown in Figure 33. They prefer to use the bus to visit the city centre as the highest number of responses with 27. Walking is the second-highest percentage with 15 responses; meanwhile, participants who live in Nottingham city prefer to walk to reach the public spaces, and just nine prefer to use the tram as the second-highest percentage for participants who live in the city centre. Participants who study in Nottingham city choose both walking and bus as the way to travel to the public spaces in the city centre as the highest percentage with 16 responses. That means the public spaces in Nottingham city centre is easy to get to, and accessible by foot, bus and tram.

5.3.4 Social aspect in the public spaces

Figure 41 below demonstrates the percentage of participants who normally visit the public spaces alone, with a group, or 'both' (equally divided). The highest percentage was 'both' (equally divided) with 45%. Participants responded to this option as they visit public

spaces ‘alone’ and in a ‘group’ equally. Meanwhile, the percentage of participants who prefer to visit public spaces in the city centre as a group is 37%. This result gives an indication that respondents prefer to go to the public spaces in groups rather than alone; participants want to be part of a group and surrounded by people for more socially.

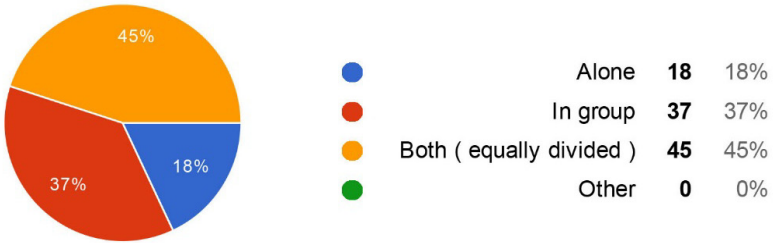


Figure 41: Visiting public spaces alone or with group

The results also show the percentage of participants who prefer to visit the public spaces alone with just 18% of the total. Both the highest percentages show that participants prefer to visit public spaces in groups rather than alone; this reflects the need for sociability in their lives, among people, which can make spend more time in the public spaces and enjoy their stay.

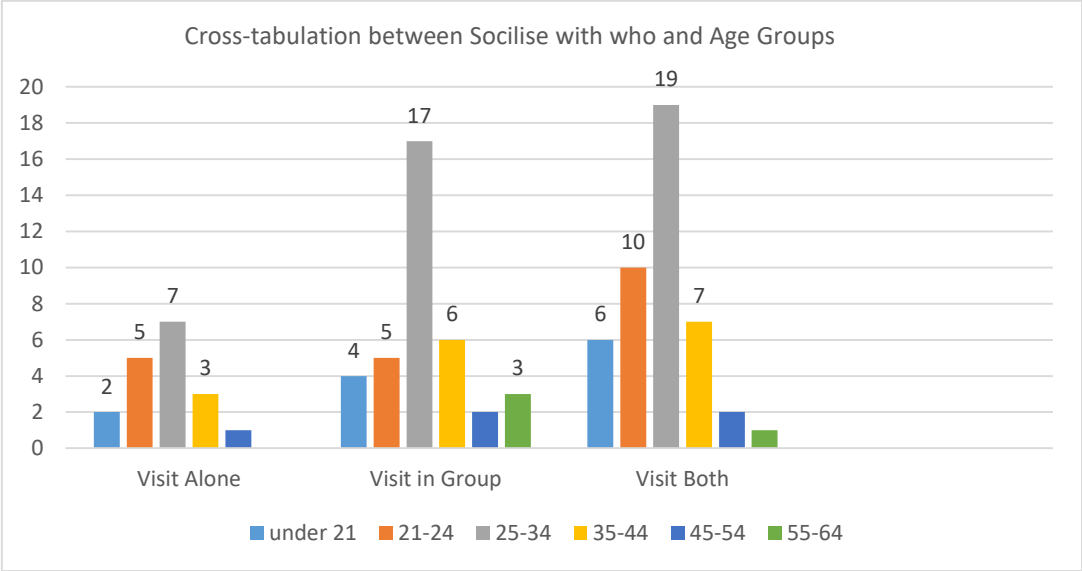


Figure 42: Cross-tabulation between Socialise with who And age Group

The results from Figure 42 above demonstrate the cross-tabulation between ‘socialise with who’ and different age groups of participants in the questionnaire survey. The age group 25-34 is the highest percentage of the total of participants as previously shown in Figure 27 with 44% of participants. The Figure also illustrates that the age group 25-34 prefer to visit public spaces ‘both equally divided’ and ‘in-group’ with 19 and 17 responses, respectively, as the highest percentage of responses. Just seven responses, were to visit public spaces alone, while the majority of the responses of other age groups are divided between a visit

in the group and visit both ‘equally divided’. These results show that public spaces in Nottingham city centre are used by people of different ages, which supports the sociability in the city centre.

4.3.5 Characteristic of visitors of the public spaces

Figure 43 below demonstrates the percentage of responses on ‘with who’ participants normally prefer to visit the public spaces in Nottingham city centre. The results illustrate that the majority, 75%, visited public spaces with friends, as the previous results of the use and activities that occur in the public spaces Figure 36 showed that 48% of participants go to public spaces for ‘socialise /spending time with co-workers/friends/family’. This indicates why the majority prefer visiting public spaces with friends or with a partner.

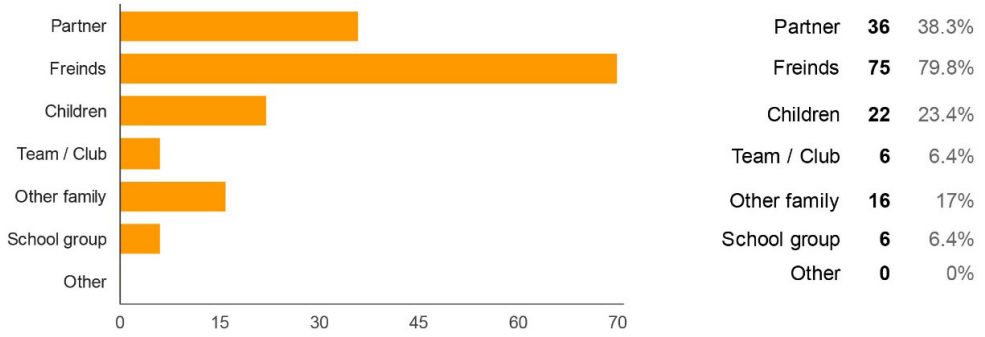


Figure 43: Who participants in the survey normally visit public spaces with

Figure 43 above also demonstrates the second-highest percentage with 38.3% (36 of 100) of participants who prefer to visit public spaces with their partner. Previous results in ‘marital status’ (Figure 33) demonstrated the participants’ marital status. The second highest percentage is ‘married’ with 45%; in this category, participants spend their break time with their partners in the public spaces, having coffee or chatting outside. Moreover, the results show the percentage of participants with 23.4% (22 of 100) who prefer to visit public spaces with their children; at the same time, 17% (16 of 100) of participants prefer to visit public spaces with another family member. Both these responses relate to family ties and their effect to attract people to visit public spaces in order to spend more time with the family members and change the routine at home.

Finally, the results also show that only 6.4% (6 of 100) participants prefer to visit public spaces in the city centre with ‘team/club’ or with a ‘school group’. These responses are the lowest percentage in this result; this gives an indication that users prefer to not visit public spaces in big groups such as team, club, or even school group.

This question was optional due to being related to the previous question, (*Do you normally visit public spaces alone or with a group* ?), in case of participants chose to visit public spaces alone, so there was no need to answer this question.

5.3.6 Features and amenities in public spaces.

Reliability statistic test was carried out to find out whether participants in the online survey understand the features and amenities that could make public spaces more comfortable and attractive. The reliability statistic, Cronbach's alpha, has a value of 0.740. However, Bond and Fox (2007) discussed that the acceptable range of reliability value should be more than 0.7 and be familiarised directly to a reliability test. That means the data are reliable, valid, and can be measured (Bond & Fox 2007).

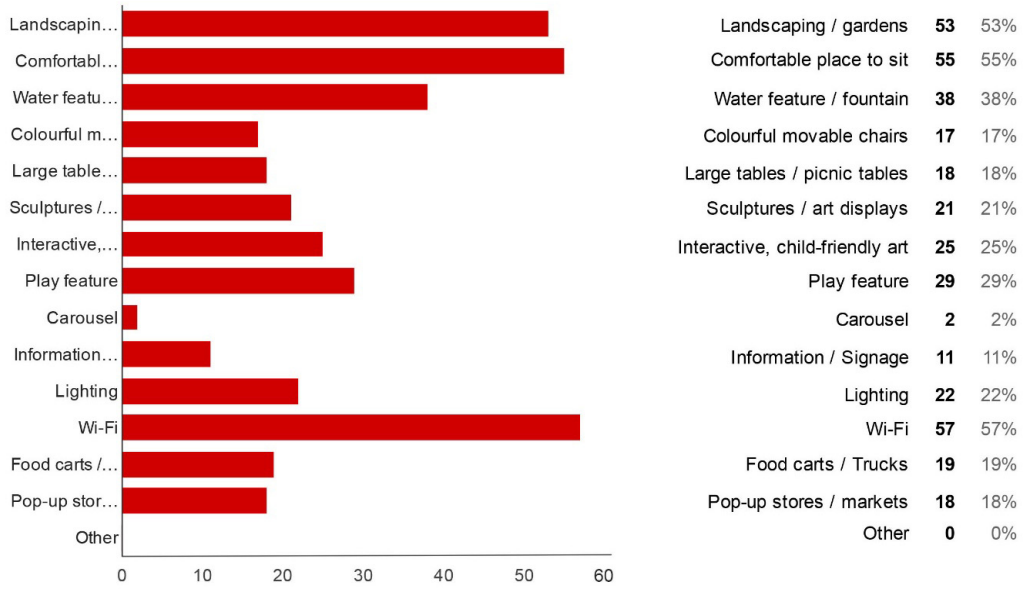


Figure 44: Amenities and features that could be provided to make public spaces more comfortable

The results above in Figure 44 demonstrate a similarity in the percentages on both highest percentage 'WI-Fi and comfortable place to sit', as the majority of participants, 57%, choose Wi-Fi (57 of 100). This result reflects the number of participants in the age group 25-34 as shown previously in Figure 27 as the highest percentage compared to other age groups of participants with 44%. This age group may be more familiar with the technology nowadays compared with other age groups because they grow up and get used to new communication such as Wi-Fi. Moreover, with 57 among 100 participants in the questionnaire citing Wi-Fi as the most important feature, this reflects how new communication such as Wi-Fi affects our lives and has become part of daily life.

Participants prefer Wi-Fi as the most important feature that can make public space more comfortable and attractive for them in the short term (as stated above, this new

communication has become part of our daily life). Table 10 below illustrates the cross-tabulation between the features and amenities with age groups of participants in the questionnaire.

Table 10: Cross-tabulation of features and age

			Age						Total
			under 21	21-24	25-34	35-44	45-54	55-64	
Q6 Feature and Amenities	Landscape/Garden	Count	3	10	26	7	3	3	52
	Comfortable place	Count	6	12	22	7	4	4	55
	Water feature	Count	1	8	19	5	2	3	38
	colourful chair	Count	0	5	6	4	0	2	17
	large table	Count	2	3	9	1	1	1	17
	art displays	Count	0	5	8	3	2	2	20
	Child-friendly art	Count	0	3	14	4	2	2	25
	play feature	Count	1	3	15	8	2	0	29
	carousel	Count	0	1	0	0	0	1	2
	Information/signing	Count	0	2	3	4	1	1	11
	lighting	Count	1	4	13	2	0	2	22
	Wi-Fi	Count	6	12	29	5	3	2	57
	food carts/Trucks	Count	2	4	6	3	2	2	19
	Pop-up / Markets	Count	2	4	4	3	3	2	18
Total		Count	12	20	43	16	5	4	100

a. Dichotomy group tabulated at value 1.

The results from Table 10 above show the cross-tabulation between the age group of participants and amenities and features that make public spaces more comfortable and attractive. The age group 25-34 was the highest percentage who chose Wi-Fi to make the place more comfortable with 29 responses, the age group 21-24 was the second-highest percentage with 12 responses, while the under-21 age group gave six responses, and the age group 35-44 gave five response. Meanwhile both 45-54 and 55-64 age groups responded with just three and two responses, respectively. Also, Table 10 shows that young participants prefer public spaces that have Wi-Fi, which attract them more and makes them more comfortable in the place, Young participants rely on Wi-Fi to connect with their friends. Also, Wi-Fi is an important element for sustaining intimacy at a distance and could help to decrease the feeling of loneliness or a sense of disconnection.

Results also demonstrated that the under-21 age group (teenagers) and 55-64 age groups (elderly participants) chose the Wi-Fi as a feature to be provided to make the place more comfortable and attractive. All participant age groups in the questionnaire prefer to have Wi-Fi provided in the public spaces. It is to be expected, however, that there are

differences in the number of responses between age groups, due to the percentage of participants' age in the questionnaire (see Figure 31), which demonstrated the majority of participants were in the 25-34 age group with 44%, even though teenagers and elderly people demonstrated interest in the new communication such as Wi-Fi, and stated that they feel more comfortable in and attracted to the public spaces if Wi-Fi service is provided. The new communication era is affecting all different age groups on how they use public spaces; therefore, providing Wi-Fi in public spaces can gather different age groups and enhance diversity in the place.

Table 11: Cross tab between Wi-Fi, Use & Activities

		Use and Activities						
		walk/Jog	Sit/Relax	Eat/Coffee	socialise	Watch people	Attend event	Total
Wi-Fi	no	8	24	19	14	6	6	42
	yes	25	36	32	34	18	12	56
Total		33	60	51	48	24	18	98

How can new communication (Wi-Fi) affect the utilisation of the public space? Table 11 demonstrated the cross-tabulation between the responses relating to providing Wi-Fi to make public spaces more comfortable and the responses on the use and activities that participants usually engage in during visiting public spaces in Nottingham city centre. The results (Table 11) demonstrate that participants who choose Wi-Fi prefer to 'sit and relax' in the public spaces with 36 responses as the highest percentage while socialising in the public spaces and spending time with 'friends, family, and co-workers' was the second-highest percentage with 34 responses. This was almost the same percentage as the utilisation of 'eat/have a coffee outside' with 32 response; 'walk/jog/exercise' drew 25 responses, while, participants who prefer Wi-Fi be provided choose 'watch people' with 18 responses during their visit to public space. Finally, 'attending organised events/celebration, performance' was the lowest percentage with just 12 responses.

The results above explain that the Wi-Fi feature can be provided in public spaces to encourage the users to gather there and enhance how public spaces are used. The participants chose to socialise and spend time with their friends, and family, at the same time, they need Wi-Fi to be provided in public spaces to make it more comfortable and attractive for them without isolating the users from the surrounding activities. A total of 57% of the participants chose Wi-Fi to be provided in the public spaces to make the place more comfortable and to attract more people to visit the public spaces.

The results in Figure 44 above demonstrate the percentage of the second-highest responses on which features could be provided in the short term to make public spaces more comfortable and attractive for the users. Participants chose a comfortable place to sit with 55% as the second-highest percentage. Table 11 above illustrates the cross-tabulation between the age groups of participants and which features can be provided in the place. The age group 25-35 is the highest percentage compared with other age groups with 22 responses, and the age group 21-24 responds to a comfortable place to sit with 12 responses as the second-highest percentage. Moreover, under-21s (teenagers) and those aged 35-44 have almost the same percentage with six and seven responses, respectively. Finally, both age groups of older and elderly participants (45-54 and 55-64) have the lowest percentage of responses, both with four responses each. The results in Table 11 shows that young participants prefer a comfortable place to sit as an important feature in the public spaces that can attract them to visit and make them more comfortable, at the same time. Also, other participant age groups show the same interest but with different percentages; that providing a comfortable place, that providing a comfortable place can give the public spaces opportunity to be more attractive to different age groups.

The results above also show that all age groups responded to 'comfortable place to sit' as an important feature to be provided in the public spaces with the highest number of responses in a total of each age group's responses. The users can come to the place and spend their free time sitting in a comfortable place, enjoying the surrounding atmosphere or even get involved in the activities in the place. Furniture elements that suit all age groups are one of the priorities in terms of designing physical layout. Each age group has different needs in terms of a comfortable place to sit; elderly people need more care and relaxing chairs while teenagers prefer furniture suitable to their needs in terms dimensions of the furniture, and which material is used. Furniture in public spaces can play an important role to attract different age groups. 'Comfortable place to sit' can be related to the location of the sitting area, in terms of shade or privacy. Teenagers tend to look for more private areas where they can play and gather with their friends away from their parents and other age groups in public spaces. Because most of the age groups prefer to sit or stand in the shade on a sunny day, it is really important in designing the furniture and the physical layout of the public spaces to take into account the different age group's needs.

Another feature that participants prefer to be provided in the public spaces is 'landscaping/ gardens'. A total of 53% of Participants responded which is almost the same percentage of responses for 'comfortable place to sit'. The green element can attract more people to visit

public spaces and the furniture may enhance the users to spend more time to enjoy the landscape and the garden in the public spaces. Table 11 above illustrates the age groups of participants who chose the 'comfortable place to sit' as important for them during their visit to public spaces in Nottingham city centre. The age group 25-34 is the highest percentage with 26 responses, the age group 35-44 chose features of landscaping and garden with just seven responses, while other age groups (under 21s, 45-54 and 55-64) have the same percentage of respondents with just three responses each, which is the lowest percentage compared with other age groups.

Table 12: Cross-tabulation of Landscape/ Garden feature and gender

		gender		
		Female	Male	Total
Q6_features_Landscape	no	19	29	48
	yes	20	32	52
Total		39	61	100

Table 12 above demonstrates the cross-tabulation of participants' gender who responded to the 'landscaping/garden' feature. The results illustrate the numbers of females and males who chose the landscaping and garden element to make public spaces more attractive and comfortable for them. Of the men, 32 of 61 chose 'landscape and garden' to be provided in the short term to make public spaces more comfortable and attractive for them. Meanwhile, 20 of 39 women participants in the questionnaire also prefer landscaping and green element to be provided as one of the most important features in the public spaces. Green element and landscape have an impact on the way women use the public spaces; increases the number of women in public spaces can enhance the image of the place in terms of safety. This percentage of women's responses reflects on how green elements can affect their level of satisfaction in public spaces.

Figure 44 also shows the percentage of another feature that makes public spaces more comfortable and attractive; 38% of the participants respond to 'water feature and fountain' to be provided in the public spaces. The water element in the public spaces was selected as one of the most important features based on the users' experience, as this feature attracts participants to use and spend more time in the place. Design principles of the public spaces are key elements to deliver active public spaces, and water features and fountains can encourage different activities to occur in the public spaces. Children play in the water during the summer, as the water element reduces the hot temperature in the place and increases the comfortability of the users in the public spaces. Table 10 demonstrates the age groups of participants in the questionnaire who responded to 'water feature/

fountain‘ feature to be provided in the public spaces to make it more comfortable. The results above show that 19 of the age group 25-34 responded as the highest percentage compared with other age groups, and age group 21-24, the second-highest percentage, responded with eight of 38 responses. Meanwhile, only five of those aged 35-44 responded, while other age groups (under-21s, 45-54 and 55-64) have the lowest percentage of respondents compared to other age groups responses with one, two, three responses each, respectively.

The result in Table 10 shows that the younger age group prefer water feature and fountain to be provided to attract them to the public spaces. The teenagers and elderly participants did not show a high interest in the water and fountain feature compared to other features listed in question 6 of the questionnaire. The results show that, in general, all participant age groups have different concerns over whether a water and fountain feature is most important or least important for them, as can be seen in the number of responses from each age group, the features of water and fountain is one of the important features which should be provided in the public spaces.

Concerning the results in Figure 44 on which features and amenities could be provided to make public spaces more comfortable and attractive, participants responded to ‘play feature’ with 29% of the total responses. Providing public spaces with play area increase the different activities and utilisation in public spaces. As regular users of the public spaces, children have certain needs to make them visit the place again and again. The time they spend in the public spaces, playing in the playground is an important element to assess whether public spaces are successful in attracting them or not. The cross-tabulation in Table 10 between the age group of participants and features and amenities show that the age group 25-34 has the highest percentage of 15 responses. Other age groups have a low percentage of responses in comparison with the 25-34 age group, while the under-21 age group responded to the ‘Play feature’ with a low number of responses, while other age groups have the same low number of responses compared to the total responses in each age group. The ‘play area’ feature can offer dynamic movement to the place and encourage different physical activities to occur in the public spaces for different age groups. The youths are more active and looking for spaces to do different exercise and sports, which encourages the social interactions between the users of the public spaces, where they can play alone or with others.

The results in Figure 44 illustrate the percentage of participants who chose the 'interactive/, child-friendly art' feature with just 25% of the responses. Moreover, the results also show that there are almost the same percentages in both 'lighting' feature and 'sculptures/art displays' feature with 22% and 21%, respectively, while the percentage of responses on the 'food carts / Trucks' feature was just 19%.

Furthermore, Figure 44 illustrated the percentage of the responses relating to 'large tables/picnic tables and pop-up stores/markets'. The results demonstrated that the percentage for both of these features are the same with just 18% of total responses. Different types of furniture (tables, chairs) can encourage people to come to visit and spend time in public spaces, as furniture can enhance the utilisation of the public spaces. For example, providing the public spaces with picnic tables can give the users the opportunity to celebrate their events or have, barbeques, while markets can attract people to visit the public spaces to buy their daily necessities or enjoy the atmosphere of being among people.

Furthermore, the results show that 11% of participants chose the feature of 'information and signage' in public spaces. Information and signage in public spaces can encourage users to know their direction when crossing the site or when they want to find important facilities. Finally, the results in Figure 44 also shows that just 2% of the participants chose the 'carousel' feature as the lowest percentage compared with other features and amenities in the public spaces. The participants considered the carousel as the less important element among the criteria that can bring people to the public spaces in the city centre of Nottingham.

The questionnaire highlighted a number of criteria that make public spaces active based on the users' experiences. The users of the public spaces in Nottingham city centre who participated in the research questionnaire responded to the question based on their experience in the public spaces. All criteria represent really important principles in designing active public spaces, and the participants give weight to these criteria, by ranking them in the level of importance to them.

5.4 Discussion on the users' experience in the public spaces.

This section discusses the outcomes of the users' experience via the online survey. The discussion stage focuses on each category of the active public spaces framework.

5.4.1 The utilisation and activities in public spaces

The results of the questionnaire on what makes public spaces active in terms of utilisation and activities demonstrate that public spaces were used by different age groups. The users report more interaction with each other and prefer to visit public spaces in groups to socialise with their friends, family members, and co-workers, and have less interaction with strangers in the public spaces. This finding indicates that the users feel more comfortable with people they know personally, compared to interacting with community and strangers. This finding concurs with Kim et al. (2003) who state that the users of public spaces are more confident to visit public spaces with people they know personally such as family members and friends. The results show that the relationship between family members plays a significant role to encourage people to get involved in the activities in the public spaces. Meanwhile, the finding above disagrees with Kazmierczak (2013) who asserted that people interact with strangers or neighbours in public spaces. Therefore, people use public spaces and interact with people they know such as family members and friends.

The findings of activities and utilisation in the public spaces indicate that public spaces have been used in different activities by different age groups. Each age group is attracted to different activities and uses the public spaces in a different way compared to other age groups, It appears that diversity in activity types can make public spaces more attractive to all age groups. This finding accords with Carmona and Tiesdell (2007) who pointed out that public spaces can encourage different age groups by providing different types of activities in public spaces. This means that each age group can be encouraged to use public spaces by understanding their needs in terms of the type of activities.

The findings relating to utilisation and activities indicate that the users of public spaces prefer to utilise public spaces to socialise and spend time with friends, and family more than doing exercises such as walking or jogging. This means that people use public spaces for more social activity and less physical activity, although physical activity does not decrease the interaction between users. This finding agrees with Thompson (2002) in the literature review chapter who illustrated that British people like to engage in many types of activity such as walking and chatting in groups which promote social interaction. However, this finding is not consistent with Chiesura (2004) who showed that the users of public spaces prefer to use public spaces for physical activity and do individual exercise such as walk and jog, which they cite as the main reason to use public spaces.

The utilisation of the public spaces is a critical element to assess the quality of public spaces. The finding shows a moderate positive relationship (r = o.322, p = 001) between 'socialising, spending time out with friends, and family member' and 'landscape/garden' elements. This means that an increase of the green element and landscape can encourage the people to use public spaces to socialise and to meet their friends or co-workers, this finding is in accord with Lang (1994), that the relationship between people and the surrounding environment encourages the users to participate in a system of socialising in order to achieve psychological comfort. Furthermore, Burgess et al. (1988) agreed with the finding that landscape and green open spaces provide opportunities for children to play in the place and enhance the sense of community among the users.

From the finding of the utilisation and activities in public spaces, there is enough evidence of a relationship (r =0.311, p = 002) $p \leq 0.005$ between lighting elements and using the place for socialising and spending time with friends. That means that the lighting element is encouraging people to use public spaces, particularly at night. Feeling safe, particularly after dark can encourage people to use public spaces for more social life. As mentioned in the literature review Gehl (2002) previously showed agreement with this finding that safety measures through the provision of lighting in the night and security could encourage people to use public spaces, particularly at night.

The correlation coefficient test demonstrates another correlation between socialise and food cart and markets (r = 0.30, p=0.002) and (r =0.311, p-value = 0.002) respectively; that means there is a moderate positive relationship between them. Providing food and market in public spaces can encourage the users to visit the place and enjoy their time, which reflects on the sociability aspect. The Project for Public Space (2014) agreed with this finding as previously mentioned in the literature review that organised activities such as local market encourage people to use public spaces and enjoy their time. Buying food and drinks from food carts can enhance the comfortability of the users and give the users an opportunity to experience the different functions of the place.

Also, the findings showed the utilisation and activities of people who use public spaces frequently. Different types of activities occur several days per week and every weekend. People walk, talk, play or do exercise, relax and are involved in the activities. This explains that public spaces in Nottingham city centre are being used in a good way by different groups which leads to more interaction between the users. This finding is in accord with Gehl (2011:15), who pointed out the relationship between the number of

outdoor activities and frequency of interaction: ” the more time people spend outdoors, the more frequently they meet and the more they talk”. The diversity of activity types encourages different groups of people to use public spaces; it can enhance the sociability between the users, and it can measure how well the public space is functioning.

5.4.2 Accesses and connectivity in public spaces.

The results of the questionnaire about what makes public spaces active in terms of access and connectivity in the public spaces demonstrate that participants prefer to use both walking and public transportation ‘bus’ to visit public spaces in Nottingham city centre. This finding means that people use a variety of options to reach the public spaces in the city centre which is easily accessible in a number of ways. This finding is in accord with Hoehner et al. (2005) who pointed out that people who have easy access to public transportation or live closer to the public spaces use public spaces frequently. Moreover, both Schipperijin et al. (2010) and Roovers et al (2002) also agreed with this finding, that the relationship between the location of public spaces and the rate of visits to the public spaces. An inverse relationship exists between the rate of visits and distance to the public spaces. That means that accessibility can enhance the utilisation of and the number who visit the public spaces.

The findings also demonstrate that the different age groups can easily reach public spaces in the city centre. Different age groups can reach the public space by using different transportation they can walk, take the bus, or use the tram. Public transportation that is accessible to all age groups enhances the frequency of visiting public spaces in the city centre. This finding is in accord with Wendel et al. (2012) who illustrated in their study in Santa Cru, Bolivia that provision of public transport encourages frequent visits to the public spaces that would otherwise be too far to walk to.

5.4.3 Sociability in public spaces.

The results of the questionnaire about what makes public spaces active, and which criteria can make public spaces active in terms of sociability, show that people visit public spaces in groups more than visiting alone, and all different age groups show an interest in being part of a group rather than spending time alone in the public spaces. the Project for Public Space (2000, P.19) agreed with this finding as it pointed out that when people use public spaces, they tend to socialise with each other in groups.

The results illustrate another finding that people prefer to visit public spaces in a group with people they know personally more than interacting with strangers. Crabill (2009) pointed out that when people meet their friends and greet their neighbours, and interact with strangers, their sense of belonging to the place is increased. While the finding shows the role of family ties and interaction with people who they know more than strangers, on the other hand, Granovetter (1985) and Putnam (2002) argue about *bonding* and *bridging* in the social cohesion in the society. Bridging the social cohesion consists of lack of community ties and trust between residents particularly in the case of strangers. Kim et al. (2003) also argue that the feeling of the users of public spaces is more comfortable with people they know by names such as family members or friends more than socialising with strangers.

The number of women who use public spaces compared to men is high. The number of women in public spaces is used as a tool to measure and assess the function of the public spaces because women need more criteria to attract them to visit public spaces. Furthermore, Wagner and Peters (2014) noted that women visit public spaces when they feel safe about the spaces that attract them. This means that the safety factor influences women's decision to visit or not public spaces alone or with family members, which is an important concern for women.

The users of public spaces in Nottingham city centre prefer to be part of a group who know each other by names such as family member, friends, and co-workers more than interaction with strangers.

5.4.4 Amenities and feature that make public spaces more comfortable.

The results of which amenities and features can make public spaces more comfortable and attractive for the users in the short term, show that public spaces in Nottingham city centre was utilised differently by the users and a number of features were highlighted as important elements that could turn the public spaces into active place. The findings indicate the different experiences of using public spaces, where different amenities and features have been chosen based on users' experience in the place. For example, 57% of respondents prefer the Wi-Fi feature to be provided in the public spaces as the highest percentage compared to other features. As discussed above, Wi-Fi is a new communication which has become part of our daily lives. Nowadays there is much debate on how Wi-Fi can affect how public spaces are used. William H.Whyte (1980) noted in *The Social Life of Small Urban Spaces*, that what attracts people the most is other people, which highlighted the importance of face-face communication and how to enhance social interaction between

users of the public spaces. Hampton et al. (2010), on the other hand, who carried out a study on Internet use in the public spaces, found that people are more likely to spend time together in groups and noted an overall increase in the number of women. Hampton realised that people do not use their mobile device all the time:

"It seems they are using it when they are alone and waiting for someone to join them, or they are using it in those transitional space(areas between destinations), which I don't see as a loss to public space- and in fact, may allow people to reconfigure their time so as to better use public space." (Hampton et al. 2010a).

Furthermore, another study about the Internet users in the public spaces found that the use of Wi-Fi in the place created new relationships between people and also enhanced, maintained and strengthened existing social ties (Kraut et al. 2002; Hampton & Wellman 2003; Robinson et al. 2008). Other studies, however, demonstrated that the use of Wi-Fi decreases in the number of people's social circles due to the fact that spending more time online can reduce face-to-face communication and social activities in the public spaces (Kraut et al. 1998; Nie et al. 2005). The finding in this research about the Internet (Wi-Fi) use in the public spaces accords with (Hampton et al. 2010b). The cross-tabulation in Table 11 above between Wi-Fi and the use and activities in the public spaces, shows that the Wi-Fi feature can encourage people to use public spaces, as all age groups showed an interest in having access to Wi-Fi in public spaces.

Another study found that people chose 'comfortable place to sit' to make public spaces more comfortable and attractive for them. The sitting area is an element attracting different age groups to gather in the public spaces and spend more time relaxing and enjoying the surrounding area. This finding agrees with Whyte (2001) who pointed out the most attractive places and gathering for people are settings where people are able to interact with each other and enjoy the beauty of the surrounding environment, and where furniture, such as seats is provided to make the place more comfortable. Furniture (seats) can encourage people to relax in the place and spend more time, which can lead them to become involved in social activities. As Peinhardt (2017) noted; "Fixing seating can fix a space, bringing back the character interactions that define what it means to use a public space".

The finding also demonstrates that all participant age groups in the questionnaire are attracted to the sitting-friendly public spaces, as an important feature to be provided in the public spaces, Whyte (1980) is in agreement with this finding and pointed out that the places that were the most sitting-friendly were the most sociable; and the places that were

the most sociable were the safest. Each age group has different needs for seating to be more comfortable for them.

The next finding on the features and amenities indicates that people prefer 'landscape/garden' features to be provided in the public spaces. The green element can attract more people to visit the public spaces and the furniture may encourage the users to spend more time to enjoy the landscape of the place Memluk (2013) agreed with this finding; he pointed out that the green element is important due to the calming and relaxing effect it has on people. Hence, plants could be used to create a public space for relaxation and resting. Moreover, Schipperijn et al. (2010) identified the benefits of the green area for reducing stress as the users of the public spaces enjoy the atmosphere in the surrounding landscape, as the green area is more frequently used by the visitor of the public spaces.

Another finding indicated that 38% of the participant's people prefer 'water and fountain' feature' to be provided in the public spaces. The water element encourages people to visit the public spaces and enhances the time they spend, Memluk (2013) pointed out the significance of providing the water element in public spaces. When designing public spaces, water element together with lighting, and green elements can be very attractive for people wanting to visit the place at night. Furthermore, the Project for Public Space (2008) published an article about water feature in public spaces. The water surface plays an important role to attract people to visit public spaces. The best things about water are the feel of it people reach the water, stick their toes and feet in it, and sometimes stick their hands in it. In many public spaces, water is only to be looked at which keeps the users away from the water. All these points encourage people to gather in the place and spend more time in public spaces.

To summarise this stage, the users of public spaces in Nottingham city centre contribute to the findings of the previous stage, through raising the significance of the new form of communication (Wi-Fi) as a feature that needs to be provided in the public spaces to attract more people and create a better place for them. Therefore, new criteria have been added in this regard to the list of criteria in the sociability category. These are '*Visibility*' (Visible to all Wi-Fi enabled devices), '*Unrestrictedly'(* unlimited use of Internet service provider), and '*Ubiquitous*' (getting access to data everywhere in the place), while the rest of the findings were compatible with the list of criteria from the previous stage.

The outcome of this stage of the user's experience (online survey) has been analysed and discussed to find out which criteria can attract and gather the users of public spaces in

Nottingham city centre based on their experience to enrich the list of criteria from the literature review in chapter two. The proposed framework (Table 13) below shows the outcome of the second iteration. The proposed framework of active public spaces continues to develop through the next stage by using the Delphi technique which target experts from different fields (architecture, urban design, landscape, social sciences, health) to validate the framework contents and enrich the list of criteria of active public spaces by adding or removing some criteria, in addition giving weight to all categories in the framework as well to all criteria in each category.

Table 13: Proposal framework of active public space

Categories	Criteria	Description	Applicability (Relationship with urban context)
Use & Activities	Active (Dynamically)	The more activities that are going on a place, the more people have an opportunity to participate in them.	Physical activity (Local Business Ownership)
	Vitality	A place that is well used in relation to its predominant function(s). The most appropriate mix of use	Land-use patterns
	Usefully	Well-planned public space has a positive impact on the rent level of nearby properties	Rent Level
	Integration	How activities can come tighter form a unified space	Mix use
	Functionally	A place that functions well at all times	Rating public life Mix-use of land
Identity & Image	Liveability	Liveable place reduces crime assault	Crime Statistics
	Safety	Somewhere that feels safe from harm	
	Walkability	A measure of how friendly an area is for walking in	
	Sittabililty	The place provides people with the opportunity to stop and sit	Physical Layout (Furniture)
	Hygiene	The place is clean and free of litter (Waste Receptacles)	
	Aesthetics	Study of art and beauty of the place	Local culture or history
	Reflectively	Showing the history image of the place	
	Attractively	The way environment information can attract and gather people in the place	Environment Data
	Historically	Archived data of environment can give a clear image of the place	
Access & connectivity	Continuity	Continuing data processed for the purpose of the conveyance of a communication on an electronic communications network	Traffic Data
	Visibility	How people can get the information easily	
	Proximity	How accurate timing foreground information regarding traffic	
	Connectivity	How well different places are connected to each other using the transport system. If trains, buses and highways work more efficiently then the level of connectivity improves	Transportation info (Mode splits)
	Readability	The readability of the transportation schedule	Transit usage
	Walkability	Activities in the street enhance people to enjoy their walking	Pedestrian activity
	Convenient	Type of activities that suit peoples needs in the place	
	Accessibility	Providing different types of parking and how a place can be reached by users. A place that is easy to get to and move through	Parking usage patterns
Well-being	Calm	Feeling less worry increase to be part of social activities in the place	Social interaction and human capital
	Chill	Somewhere to chill out and have an opportunity for social contact	
	Accessibility	Getting access to art, cultural and leisure amenities promote happiness.	
	Safety	Feeling safe and walking around the place day and night and feeling socially connected with the community	
	Peaceful	Peaceful experience of the activities for elderly people	Physical outdoor activities
	Relax	Evaluate the satisfaction of physical exercise in the place	
	Green	Greener urban area displays more positive indicators of mental health which are associated with the physical activity level that will increase the sense of belonging	Community belonging
	functionality	The impact of art (such as dance, drama, music, visual arts) on mental health	Physical environment
Sociability	Diversity	The use of place diversity of age and different groups in the place	Number of women, children, elderly
	Stewardship	Providing each group's need in the place	
	Pride	Getting involved in social activities	Voluntarism
	Encouragement	Motivate people to contribute to knowledge between each other	Sharing knowledge
	Ubiquitous	Getting access to data everywhere in the place	The communication network (Wi-Fi)
	Visibility	Visible to all Wi-Fi enabled devices	
	Unrestrictedly	Unlimited use of Internet service provider	
	Friendly	Those places that are well used and loved by users	Evening use
	Interactive	Multi-use of the place can gather people and make the place liveable	
	Welcoming	A place where anyone has a right to be	Street Life
	Communal	Shared by all members of a community; for common use	Community (ethnical origin)
	Mix / Mixture	A mix of different diverse community groups in the place	

Chapter Six: Delphi consultation process

6.1 Introduction

The Delphi technique has been used in this research; the aim of using the Delphi technique is to explore experts' opinions about the important impact of the proposed framework for assessing the quality of public space. This investigates and analyses just the design aspect. Experts investigate the validity of applying such a framework as a guideline for urban designers and planners to design better public space. Based on this, the Delphi method can be considered as a tool to validate and add new criteria to the proposed framework of active public space. Experts evaluate all criteria that make public space active in the proposed framework; in addition, they create a weighting list for each category and its criteria for the proposed framework.

This chapter answers the research question. *How can active public space be measured and assessed?* The very essence of this chapter is to develop a set of criteria to assess and measure the quality of public space and propose a framework more adapted to the digital era, which response to research objective 3. The result of this stage-enriched the proposed framework of active public space and created the third iteration with the outcomes from the previous stages to finalise and validate the final framework of active public space.

This chapter starts with a description of the collected data and analysis tools with a description of the main result from the Delphi technique survey that has been gathered to develop the proposed framework. The chapter concludes with a summary of the outcomes, and present the final framework of active public space as a guideline for planners, architects and urban designers to design better places.

The sampling technique to select the experts in a different area was Non-probability sampling that used Quota sampling which is a non-random sampling technique, experts been selected based on their experience and specialisation area, experts should have at least 3 years' experience in architecture and urban design or relevant area such as Health and wellbeing, social science, building engineering. The invitation was sent to a number of experts ask them to participate, a total number of experts participated in the first round of Delphi questionnaire was 40, while 35 of 40 completed the second round.

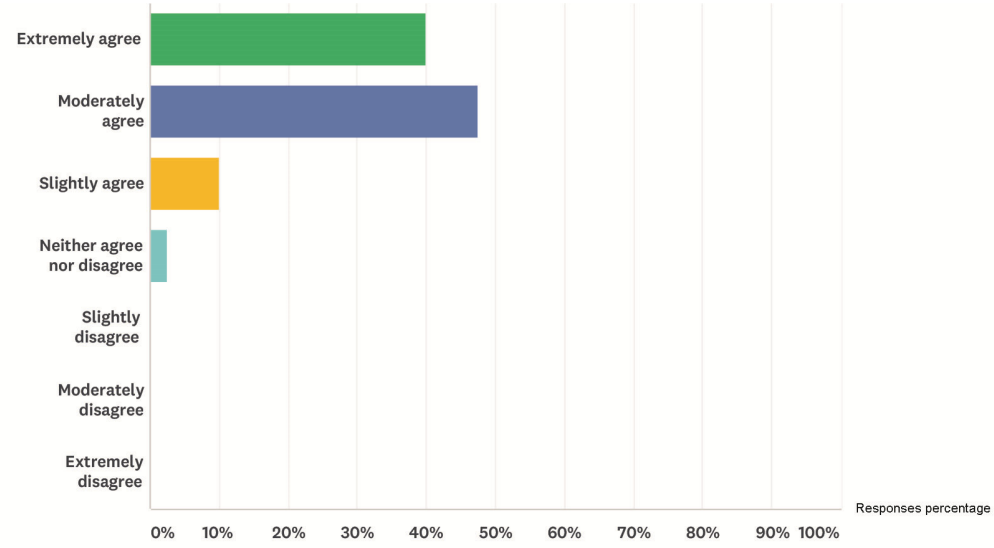
6.2 Validation of the result

Experts in this stage of the research were asked to give their opinions regarding the level of the importance of all criteria in each category of the proposed framework of active public spaces that been developed during the first and second iterations. In addition, experts asked to give weight to every criterion in each category. The purpose of this weighting list is to identify which criteria the most and least important in each category of the proposed framework of active public space. Forty experts accepted to participate in the Delphi technique survey, 40 completed the first round. Experts from a range of different areas (Urban Design, Architecture, Planning, Human Behaviour and Urban Landscape, Health and Social Sciences, Cultural Landscape, Environment, Geography, Building Engineering, History of architecture, Sociology and Politics) participated. Their experience in their field ranged between 3 and 32 years. Table 14 below summarizing the profile of the participant experts in the Delphi questionnaire. The experts participated via an online survey; only 35 experts from the first round completed the second round. The two rounds of the online survey on Survey Monkey were carried out during February and March 2017 and the collected data were analysed by SPSS software.

Table 14: Summarizing the profile of the participant experts

Experts number	Specialisation area	Year of experience
7	Urban Design	8 -32
7	architecture	3- 12
3	Geography	6 - 8
6	Urban planning	3 - 14
2	Human behaviour and Urban Landscape	6-8
2	Sociology and Politics	4-7
1	History of Architecture	6
4	Health and social sciences	6-9
2	Cultural Landscape	4-5
2	Environment	7-10
4	Building Engineering	5-12

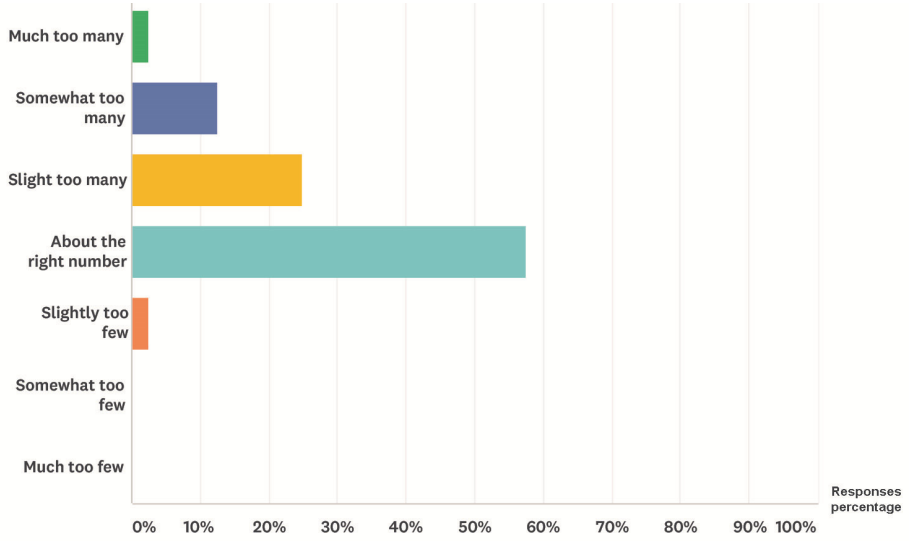
During the first round, experts were asked to give their opinion regarding the content of the proposed framework. Figure 45 below demonstrates to what extent experts agree or disagree with the contents of the proposed framework; 40 experts completed this round and responded to this question individually. They explored the content of the proposed framework and responded to the questions based on experience and their points of view.



ANSWER CHOICES	RESPONSES	
Extremely agree	40.00%	16
Moderately agree	47.50%	19
Slightly agree	10.00%	4
Neither agree nor disagree	2.50%	1
Slightly disagree	0.00%	0
Moderately disagree	0.00%	0
Extremely disagree	0.00%	0
TOTAL		40

Figure 45: Participants' responses to the contents of the proposed framework

The majority of experts, 19 of 40, responded on ‘moderately agree’ with 47.5% as the highest percentage, while 16 of 40 responded to ‘extremely agree’ with 40% as the second-highest percentage, and both ‘slightly agree’ and ‘neither agree nor disagree’ were 10% and 2.5%, respectively. The results show the achievement of consensus and stability of results between experts’ responses and illustrate that experts agree with the contents of the proposed framework. All the responses are considered between ‘moderately agree’ and ‘extremely agree’. Moreover, experts were asked to respond during the first round to whether the proposed framework has too many, too few, or about the right number of categories and criteria; responses are shown in Figure 46 below. Forty experts completed the first round and answered this question.



ANSWER CHOICES	RESPONSES	
Much too many	2.50%	1
Somewhat too many	12.50%	5
Slight too many	25.00%	10
About the right number	57.50%	23
Slightly too few	2.50%	1
Somewhat too few	0.00%	0
Much too few	0.00%	0
TOTAL		40

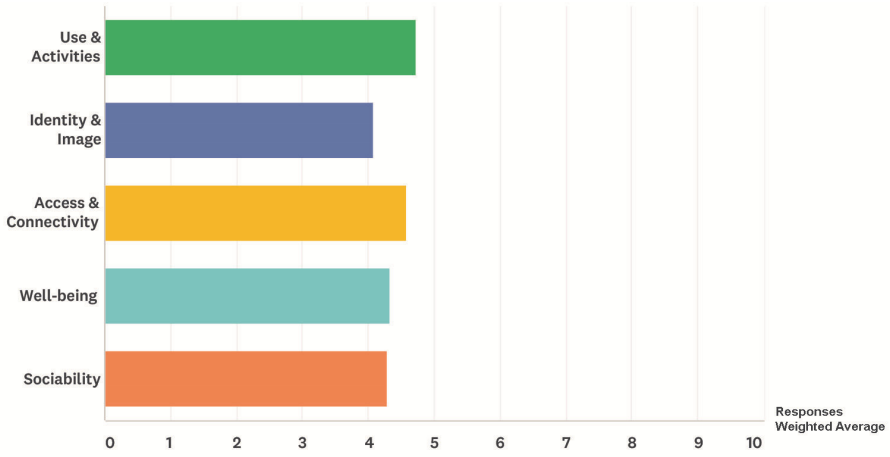
Figure 46: Participants' responses regard the number of category and their criteria of the proposed framework

The results from Figure 46 above demonstrate the majority of experts' responses 23 of 40 were 'about the right number' with 57.50% as the highest percentage, while 'slight too many' was the second-highest percentage with 25% or 10 of 40 responses. Only five responses were for 'somewhat too many' with 12.50%. Moreover, both categories 'slight too few' and 'Much too many' have the same percentage with just one response of 40 in total, with 2.5%.

The result illustrates stability in the experts' response, as all the responses considered between 'about the right number', 'slight too many' and 'somewhat too many' and the majority of experts agreed about the number of all categories and their criteria in the proposed framework. The experts achieved a consensus about the contents of the proposed framework from the first round of the Delphi technique survey.

Figure 47 below illustrates the importance level of each category of the proposed framework according to the expert's opinions; their responses reflected the significance of all categories in the proposed framework, rated based on their experience; where 1 represents 'Not important at all' and 5 represents 'Extremely important', moreover 0 represent 'Remove this category'. The result shows that the Use and Activities category is

considered as the most important category of the proposed framework with a weighted average of 4.72, while the Access and Connectivity category is rated as the second most important with a weighted average of 4.58. The Wellbeing category was rated as the third most important with a weighted average of 4.33. This was contributed from the outcome of the literature review chapter as a new category added to the framework of active public space. Moreover, the Sociability category was rated fourth in the level of importance with a weighted average of 4.28. Finally, the Identity and Image category was been rated as having the lowest level of importance compared to other categories in the proposed framework with a weighted average of 4.08. However, all five categories were rated with nearly the same weighted average with a score between 4.08 and 4.72, and all the scores are considered between extremely important and moderately important.



	EXTREMELY IMPORTANT	VERY IMPORTANT	MODERATELY IMPORTANT	SLIGHTLY IMPORTANT	NOT IMPORTANT AT ALL	REMOVE THIS CATEGORY	TOTAL	WEIGHTED AVERAGE
Use & Activities	75.00% 30	22.50% 9	2.50% 1	0.00% 0	0.00% 0	0.00% 0	40	4.72
Identity & Image	32.50% 13	42.50% 17	25.00% 10	0.00% 0	0.00% 0	0.00% 0	40	4.08
Access & Connectivity	62.50% 25	32.50% 13	5.00% 2	0.00% 0	0.00% 0	0.00% 0	40	4.58
Well-being	47.50% 19	37.50% 15	15.00% 6	0.00% 0	0.00% 0	0.00% 0	40	4.33
Sociability	52.50% 21	27.50% 11	17.50% 7	0.00% 0	2.50% 1	0.00% 0	40	4.28

Figure 47: The level of importance of all categories in the proposed framework

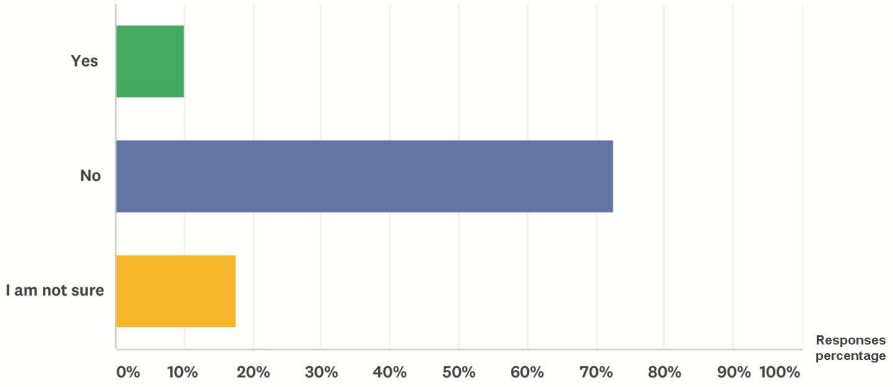
Table 15 below illustrates the range of the mean values and standard deviations for all five categories of the proposed framework. The mean values are in the range between 1.27 and 1.93, where 1 represents ‘Extremely important’ and 5 is ‘Not important at all’, while 6 represents the option of removing this criterion from the proposed framework if any expert suggests so. Furthermore, standard deviations for all five categories are less than 1 and between 0.506 and 0.933; this means that experts have reached a satisfactory consensus. When the standard deviation is less than 1, that means the experts are showing convergence in their opinions (Wagenmakers & Brown 2007; Vidal et al. 2011).

Table 15: Mean and standard deviations for all five categories of the proposed framework

		Use & Activities	Identity & Image	Access & Connectivity	Well-being	Sociability
N	Valid	40	40	40	40	40
	Missing	0	0	0	0	0
Mean		1.28	1.93	1.43	1.68	1.73
Std. Deviation		.506	.764	.594	.730	.933
Minimum		1	1	1	1	1
Maximum		3	3	3	3	5

This paragraph presents the outcomes of the Delphi technique online survey and illustrates the importance of ranking of all five categories of the proposed framework. The following focuses on each category and shows the results from the Delphi technique survey for each category. The reason for dividing this into five sections is to obtain the opinion of experts about each criterion of all five categories in the proposed framework to answer the research question: *How can active public spaces be measured and assessed?*

Figure 48 demonstrates agreement of the experts' responses on the number of categories of the proposed framework; the experts responded to the question of whether they think that more categories should be included with this framework. The outcome shows the achievement of consensus and stability of results in the experts' responses. The majority of experts, 29 of 40, responded 'No' with 72.50% as the highest percentage. While 7 of the 40 experts responded 'I am not sure' with 17.50% as the second percentage, and just 4 of the 40 experts chose 'Yes' with just 10% which is the lowest percentage compared to the other percentages.



ANSWER CHOICES	RESPONSES	
Yes	10.00%	4
No	72.50%	29
I am not sure	17.50%	7
TOTAL		40

Figure 48: Participants' responses about whether other factors should be considered with this framework

In addition, the results in Figure 48 show that just four experts suggest new criteria for the proposed framework of active public spaces. The four new criteria, as shown in Figures 45

and 46, show the agreement related to the content of the framework and also the number of categories and their criteria. The first suggestion criterion is about;

"I know you have put wellbeing in this framework, what about Safety or Perception of Safety"

The proposed framework of active public space has already taken into account safety as criteria in a number of categories. The second recommendation is about Flexibility as a criterion in the Use and Activities category;

"Flexibility; in terms of physical arrangements which can promote the use of the space to accommodate different types of activities."

While other recommendations of the proposed framework in the first round suggest taking into account the public engagement criteria in sociability category.

"Would be a sub-category on the sociability section, something like political participation and public speaking."

The last recommendation is about Comfortability in the Wellbeing category;

"What about microclimate, the comfortable place has an impact on the well-being and the health of the public space users."

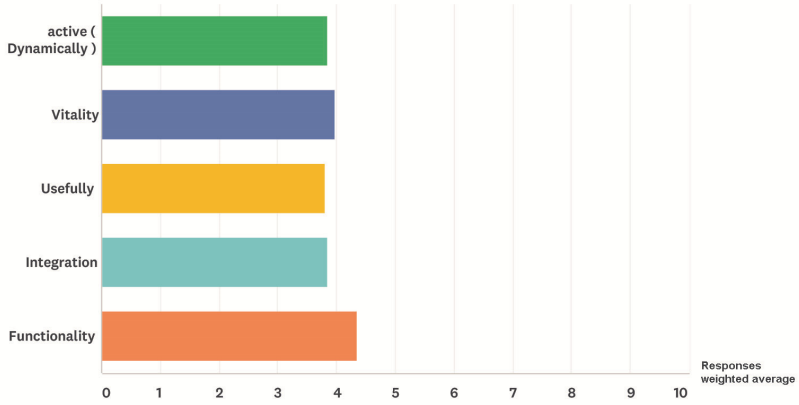
The results show that all new recommendations were about adding new criteria rather than a new category. All new recommendations are taken into account and evaluated in the second round by experts.

6.2.1 Use and Activities.

The results from the first round were achieved by asking experts to individually rank the level of importance of all criteria in the Use and Activities category, based on their experience and the priority of each criterion from their point of view. Here, 1 represents 'Not important at all' and 5 is 'Extremely important', while 0 represents the option of removing criteria if any expert suggests doing so.

The results in Figure 46 below demonstrate that 'Functionality' is the most important criterion with a weighted average of 4.35 and the responses considered between 'very important' and 'extremely important'. Moreover, the results show that 'Vitality' is rated as

the second level of importance with a weighted average of 3.98. The ‘Usefully’ criterion has been rated as the third level of importance in this category with a weighted average of 3.80. Meanwhile, both ‘Active-Dynamically’ and ‘Integration’ have the lowest level of importance compared with other criteria in the Use and Activities category with a weighted average of ‘3.85, 3.80’ respectively, where most of their responses are located around ‘Very important’ and ‘moderately important’.



	EXTREMELY IMPORTANT	VERY IMPORTANT	MODERATELY IMPORTANT	SLIGHTLY IMPORTANT	NOT IMPORTANT AT ALL	REMOVE THIS CRITERIA	TOTAL	WEIGHTED AVERAGE
active (Dynamically)	25.00% 10	47.50% 19	20.00% 8	5.00% 2	0.00% 0	2.50% 1	40	3.85
Vitality	17.50% 7	62.50% 25	20.00% 8	0.00% 0	0.00% 0	0.00% 0	40	3.98
Usefully	32.50% 13	42.50% 17	10.00% 4	7.50% 3	2.50% 1	5.00% 2	40	3.80
Integration	30.00% 12	35.00% 14	30.00% 12	2.50% 1	0.00% 0	2.50% 1	40	3.85
Functionality	40.00% 16	55.00% 22	5.00% 2	0.00% 0	0.00% 0	0.00% 0	40	4.35

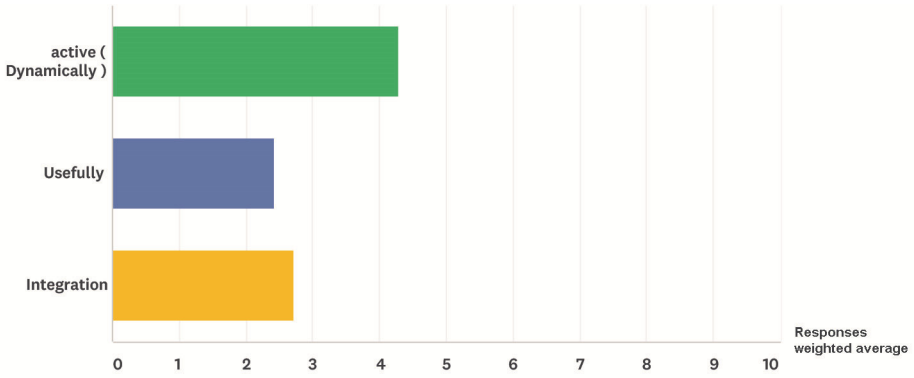
Figure 49: Level of importance of all criteria in Use and Activities category

Table 16 below shows the mean values and standard deviations for all responses of criteria in the Use and Activities category based on the result from the first round. The mean values are in the range of 1.09 and 2.15, and standard deviations for the category are in the range between 0.58 to 1.32 which is more than 1. The result shows that standard deviations above 1 due to the fact that it was recommended that some criteria are removed from this category. Experts’ responses show agreement regarding the results on the rest of the criteria, and experts achieved consensus and considered ‘Functionality’ as the most important criterion in this category. Table 16 presents the mean values and standard deviations for all criteria of the use and activities category.

Table 16: The mean and standard deviations for all criteria in Use and Activities category

		active (Dynamically)	Vitality	Usefully	Integration	Functionality
N	Valid	40	40	40	40	40
	Missing	0	0	0	0	0
Mean		2.15	2.03	2.20	2.15	1.65
Mode		(2) 4	4	4	4	4
Std. Deviation		1.027	.620	1.324	1.051	.580
Minimum		0	1	0	0	1
Maximum		6	3	6	6	3

The experts were asked to give their opinion about the recommendations for adding and removing some criteria from the proposed framework in the second round. The result in Figure 49 above shows that some participants recommended removing some criteria from the Use and Activities category. One of the 40 experts suggested removing 'Active – Dynamically' criterion from this category, while 2 of the 40 experts suggested removing the 'Usefully' criterion from the category, and just only 1 of the 40 experts suggested removing the 'Integration' criterion from this category as well. Experts clarify their recommendations due to considering these criteria as having the lowest level of importance compared to other criteria in this category as these criteria may overlap with and/or have similar meanings to other criteria, so they can emerge in one criterion. Despite the very low number of experts who recommended removing these criteria, these recommendations are taken into account in the second round and experts were asked to give their opinions again whether to agree or disagree with these recommendations.

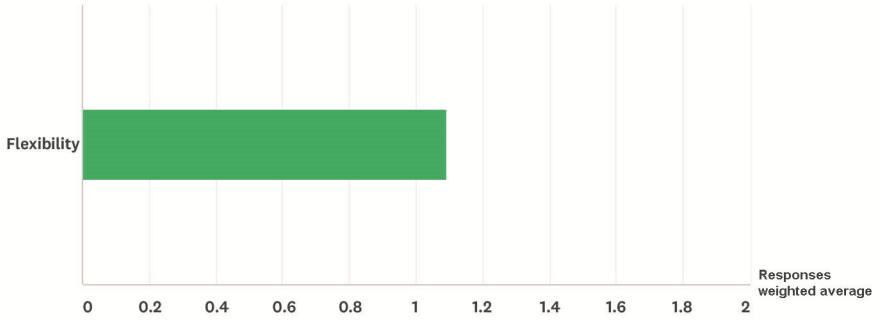


	AGREE (REMOVE THIS CRITERIA)	DISAGREE (KEEP THIS CRITERIA)	TOTAL	WEIGHTED AVERAGE
active (Dynamically)	34.29% 12	65.71% 23	35	4.29
Usefully	71.43% 25	28.57% 10	35	2.43
Integration	65.71% 23	34.29% 12	35	2.71

Figure 50: Participants' opinion about agreeing or disagreeing about removing some criteria from the Use and Activities category

Figure 50 above demonstrates the results from the second round. The experts responded on whether to agree or disagree with removing these criteria from the Use and Activities category. In the second round, just 35 experts participated and completed this round. The result illustrates agreement about the 'Active – Dynamically' criterion with 65.71% (23 of 35 of total participants) disagreeing about removing it, instead recommending retaining this criterion, while just 12 of 35 recommended removing this criterion. Moreover, 71.43% of experts (25of 35) agree to remove 'Usefully' from this category, due to the lowest level of importance, and the overlap with other criteria in this category. In the meantime, 65.71% of participants (23 of 35) agree to remove the 'Integration' criterion from this category, and just 12 of the total 35 disagreed about removing this criterion and recommended retaining it.

In addition, from the results in the first round, a new criterion was suggested to be added to the proposed framework- *Flexibility: in terms of physical arrangements which can promote the use of the place to accommodate different types of activities* - which was recommended to be added to the category of Use and Activities. During the second round, experts were asked to give their opinion about whether to agree or disagree to add 'Flexibility' to the Use and Activities category. Figure 51 below shows experts' responses in regard to adding the new criterion 'flexibility' to the proposed framework. The result from Second Round illustrates 91.43% of participants (32 of 35) agree to add this criterion to the framework, while just 8.57% of participants (3 of 35) disagree and suggested removing this criterion. The result below shows stability in the responses as experts achieved consensus in their responses.

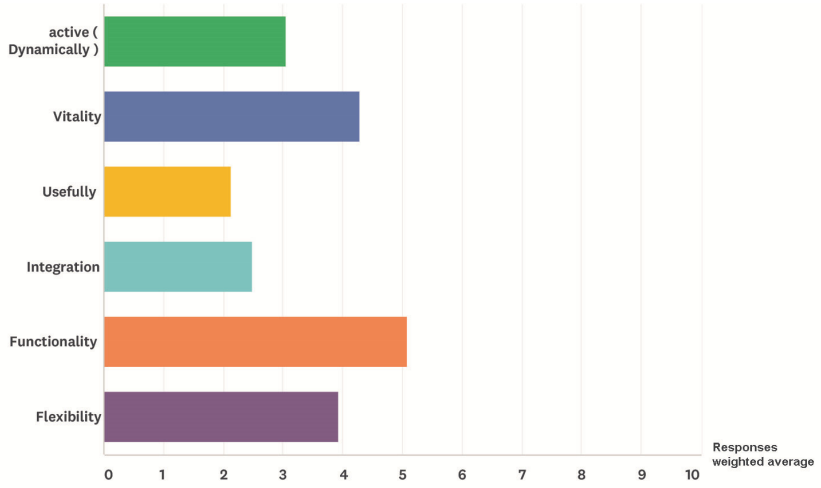


	AGREE(ADD THIS CRITERIA)	DISAGREE (REMOVE THIS CRITERIA)	TOTAL	WEIGHTED AVERAGE
Flexibility	91.43%	8.57%		
	32	3	35	1.09

Figure 51: Participants' opinion about agreeing or disagree to add a criterion to the Use and Activities category

Participants were again asked to weight the final list of criteria of the Use and Activities category from the second round. Figure 52 below presents the weight result of each criterion from the second round regarding the final list of this category. Experts rated

‘Functionality’ as the most important criterion in the Use and Activities category with a score of 5.09, and the ‘Vitality’ criterion was rated as the second most important criterion in the list with a score of 4.28. The result also illustrates that ‘Flexibility’ was considered as the third most important criterion with a score of 3.94, while the ‘Active –dynamically’ criterion was rated fourth with a score of 3.06. However, both criteria, Integration and Usefully’ which experts had recommended removing from the Use and Activities category were rated as having the lowest level of importance in this category. Meanwhile, Figure 52 shows the responses and a rating average of the importance level of all criteria for the Use and Activities category based on the final round (second round) completed by 35 experts.



	1	2	3	4	5	6	TOTAL	SCORE
active (Dynamically)	18.75% 6	3.13% 1	9.38% 3	28.13% 9	15.63% 5	25.00% 8	32	3.06
Vitality	25.00% 8	18.75% 6	25.00% 8	21.88% 7	9.38% 3	0.00% 0	32	4.28
Usefully	0.00% 0	12.50% 4	9.38% 3	3.13% 1	28.13% 9	46.88% 15	32	2.13
Integration	0.00% 0	15.63% 5	6.25% 2	15.63% 5	37.50% 12	25.00% 8	32	2.50
Functionality	53.13% 17	15.63% 5	18.75% 6	12.50% 4	0.00% 0	0.00% 0	32	5.09
Flexibility	3.13% 1	34.38% 11	31.25% 10	18.75% 6	9.38% 3	3.13% 1	32	3.94

Figure 52: Weighting list of all criteria in Use and Activities category

Experts emphasised their opinions regarding which criteria can make public space active in terms of the Use and Activities category. During the first round, three criteria were selected for removal from this category. Despite, the very low percentage, these recommendations were taken account of in the second round, in addition to adding a new criterion ‘Flexibility’. Experts gave their opinions about adding and removing these criteria from the Use and Activities category. The researcher took into account the experts’ opinions and agreed to remove both ‘Usefully’ and ‘Integration’ criteria from this category due to the possibility to merge them under the ‘Functionality’ criterion meaning. Meanwhile, the

researcher also agreed with the second-round results in regard to adding ‘Flexibility’ to the list.

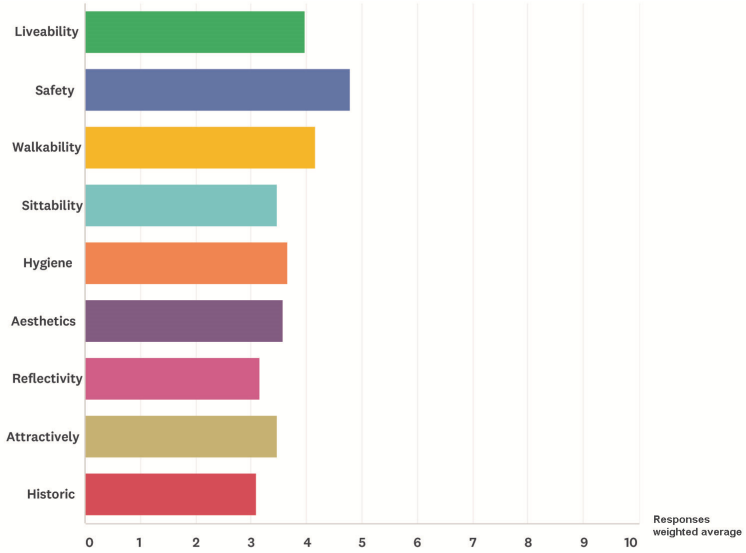
Table 17 below demonstrates the final list of criteria in the Use and Activities category ranked based on their level of importance.

Categories	Criteria	Weight of criteria	Applicability (Relationship with urban context)
Use and Activities	Functionally	5.09	Rating public life Mixed-use of land
	Vitality	4.28	Land-use patterns
	Flexibility	3.94	Physical Layout
	Active- Dynamically	3.06	physical activity

Table 17: Final list of criteria for Use and Activities category ranked based on their level of importance

6.2.2 Identity and Image

Experts expressed their opinions regarding the level of importance of all criteria in the Identity and Image category. Experts gave their opinions individually based on the priority of each criterion in this category, where 5 represents ‘extremely important’ and 1 is ‘Not important at all’, while 0 represents the option of ‘removing this criterion’ if any expert doing so. Figure 53 below presents the significance level of each criterion in the Identity and Image category. The results demonstrate that the ‘Safety’ criterion is considered the most important in this category with a weighted average of 4.80. Also, the results show that the ‘Walkability’ criterion is considered as the second most important criterion with a weighted average of 4.17, while the ‘Liveability’ criterion has been rated by experts as the third most important criterion with a weighted average of 3.98. The rest of criteria (Hygiene, Aesthetics, Sittability, Attractively, and Reflectively) were rated with similarly weighted averages (3.58, 3.48, 3.48, and 3.15 respectively), and the criterion of lowest importance is ‘Historic’ with a weighted average of 3.10.



	EXTREMELY IMPORTANT	VERY IMPORTANT	MODERATELY IMPORTANT	SLIGHTLY IMPORTANT	NOT IMPORTANT AT ALL	REMOVE THIS CRITERIA	TOTAL	WEIGHTED AVERAGE
Liveability	32.50% 13	52.50% 21	7.50% 3	0.00% 0	2.50% 1	5.00% 2	40	3.98
Safety	82.50% 33	15.00% 6	2.50% 1	0.00% 0	0.00% 0	0.00% 0	40	4.80
Walkability	42.50% 17	40.00% 16	15.00% 6	0.00% 0	0.00% 0	2.50% 1	40	4.17
Sittability	12.50% 5	37.50% 15	37.50% 15	10.00% 4	2.50% 1	0.00% 0	40	3.48
Hygiene	20.00% 8	42.50% 17	25.00% 10	10.00% 4	2.50% 1	0.00% 0	40	3.67
Aesthetics	15.00% 6	40.00% 16	32.50% 13	12.50% 5	0.00% 0	0.00% 0	40	3.58
Reflectivity	12.50% 5	32.50% 13	27.50% 11	17.50% 7	5.00% 2	5.00% 2	40	3.15
Attractively	15.00% 6	37.50% 15	37.50% 15	5.00% 2	0.00% 0	5.00% 2	40	3.48
Historic	12.50% 5	25.00% 10	35.00% 14	17.50% 7	7.50% 3	2.50% 1	40	3.10

Figure 53: Level of importance of all criteria in the Identity and Image category

As the case with the previous category. Table 18 below illustrates the value means and standard deviations for all criteria in the Identity and Image category. The mean values for this category are in the range between 1.20 and 2.90, while the standard deviations for all criteria of the Identity and Image category are in the range between 0.464 and 1.292. The reason for standard deviations above 1 is that some criteria have been recommended to be removed by experts from this category as shown previously in Figure 50. In fact, regarding all accepted criteria that experts agreed to retain in the list during the first round, their standard deviations are less than 1 and in the range of 0.46 and 0.99. The recommendation of removing some criteria has been taken into account in the second round to be rated again by experts based on their priority and according to their points of view.

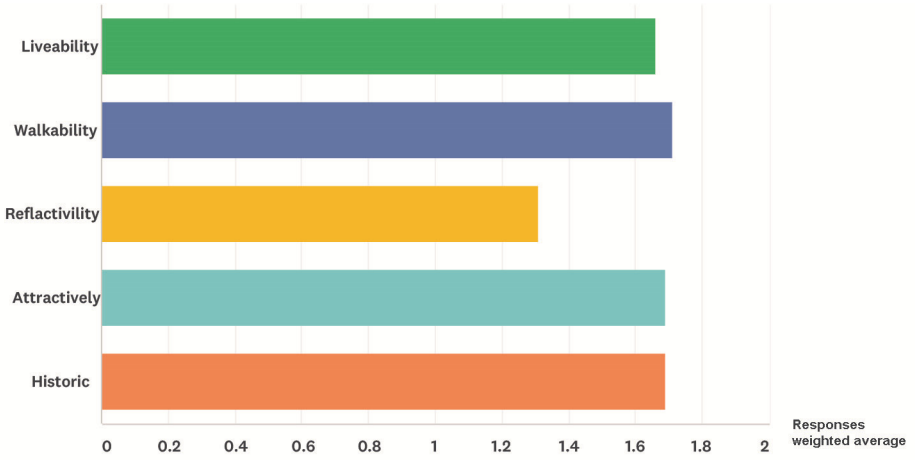
Table 18: Mean and standard deviations of all criteria of the identity and image category

		Liveability	Safety	Walkability	Sittability	Hygiene	Aesthetics	Reflectivity	Attractively	Historic
N	Valid	40	40	40	40	40	40	40	40	40
	Missing	0	0	0	0	0	0	0	0	0
Mean		2.03	1.20	1.83	2.53	2.33	2.43	2.85	2.53	2.90
Mode		2	1	1	2[a]	2	2	2	2[a]	3
Std. Deviation		1.209	.464	.984	.933	.997	.903	1.292	1.132	1.215
Minimum		0	1	0	1	1	1	0	0	0
Maximum		6	3	6	5	5	4	6	6	6

a. Multiple modes exist. The smallest value is shown

As previously shown in Figure 53, in regard to the recommendations of removing some criteria, just 2 of the 40 experts recommended removing ‘Liveability’,‘Reflectivity’ and ‘Attractively’ criteria from the Identity and Image category, and just one expert recommended removing the ‘Walkability’ and ‘Historic’ criteria from this category. Despite, the very low percentage of experts who recommended removing these criteria, these recommendations were taken into account in the second round, to be evaluated again by the experts.

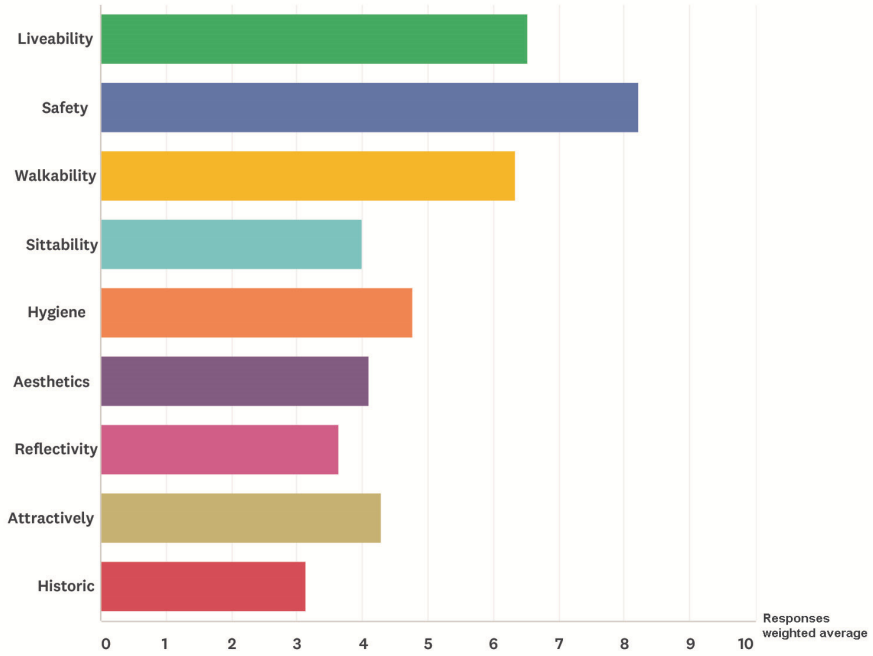
Figure 54 below shows the result from the second round, in regard to the experts’ responses on whether they agree or disagree to remove some criteria from the Identity and Image category. Thirty-five experts completed the second round and were asked to give their opinions related to the new recommendations of removing some criteria. The result demonstrates that 65.71% of participants (23 of 35) disagreed with removing ‘Liveability’ and recommended keeping this criterion in this category, while the ‘Walkability’ criterion was rated with the higher percentage of consensus between experts with 71.43% (25 of 35) who disagree with removing this criterion from the list and recommended keeping it within the Identity and Image category. Moreover, 68.57% of participants (24 of 35) agreed to remove the ‘Reflectivity’ criterion from the category due to having the lowest level of importance and possibility of merging it with another criterion. At the same time, the experts achieved a consensus of their responses in regards both ‘Attractively’ and ‘Historic’, both had a score of 68.57% (24 of 35) who disagreed and recommended keeping both of these criteria in the category.



	AGREE(REMOVE THIS CRITERIA)	DISAGREE (KEEP THIS CRITERIA)	TOTAL	WEIGHTED AVERAGE
Liveability	34.29% 12	65.71% 23	35	1.66
Walkability	28.57% 10	71.43% 25	35	1.71
Reflactivility	68.57% 24	31.43% 11	35	1.31
Attractively	31.43% 11	68.57% 24	35	1.69
Historic	31.43% 11	68.57% 24	35	1.69

Figure 54: Participants' responses regard to agree or disagree to remove some criteria from the Identity and Image category

During the Delphi technique survey, experts were asked weight each criterion in the Identity and Image category. Experts gave weight to each criterion in this category based on their priority and their point of view. Figure 55 below shows the weight list of all criteria in the Identity and Image category from round one, where 1 is considered as the most important and 9 is the least important. The results in Figure 55 below show that the 'Safety' criterion has been given the highest weight and considered as the most important criterion in this category with a score of 8.22, and the 'Liveability' criterion has been weighted as the second most important criterion in this category with a score of 6.53. Also, the 'Walkability' criterion has been rated by experts as the third most important criterion with a score of 6.33. Moreover, 'Hygiene', 'Attractively', 'Aesthetics', and 'Sittability' criteria were rated with almost the same scores (4.78, 4.28, 4.10, and 4.00 respectively). On the other hand, the result shows that both 'Reflectivity' and 'Historic' criteria were rated lowest in this category with scores of 3.65 and, 3.13, respectively.



	1	2	3	4	5	6	7	8	9	TOTAL	SCORE
Liveability	22.50% 9	20.00% 8	15.00% 6	15.00% 6	7.50% 3	10.00% 4	2.50% 1	2.50% 1	5.00% 2	40	6.53
Safety	60.00% 24	20.00% 8	12.50% 5	0.00% 0	5.00% 2	2.50% 1	0.00% 0	0.00% 0	0.00% 0	40	8.22
Walkability	2.50% 1	27.50% 11	27.50% 11	15.00% 6	10.00% 4	7.50% 3	7.50% 3	2.50% 1	0.00% 0	40	6.33
Sittability	2.50% 1	0.00% 0	2.50% 1	17.50% 7	22.50% 9	15.00% 6	15.00% 6	12.50% 5	12.50% 5	40	4.00
Hygiene	0.00% 0	15.00% 6	17.50% 7	10.00% 4	10.00% 4	17.50% 7	7.50% 3	10.00% 4	12.50% 5	40	4.78
Aesthetics	2.50% 1	2.50% 1	10.00% 4	7.50% 3	12.50% 5	17.50% 7	32.50% 13	7.50% 3	7.50% 3	40	4.10
Reflectivity	0.00% 0	5.00% 2	7.50% 3	15.00% 6	10.00% 4	5.00% 2	15.00% 6	25.00% 10	17.50% 7	40	3.65
Attractively	7.50% 3	7.50% 3	5.00% 2	7.50% 3	15.00% 6	17.50% 7	5.00% 2	25.00% 10	10.00% 4	40	4.28
Historic	2.50% 1	2.50% 1	2.50% 1	12.50% 5	7.50% 3	7.50% 3	15.00% 6	15.00% 6	35.00% 14	40	3.13

Figure 55: Weight list of all criteria in Identity and Image category

The expert expressed their opinions regarding which criteria can make public space active in terms of the Identity and Image category. During the first round, five criteria were selected to be removed from this category. Despite, the very low percentage, these recommendations were taken through to the second round of the survey. Experts gave their opinions about removing these criteria from the Identity and Image category; the researcher took into account the experts' opinions and agreed to remove the 'Attractively' criterion from this category due to the possibility of merging it with the 'Historic' criterion. Meanwhile, the experts demonstrated their opinions in regard to the other criteria as they achieved a consensus of their responses about retaining other criteria in this category.

Table 19 below demonstrates the final list of criteria in the Identity and Image category ranked based on their level of importance.

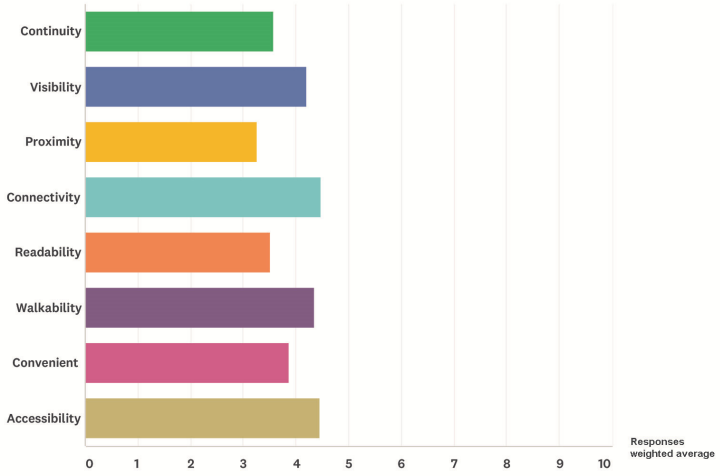
Table 19: Final list of criteria for the Identity and Image category ranked based on their level of importance

Categories	Criteria	Weight of criteria	Applicability (Relationship with urban context)
Identity & Image	Safety	8.22	Crime Statistics
	Liveability	6.53	
	Walkability	6.33	
	Hygiene	4.78	Physical Layout (Furniture)
	Attractively	4.28	Environment Data
	Aesthetics	4.10	Local culture or history
	Sittability	4.00	Physical Layout (Furniture)
	Historically	3.13	Environment Data

6.2.3 Access and Connectivity.

Experts emphasised the importance level of all criteria of the Access and Connectivity category. They gave their opinion based on the priority of each criterion according to their points of view, where 1 represents 'Not important at all' and 5 represents 'Extremely important', while 0 represents the option of removing the criterion from the category. The Access and Connectivity category was rated as the second most important category in the proposed framework with a weighted average of 4.58 as shown previously in Figure 47. The results as shown in Figure 56 below illustrate the level of importance for all criteria in this category. Experts rated criteria individually based on their experience and their points of view; they rated 'Connectivity' as the most important criterion in this category with a weighted average of 4.47, while 'Accessibility' was rated at almost the same level a weighted average of 4.45 as the second most important criterion. Moreover, both 'Walkability' and 'Visibility' were rated with almost the same level of importance with a weighted average of '4.35 and, 4.20, respectively. At the same time, experts rated 'Proximity' criterion as having the lowest level of importance with a weighted average of '3.27'. The results were considered between 'Moderately important' and 'extremely important'.

During the first round, one of the 40 participants recommended removing 'Walkability' from this category. Despite, the very low percentage of this recommendation, this suggestion was taken into account in the second round, when experts were asked to give their opinion again about removing this criterion.



	EXTREMELY IMPORTANT	VERY IMPORTANT	MODERATELY IMPORTANT	SLIGHTLY IMPORTANT	NOT IMPORTANT AT ALL	REMOVE THIS CRITERIA	TOTAL	WEIGHTED AVERAGE
Continuity	10.00% 4	42.50% 17	42.50% 17	5.00% 2	0.00% 0	0.00% 0	40	3.58
Visibility	32.50% 13	57.50% 23	7.50% 3	2.50% 1	0.00% 0	0.00% 0	40	4.20
Proximity	15.00% 6	20.00% 8	42.50% 17	22.50% 9	0.00% 0	0.00% 0	40	3.27
Connectivity	55.00% 22	37.50% 15	7.50% 3	0.00% 0	0.00% 0	0.00% 0	40	4.47
Readability	17.50% 7	30.00% 12	40.00% 16	12.50% 5	0.00% 0	0.00% 0	40	3.52
Walkability	57.50% 23	30.00% 12	7.50% 3	2.50% 1	0.00% 0	2.50% 1	40	4.35
Convenient	25.00% 10	47.50% 19	20.00% 8	5.00% 2	2.50% 1	0.00% 0	40	3.88
Accessibility	52.50% 21	42.50% 17	2.50% 1	2.50% 1	0.00% 0	0.00% 0	40	4.45

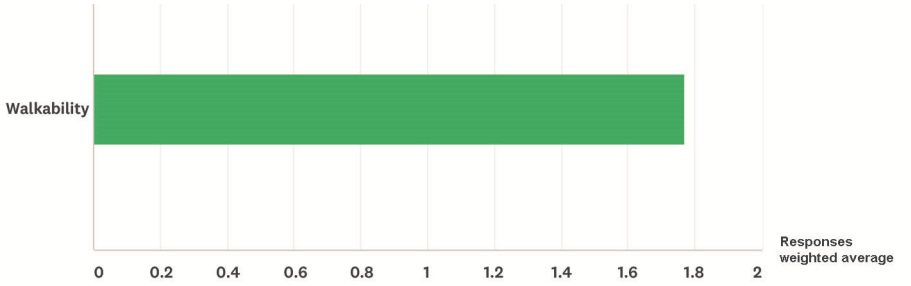
Figure 56: Level of importance for all criteria of the Access and Connectivity category

Table 20 below presents the mean values and standard deviations of all criteria of the Access and Connectivity category. The standard deviations for each criterion in this category are less than 1 except one criterion which has a 1.027 standard deviation due to the recommendation in the first round that it be removed from this category. The range of the standard deviations was between 0.64 and 1.02; this shows that experts have achieved consensus in their responses. Moreover, the mean values for all criteria ranged between 1.53 and 2.73. Table 20 displays the mean values and standard deviations for all criteria of the Access and Connectivity category.

Table 20: Mean values and standard deviations of all criteria of the Access and Connectivity category

		Continuity	Visibility	Proximity	Connectivity	Readability	Walkability	Convenient	Accessibility
N	Valid	40	40	40	40	40	40	40	40
	Missing	0	0	0	0	0	0	0	0
Mean		2.43	1.80	2.73	1.53	2.48	1.65	2.13	1.55
Std. Deviation		.747	.687	.987	.640	.933	1.027	.939	.677
Minimum		1	1	1	1	1	1	1	1
Maximum		4	4	4	3	4	6	5	4

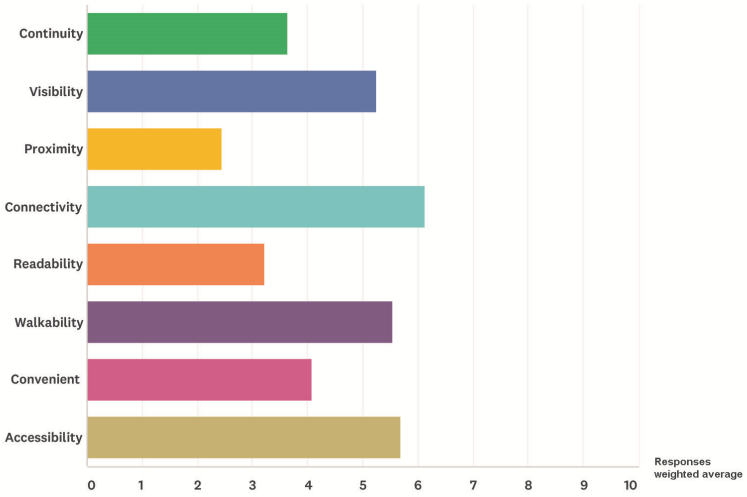
Meanwhile, during the second round of the Delphi technique survey, experts were again asked to give their opinions on whether they agreed or disagreed with removing the 'Walkability' criterion from the Access and Connectivity category. Figure 57 below shows the responses of participants about their opinions of removing 'Walkability' from the Access and Connectivity category. In fact, just 35 experts completed this round and responded to this question; the result demonstrates agreement on their responses as the majority of experts recommend keeping this criterion with 77.14% (27 of 35) whereas just 22.86% (8 of 35) experts responded to remove this criterion.



	AGREE(REMOVE THIS CRITERIA)	DISAGREE(KEEP THIS CRITERIA)	TOTAL	WEIGHTED AVERAGE
Walkability	22.86%	77.14%		
	8	27	35	1.77

Figure 57: Participants' opinions regarding agreeing or disagree to remove walkability from the Access and Connectivity category

Figure 58 below illustrates the weight list of all accepted criteria of the Access and Connectivity category from the first round, as experts achieved consensus about the number of criteria in this category from the first round. The experts were asked to weight each criterion based on their opinions and point of view, where 1 represents extremely important and 8 represents the lowest level of importance. The result shows that the 'Connectivity' criterion is considered the most important in this category with the highest score of 6.13, and 'Accessibility' has been rated as the second most important criterion with the second-highest score of 5.70; while 'Walkability' has been rated as the third most important criterion with 5.55, very close to the 'Accessibility' score. Moreover, experts rated 'Visibility' fourth with a score of 5.25, and 'Proximity' at the lowest level of importance in the Access and Connectivity category with a 2.45 score.



	1	2	3	4	5	6	7	8	TOTAL	SCORE
Continuity	0.00% 0	7.50% 3	10.00% 4	15.00% 6	17.50% 7	20.00% 8	15.00% 6	15.00% 6	40	3.63
Visibility	15.00% 6	15.00% 6	20.00% 8	12.50% 5	15.00% 6	15.00% 6	5.00% 2	2.50% 1	40	5.25
Proximity	2.50% 1	0.00% 0	5.00% 2	10.00% 4	5.00% 2	10.00% 4	27.50% 11	40.00% 16	40	2.45
Connectivity	27.50% 11	25.00% 10	12.50% 5	17.50% 7	7.50% 3	7.50% 3	0.00% 0	2.50% 1	40	6.13
Readability	2.50% 1	5.00% 2	5.00% 2	15.00% 6	10.00% 4	12.50% 5	35.00% 14	15.00% 6	40	3.23
Walkability	20.00% 8	22.50% 9	17.50% 7	10.00% 4	10.00% 4	7.50% 3	7.50% 3	5.00% 2	40	5.55
Convenient	12.50% 5	5.00% 2	5.00% 2	7.50% 3	32.50% 13	15.00% 6	7.50% 3	15.00% 6	40	4.08
Accessibility	20.00% 8	20.00% 8	25.00% 10	12.50% 5	2.50% 1	12.50% 5	2.50% 1	5.00% 2	40	5.70

Figure 58: Weight list of all criteria of the Access and Connectivity category

Experts expressed their opinion regarding which criteria can make public space active in terms of the Access and Connectivity category. During the first round, just one criterion was selected for removal from this category. Despite, the very low percentage, this recommendation was addressed again in the second round of the survey. Experts gave their opinion about removing this criterion from the Access and Connectivity category. The researcher took into account the experts' opinions and agreed to retain 'Walkability' in this category. Table 21 below demonstrates the final list of criteria in the Access and Connectivity category ranked based on their level of importance.

Table 21: Final list of criteria for the Access and connectivity category ranked based on their level of importance

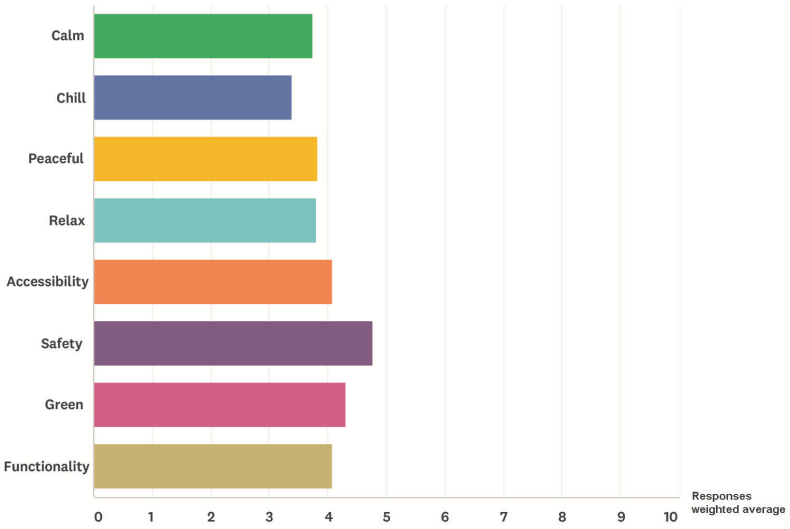
Categories	Criteria	Weight of criteria	Applicability (Relationship with urban context)
Access & connectivity	Connectivity	6.13	Transportation Info (Mode Splits)
	Accessibility	5.70	Parking Usage Patterns
	Walkability	5.55	Pedestrian Activity
	Visibility	5.25	Traffic Data
	Convenient	4.08	Pedestrian Activity
	Continuity	3.63	Traffic Data
	Readability	3.23	Transit Usage
	Proximity	2.45	Traffic Data

The experts achieved a consensus of their results during the two rounds of the Delphi technique survey, through expressing their opinions about the recommendations of removing criteria as they achieved consensus and stability in their responses in the second round. The Delphi technique helped experts to express their opinions to achieve the stability in the results and also gave them the opportunity to express their opinions individually based on their experience and their points of view, as they can see other experts' recommendations and respond to them individually.

6.2.4 Wellbeing.

In this category, experts have emphasised the level of importance of each criterion in the Wellbeing category and rated them according to the perceived level of importance. This category has been rated as the third most important category in the proposed framework of active public space with a weighted average of 4.33 as shown in Figure 44. Participants show a satisfactory consensus and agreed to add Wellbeing and its criteria to the proposed framework. Experts were asked to rate the level of importance of all criteria in the Wellbeing category, they gave their opinions based on the priority of each criterion from their individual point of view. Here, 1 represents 'Not important at all' and 5 represents 'Extremely Important', while 0 represents the option of removing criteria from the category.

Participants were asked to rate the level of importance for all these criteria according to their individual points of view and based on the priority of each criterion. Forty experts completed the first round. The results in Figure 59 below from the first round illustrate the level of importance of all criteria in the Wellbeing category, as experts rated 'Safety' as the most important criterion in this category with a weighted average of 3.75, while the 'Green' criterion was considered as the second most important criterion with a weighted average of 4.30. Moreover, both 'Accessibility' and, 'Functionality' criteria have been rated with the same weighted average of 4.08 in the third level of importance in this category. At the same time, experts rated the Chill criterion as having the lowest level of importance with a weighted average of 3.38. The result also shows that the 'Chill' and, 'Peaceful' criteria were recommended to be removed from this category by one expert out of the 40.



	EXTREMELY IMPORTANT	VERY IMPORTANT	MODERATELY IMPORTANT	SLIGHTLY IMPORTANT	NOT IMPORTANT AT ALL	REMOVE THIS CRITERIA	TOTAL	WEIGHTED AVERAGE
Calm	20.00% 8	40.00% 16	37.50% 15	0.00% 0	2.50% 1	0.00% 0	40	3.75
Chill	10.00% 4	37.50% 15	40.00% 16	7.50% 3	2.50% 1	2.50% 1	40	3.38
Peaceful	20.00% 8	55.00% 22	17.50% 7	5.00% 2	0.00% 0	2.50% 1	40	3.83
Relax	22.50% 9	47.50% 19	17.50% 7	12.50% 5	0.00% 0	0.00% 0	40	3.80
Accessibility	32.50% 13	47.50% 19	15.00% 6	5.00% 2	0.00% 0	0.00% 0	40	4.08
Safety	80.00% 32	17.50% 7	2.50% 1	0.00% 0	0.00% 0	0.00% 0	40	4.78
Green	52.50% 21	30.00% 12	12.50% 5	5.00% 2	0.00% 0	0.00% 0	40	4.30
Functionality	30.00% 12	52.50% 21	15.00% 6	0.00% 0	2.50% 1	0.00% 0	40	4.08

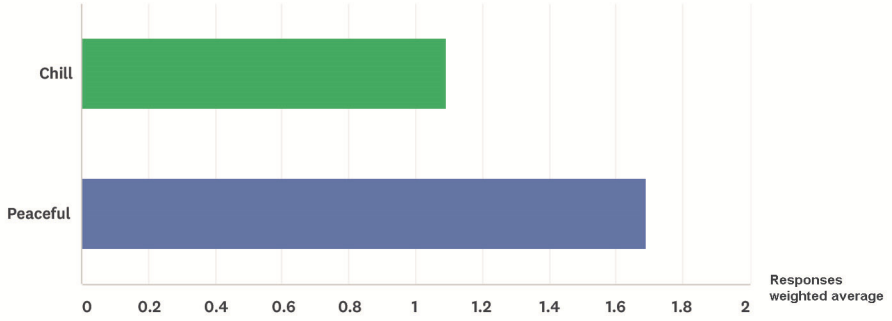
Figure 59: Level of importance for all criteria of the Wellbeing category

Table 22 below shows the mean values and standard deviations for all criteria in the Wellbeing category from the first round. The mean value in this category lies in the range between 1.23 and 2.25, while standard deviations for all criteria in the Wellbeing category are less than 1, except for the 'Chill' and, 'Peaceful' criteria which were recommended to be removed from this category, as their mean values are above than 1. This reflects that experts' responses achieved consensus in all other criteria. The standard deviations for all criteria in the range of 0.48 and 1.12.

Table 22: Mean values and standard deviations of all criteria of the Wellbeing category

		Calm	Chill	Peaceful	Relax	Accessibility	Safety	Green	Functionality
N	Valid	40	40	40	40	40	40	40	40
	Missing	0	0	0	0	0	0	0	0
Mean		2.25	2.24	2.18	2.20	1.93	1.23	1.65	1.98
Mode		2	2	2	2	2	1	1	2
Std. Deviation		.870	1.12	.984	.939	.829	.480	.864	.832
Minimum		1	0	0	1	1	1	1	1
Maximum		5	3	6	4	4	3	4	5

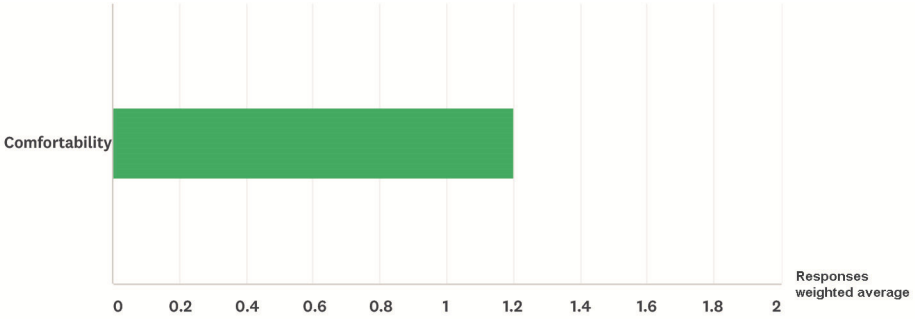
During the first round, some participants recommend removing both ‘Chill’ and, ‘Peaceful’ criteria as shown previously in Figure 59 above. These recommendations were taken into account in the second round by asking experts to give their opinions about removing these criteria from the Wellbeing category. Thirty-five experts completed the second round and responded in this regard. Figure 60 below shows experts’ opinions about removing both ‘Chill’ and ‘Peaceful’ criteria from the Wellbeing category by responding to ‘Agree’ (remove this criterion) or ‘Disagree’ (keep this criterion). The result shows agreement regard removing the ‘Chill’ criterion from the Wellbeing category with a high percentage of 91.43% (32 of 35) who agreed to remove this criterion, due to the lowest level of importance, while just 3 of 35 experts, 8.57%, recommended retaining this criterion. Moreover, 68.57% (24 of 35) experts responded to remove the ‘Peaceful’ criterion from this category based on their point of view.



	AGREE(REMOVE THIS CRITERIA)	DISAGREE(KEEP THIS CRITERIA)	TOTAL	WEIGHTED AVERAGE
Chill	91.43% 32	8.57% 3	35	1.09
Peaceful	31.43% 11	68.57% 24	35	1.69

Figure 60: Participants' opinions regard to agree or disagree about removing criteria from the Wellbeing category

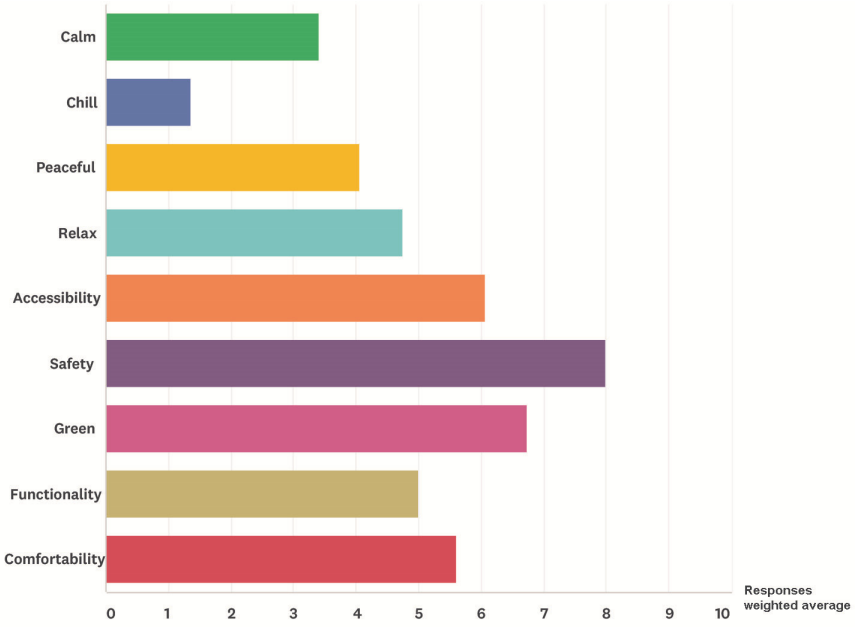
At the same time, during the first round, a new criterion ‘Comfortability’ was recommended by one expert to be added to the Wellbeing category as mentioned previously. This recommendation was taken into account in the second round as well; 35 experts completed the second round and responded in this regard. The results in Figure 58 below demonstrate that 80% (28 of 35) recommended adding this criterion to the Wellbeing category, This showed a satisfactory consensus in experts responses regard adding ‘Comfortability’ to wellbeing category, while just 20% (7 of 35) of experts disagreed about adding this criterion to the category.



	AGREE(ADD THIS CRITERIA)	DISAGREE(REMOVE THIS CRITERIA)	TOTAL	WEIGHTED AVERAGE
Comfortability	80.00%	20.00%		
	28	7	35	1.20

Figure 61: Level of agreement of adding new criteria to wellbeing category

Also, during the second round, participants were asked to rate the level of importance for the final list of criteria of the Wellbeing category, based on the priority of each criterion and their points of view. The experts agreed to add 'Comfortability' to the Wellbeing category as shown in Figure 61 above. Due to the fact that new criteria were added to the weight list of all criteria in this category, they needed to be rated again. Thirty-five experts responded in this regard; 31 had already agreed to add this criterion, so they responded to give a new weight list of all the criteria again, while just three experts disagreed about adding this criterion as shown in Figure 61 above, so they did not weight it. Figure 62 below shows the level of importance of all criteria in this category. The results from the figure below illustrate that experts rated the Safety criterion as the most important and considered it as first in the list with the highest score of 8.00. The Green criterion was rated as the second most important criterion with the second-highest score of 6.74, while the 'Accessibility' criterion has been rated as the third most important criterion with a score of 6.06. Furthermore, a new criterion 'Comfortability' was rated as the fourth level of importance with a score of 5.61. At the same time, both 'Functionality' and, 'Relax' criteria were rated with (5.00 and, 4.74 respectively). The 'Peaceful' criterion which experts recommended removing from this category, was rated with a score of 4.06 ranked as the eighth level of importance. The result also demonstrates that the 'Chill' criterion was rated as having the lowest level of importance with a score of just 1.35, and experts recommended to removing it from this category, as shown in figure 57 above.



	1	2	3	4	5	6	7	8	9	TOTAL	SCORE
Calm	3.23% 1	3.23% 1	6.45% 2	0.00% 0	3.23% 1	16.13% 5	29.03% 9	35.48% 11	3.23% 1	31	3.42
Chill	0.00% 0	3.23% 1	0.00% 0	0.00% 0	0.00% 0	3.23% 1	0.00% 0	3.23% 1	90.32% 28	31	1.35
Peaceful	3.23% 1	3.23% 1	12.90% 4	6.45% 2	19.35% 6	3.23% 1	16.13% 5	29.03% 9	6.45% 2	31	4.06
Relax	6.45% 2	0.00% 0	6.45% 2	19.35% 6	19.35% 6	19.35% 6	22.58% 7	6.45% 2	0.00% 0	31	4.74
Accessibility	16.13% 5	6.45% 2	32.26% 10	3.23% 1	12.90% 4	16.13% 5	9.68% 3	3.23% 1	0.00% 0	31	6.06
Safety	45.16% 14	32.26% 10	12.90% 4	0.00% 0	6.45% 2	3.23% 1	0.00% 0	0.00% 0	0.00% 0	31	8.00
Green	16.13% 5	32.26% 10	9.68% 3	22.58% 7	3.23% 1	6.45% 2	6.45% 2	3.23% 1	0.00% 0	31	6.74
Functionality	6.45% 2	9.68% 3	6.45% 2	12.90% 4	19.35% 6	22.58% 7	9.68% 3	12.90% 4	0.00% 0	31	5.00
Comfortability	3.23% 1	9.68% 3	12.90% 4	35.48% 11	16.13% 5	9.68% 3	6.45% 2	6.45% 2	0.00% 0	31	5.61

Figure 62: Weight list of all criteria of Wellbeing category

The expert expressed their opinion regarding which criteria can make public space active in terms of the Wellbeing category. During the first round, two criteria were selected for removal from this category. Despite, the very low percentage, this recommendation was taken to the second round of the survey. Meanwhile, another recommendation in regard to adding new criteria was suggested during the first round which was also taken into account in the second round. Experts gave their opinions about removing this criterion from the Wellbeing category; the researcher took into account the experts' opinions and agreed to remove the 'Chill' criterion from this category, due to its low level of importance and the possibility of merging it with another criterion in this category. In addition, it was recommended that the 'Peaceful' criterion be retained in the list. Moreover, experts achieved consensus and stability in their responses to the new criterion 'Comfortability', which was added to the final list of criteria in this category.

Table 23 below demonstrates the final list of criteria in the Wellbeing category ranked based on their level of importance.

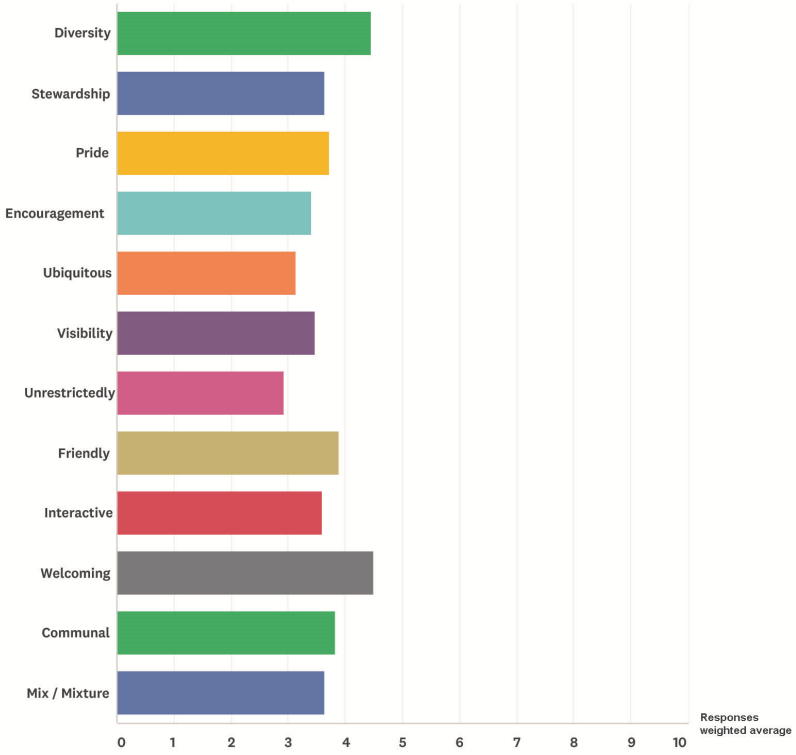
Table 23: Final list of criteria for the Wellbeing category ranked based on their level of importance

Categories	Criteria	Weight of criteria	Applicability (Relationship with urban context)
Well-being	Safety	8.00	Social interaction And human capital
	Green	6.74	Community belonging
	Accessibility	6.06	Social interaction And human capital
	Comfortability	5.61	Urban Canyon
	Functionality	5.00	Physical Environment
	Relax	4.74	Physical outdoor activities
	Peaceful	4.06	
	Calm	3.42	Social interaction And human capital

6.2.5 Sociability

Finally, but just as important, experts placed emphasis on the level of importance of all criteria of the Sociability category and rated this list of criteria based on their points of view. Here, 1 represents 'Not important at all' and 5 represents 'Extremely Important', while 0 represents the option of removing criteria from the category. Forty experts completed the first round and responded in this regard.

Figure 63 below presents the experts' opinion regarding the level of importance of all criteria of the Sociability category. The results show that the 'Welcoming' criterion was rated as the most important criterion in this category with a weighted average of 4.45, and the 'Diversity' criterion was rated as the second most important criterion with a weighted average of 4.45. Meanwhile, the 'Unrestrictedly' criterion was rated as having the lowest level of importance compared to other criteria in the Sociability category. Furthermore, some experts recommended removing some criteria from this category; one of the 40 experts recommended removing the following criteria 'Stewardship', 'Encouragement', 'Ubiquitous', 'Unrestricdely', and 'Mix / Mixture' due to the lowest level of importance they were given. Despite, the very low percentage of these recommendations, these suggestions were taken into account in the second round, experts were asked to give their opinion again about removing these criteria. Meanwhile, the experts recommended adding a new criterion, 'Public engagement' to the Sociability category, which has been taken into account as well in the second round to be rated by experts.



	EXTREMELY IMPORTANT	VERY IMPORTANT	MODERATELY IMPORTANT	SLIGHTLY IMPORTANT	NOT IMPORTANT AT ALL	REMOVE THIS CRITERIA	TOTAL	WEIGHTED AVERAGE
Diversity	57.50% 23	32.50% 13	7.50% 3	2.50% 1	0.00% 0	0.00% 0	40	4.45
Stewardship	20.00% 8	40.00% 16	27.50% 11	10.00% 4	0.00% 0	2.50% 1	40	3.63
Pride	12.50% 5	55.00% 22	25.00% 10	7.50% 3	0.00% 0	0.00% 0	40	3.73
Encouragement	7.50% 3	42.50% 17	40.00% 16	5.00% 2	2.50% 1	2.50% 1	40	3.40
Ubiquitous	5.00% 2	42.50% 17	22.50% 9	22.50% 9	5.00% 2	2.50% 1	40	3.13
Visibility	10.00% 4	52.50% 21	20.00% 8	10.00% 4	7.50% 3	0.00% 0	40	3.48
Unrestrictedly	10.00% 4	25.00% 10	25.00% 10	30.00% 12	7.50% 3	2.50% 1	40	2.92
Friendly	25.00% 10	45.00% 18	27.50% 11	0.00% 0	2.50% 1	0.00% 0	40	3.90
Interactive	20.00% 8	37.50% 15	25.00% 10	17.50% 7	0.00% 0	0.00% 0	40	3.60
Welcoming	67.50% 27	20.00% 8	7.50% 3	5.00% 2	0.00% 0	0.00% 0	40	4.50

Figure 63: Level of importance for all criteria of the Sociability category

Table 24 below presents the mean value and standard deviations of all criteria of the Sociability category the mean value falls in the range of 2.92 and 4.50 while the standard deviations lie in the range between 0.749 and 1.22. It was recommended removing some criteria from this category that cause an increase in the standard deviations above 1, while other criteria had standard deviations less than 1. These recommendations were taken into account in the second round to achieve consensus in the responses.

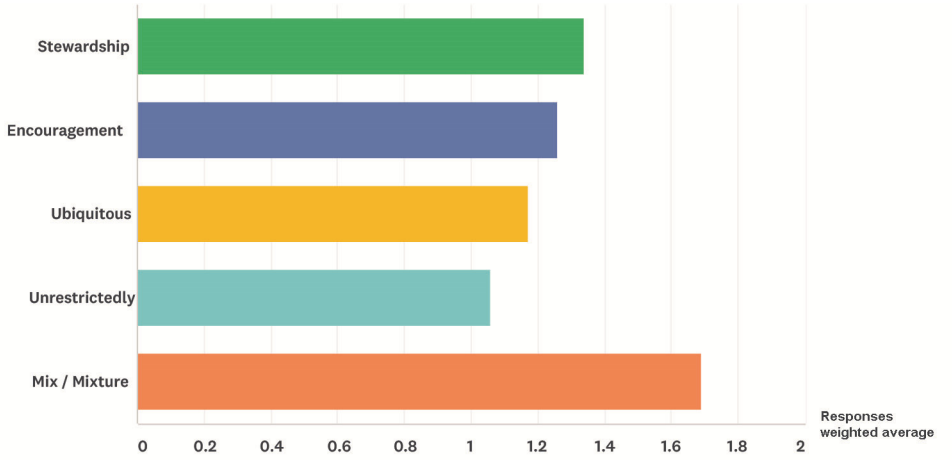
Table 24: Mean value and standard deviations of all criteria of the Sociability category

Statistics

		Diversity	Stewardship	Pride	Encouragement	Ubiquitous	Visibility	Unrestrictedly	Friendly	Interactive	Welcoming	Communal	Mix / Mixture
N	Valid	40	40	40	40	40	40	40	40	40	40	40	40
	Missing	0	0	0	0	0	0	0	0	0	0	0	0
Mean		4.45	3.63	3.73	3.40	3.13	3.48	2.93	3.90	3.60	4.50	3.78	3.63
Mode		5	4	4	4	4	4	2	4	4	5	4	4
Std. Deviation		.749	1.07	.784	.982	1.13	1.06	1.22	.871	1.00	.847	.832	1.079
Minimum		2	0	2	0	0	1	0	1	2	2	2	0
Maximum		5	5	5	5	5	5	5	5	5	5	5	5

During the first round, some participants suggested removing some criteria from the Sociability category. The next figure shows the experts' opinions on whether they agree or disagree about removing a number of criteria 'Stewardship', 'Encouragement', 'Ubiquitous', 'Unrestricted', and 'Mix / Mixture' from the list in the Sociability category. Despite, the very low percentage who asked to have these criteria removed, these recommendations were taken into account in the second round, when experts asked again to give their opinions on whether to agree or disagree with these recommendations. Thirty-five experts completed the second round and responded in this regard.

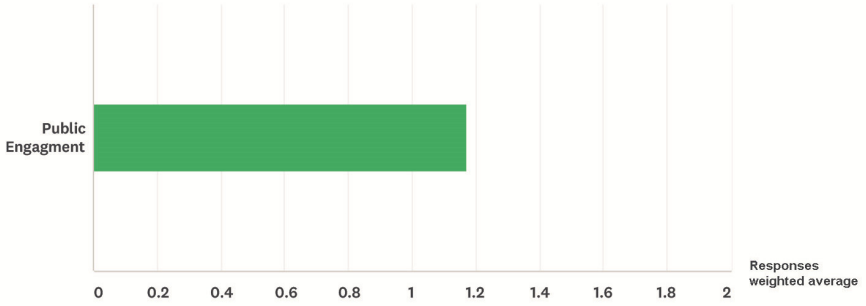
The results in Figure 64 below illustrates that 65.71% (23 of 35) of experts show agreement regarding the 'Stewardship' criterion. Participants agreed to remove the 'Stewardship' criterion from the Sociability category, while just 12 of 35 participants, 34.29%, disagreed and recommended retaining this criterion. In addition, the 'Encouragement' criterion had 74.29% (26 of 35) of participants who recommended remove this criterion, and just 9 of 35 experts - 25.71% recommended keeping this criterion. Moreover, 82.86% (29 of 35) of participants agreed to remove the 'Ubiquitous' criterion from the Sociability category, and just 17.14% (6 of 35) participants recommended retaining it. In addition, 94.29% (33 of 35) participants recommended removing the 'Unrestrictedly' criterion, while just 2 of the 35 participants - 5.71% - recommended keeping this criterion. Finally, the results show the responses about the 'Mix/Mixture' criterion, with 68.57% (24 of 35) participants recommending retaining this criterion, while just 31.43% (11 of 35) participants suggested removing this criterion. The result showed that the experts achieved consensus.



	AGREE(REMOVE THIS CRITERIA)	DISAGREE(KEEP THIS CRITERIA)	TOTAL	WEIGHTED AVERAGE
Stewardship	65.71% 23	34.29% 12	35	1.34
Encouragement	74.29% 26	25.71% 9	35	1.26
Ubiquitous	82.86% 29	17.14% 6	35	1.17
Unrestrictedly	94.29% 33	5.71% 2	35	1.06
Mix / Mixture	31.43% 11	68.57% 24	35	1.69

Figure 64: Level of agreement regarding removing or keeping criteria from the Sociability category

Furthermore, during the first round, experts recommended adding a new criterion to Sociability category, the 'Public engagement' as mentioned previously. New criteria were rated by experts in the second round to see whether they agreed or disagreed about adding them to the Sociability category. Figure 65 below illustrates the percentage of participants' responses regarding the new criterion in the Sociability category. The results illustrate that 82.86% (29 of 35) participants recommended adding this criterion to the sociability category, while just 17.14% (6 of 35) participants disagree. The result shows that experts achieved consensus in their responses.

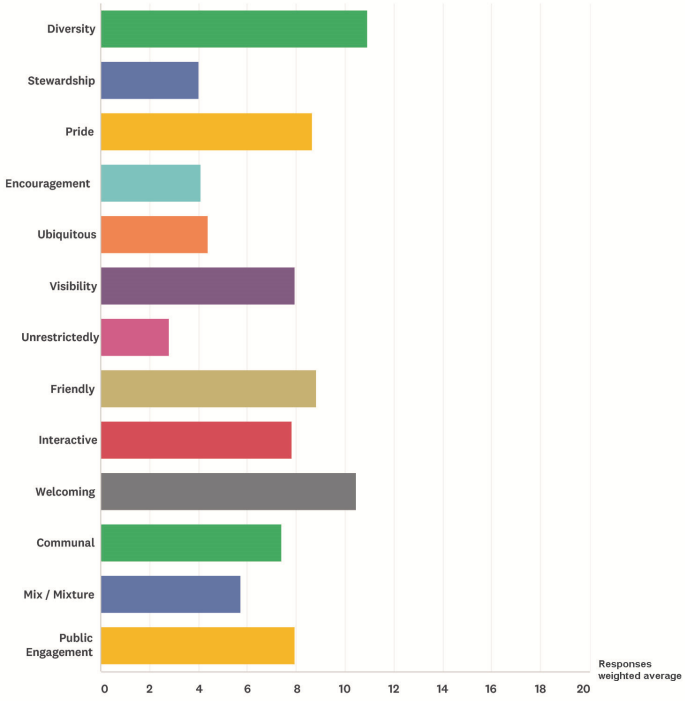


	AGREE(ADD THIS CRITERIA)	DISAGREE(REMOVE THIS CRITERIA)	TOTAL	WEIGHTED AVERAGE
Public Engagment	82.86% 29	17.14% 6	35	1.17

Figure 65: Level of agreement regarding adding a new criterion to the sociability category

Last, but not least, experts placed emphasis on the importance of each criterion in the final list of criteria of the Sociability category. Experts give weight to each criterion in the second round of the Delphi process; 35 experts completed this round and responded to this question.

The results in Figure 66 below illustrates the level of importance of each criterion in the Sociability category by giving a weight to each criterion in this category. The results show that the 'Diversity' criterion was rated as the most important in this category with the highest score of '10.90', while the 'Welcoming' criterion was rated as the second most important criterion with the second-highest score (10.45). Furthermore, both (Friendly, Pride) criteria have been rated as the third and fourth most important criteria respectively in this category with almost the same scores of 8.81 and, 8.65, respectively. Finally, experts rated the 'Unrestrictedly' criterion as having the lowest level of importance in the Sociability category with a score of 2.81. Figure 61 shows that experts agreed to remove this criterion from the Sociability category, due to the low level of importance compared to other criteria.



	1	2	3	4	5	6	7	8	9	10	11	12	13
Diversity	48.39% 15	9.68% 3	9.68% 3	3.23% 1	6.45% 2	6.45% 2	3.23% 1	9.68% 3	3.23% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0
Stewardship	9.68% 3	6.45% 2	0.00% 0	0.00% 0	3.23% 1	0.00% 0	6.45% 2	0.00% 0	3.23% 1	3.23% 1	9.68% 3	6.45% 2	51.61% 16
Pride	0.00% 0	6.45% 2	22.58% 7	22.58% 7	9.68% 3	3.23% 1	6.45% 2	16.13% 5	6.45% 2	6.45% 2	0.00% 0	0.00% 0	0.00% 0
Encouragement	0.00% 0	0.00% 0	0.00% 0	0.00% 0	12.90% 4	3.23% 1	0.00% 0	9.68% 3	6.45% 2	16.13% 5	16.13% 5	29.03% 9	6.45% 2
Ubiquitous	3.23% 1	3.23% 1	3.23% 1	6.45% 2	6.45% 2	3.23% 1	0.00% 0	0.00% 0	0.00% 0	3.23% 1	35.48% 11	19.35% 6	16.13% 5
Visibility	3.23% 1	0.00% 0	16.13% 5	16.13% 5	9.68% 3	16.13% 5	6.45% 2	6.45% 2	12.90% 4	12.90% 4	0.00% 0	0.00% 0	0.00% 0
Unrestrictedly	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	6.45% 2	29.03% 9	16.13% 5	35.48% 11	12.90% 4
Friendly	3.23% 1	9.68% 3	12.90% 4	12.90% 4	12.90% 4	19.35% 6	12.90% 4	9.68% 3	6.45% 2	0.00% 0	0.00% 0	0.00% 0	0.00% 0
Interactive	6.45% 2	3.23% 1	9.68% 3	0.00% 0	19.35% 6	6.45% 2	25.81% 8	12.90% 4	6.45% 2	9.68% 3	0.00% 0	0.00% 0	0.00% 0
Welcoming	16.13% 5	32.26% 10	9.68% 3	22.58% 7	0.00% 0	3.23% 1	6.45% 2	3.23% 1	0.00% 0	6.45% 2	0.00% 0	0.00% 0	0.00% 0

Figure 66: Weight list for all criteria of the Sociability category

The results demonstrate that all criteria which experts had recommended removing from the Sociability category have been rated at the lower level of importance in the final criteria list of the Sociability category. This reflects the percentage of stability in the responses achieved by experts.

Experts expressed their opinions regarding which criteria can make public space active in terms of the Sociability category. During the first round, five criteria were selected to be removed from this category. Despite the very low percentage, this recommendation was taken through to the second round of the survey. Meanwhile, another recommendation in regard to adding a new criterion ‘Public Engagement’ was made during the first round which was taken into account in the second round as well. Experts gave their opinion about removing three criteria ‘Stewardship’, ‘Encouragement’, and ‘Ubiquitous’ from the Sociability category; the researcher took the experts’ opinions into account and agreed to

remove the three criteria from this category, due to their low level of importance and the possibility of merging them with another criterion in this category. However, the researcher preferred to retain 'Unrestrictedly' criterion in the Sociability category due to its impact in providing a good Wi-Fi service for the users of public space. Meanwhile, it was recommended that the 'Mix / Mixture' criterion be retained in the list as the researcher showed the same interest and thus included it. Moreover, experts achieved consensus and stability in their responses to the new criterion, 'Public Engagement' as the researcher included it in the final list in the sociability category.

Table 25 below demonstrates the final list of criteria in the Sociability category ranked based on their level of importance.

Table 25: Final list of criteria for the sociability category ranked based on their level of importance

Categories	Criteria	Weight of criteria	Applicability (Relationship with urban context)
Sociability	Diversity	10.90	Number of Women, Children, Elderly
	Welcoming	10.45	Street Life
	Friendly	8.81	Evening Use
	Pride	8.65	Voluntarism
	visibility	7.97	The communication network (WiFi)
	Public Engagment	7.94	Public Participation
	Interactive	7.84	Evening Use
	Communal	7.42	Community (Ethnical Origin)
	Mix / Mixture	5.74	
	Unrestrictedly	2.81	The communication network (WiFi)

6.3 Main Finding and Discussion.

During the Delphi technique consulting process the experts indicated the importance of the framework of active public space in the quality of public space assessment. There was a consensus among participants about the contents of the proposed framework. In addition, experts achieved consensus in regard to the number of categories of the proposed framework of active public space. as they validated applying such a framework to assess the quality of public space.

The experts pointed out that most of the existing frameworks to assess the quality of places such as the Green Flag Award framework and the Creating Successful Places framework were not keeping up with the rapid technological development of the era. For example, by neglecting the impact of free Wi-Fi to encourage people to gather in the public space, the consequences of neglecting these factors can be assessed.

During the Delphi technique survey, experts emphasised the levels of importance of all categories of the proposed framework, as confirmed by the significance of the placemaking agenda in transferring and creating a better place for people, which must be taken into account during the design process for modern cities. Consequently, there are a number of factors based on the placemaking agenda and the quality of place assessment that should be highlighted to reach a clear understanding about the role of the community in transferring and shaping the place; the importance of users' opinions in creating their place; and the significance of mental health and wellbeing in the users' perception of the place. They point out that understanding these factors can enhance the sense of belonging to the community and highlight the importance of social cohesion.

In fact, using the Delphi technique survey increased the validation of the results and findings which has stressed the significance of the proposed framework due to rapid development caused technology, and highlighted, the need for such an effective quality of public space framework. The aim of this research is to redevelop a framework to assess the quality of public space taking into account the new communication era to deliver significant benefits to communities with placemaking concepts. Throughout the Delphi technique developing process, participants rated the level of importance of all categories of the proposed framework. The results demonstrated that experts achieved consensus in their responses about considering Wellbeing as a new category, while the existing frameworks have neglected the role of understanding well-being and mental health in transferring public space; the Wellbeing category was rated as the third level of importance of the proposed framework. Throughout the two rounds of the Delphi technique, new criteria were recommended to be added and others were recommended to be removed from the proposed framework. A new criterion 'Public engagement' was introduced. It refers to the place which can hold public speaking events and has an excellent visual and physical connection to gather people in the place for public participation. On the other hand, it was recommended that some criteria were removed from the proposed framework. Despite, the very low percentage of these recommendations, nevertheless, the Delphi technique process shows that experts achieved consensus in their responses in the second round in regard to these recommendations. For example, during the first round, just one of the 40 experts suggested adding or removing a criterion; however, by the second round, this very low percentage increased to over 65%, as experts responded to the new recommendations individually based on their priority and their points of view.

Table 26 demonstrates the *final proposed framework of active public space* after the three stages of development in this research and finalised based on the result from the final round in the Delphi technique process. Finally, the conclusion of this process showed that experts have achieved a consensus regarding the content of the proposed framework of active public space, and validate using such a framework to assess the quality of public space in the UK. Experts point out the significant impact of such framework on providing guidelines for architects, urban designers, and planners to design better public space based on the concept of placemaking and taking into account the effective use of technology.

Table 26: Active Public space framework

Categories	Criteria	Description	Applicability (Relationship with urban context)
Use & Activities	Active (Dynamically)	The more activities that are going in a place, the more people have an opportunity to participate in them.	physical activity (Local Business Ownership)
	Vitality	A place that is well used in relation to its predominant function(s). The most appropriate mix of use	Land-use patterns
	Flexibility	In terms of physical arrangements which can promote the use of the space to accommodate different types of activities	Physical layout
	Functionally	A place that functions well at all times	Rating public life Mixed-use of land
Identity & Image	Liveability	Liveable place reduces crime assault	Crime Statistics
	Safety	Somewhere that feels safe from harm	
	Walkability	A measure of how friendly an area is for walking	
	Sittablilty	The place provides people with the opportunity to stop and sit	Physical Layout (Furniture)
	Hygiene	The place is clean and free of litter (Waste Receptacles)	
	Aesthetics	Study of art and beauty of the place	Local culture or history
	Attractively	The way environment information can attract and gather people in the place	Environment Data
	Historically	Archived data of environment can give a clear image of the place	
Access & connectivity	Continuity	continuing data processed for the purpose of the conveyance of a communication on an electronic communications network	Traffic Data
	Visibility	How easily people can get the information	
	Proximity	How accurate timing foreground information regarding traffic	
	Connectivity	How well different places are connected to each other using the transport system. If trains, buses and highways work more efficiently then the level of connectivity improves	Transportation Info (Mode Splits)
	Readability	The readability of the transportation schedule	Transit Usage
	Walkability	Activities in the street encourage people to enjoy their walking	Pedestrian Activity
	Convenient	Type of activities that suit people's needs in the place	
	Accessibility	Providing different types of parking and how a place can be reached by users. A place that is easy to get to and move through	Parking Usage Patterns
Well-being	Calm	Feeling less worried increases being part of social activities in the place	Social interaction And human capital
	Accessibility	Getting access to art, cultural and leisure amenities promotes happiness.	
	Safety	Feeling safe and walking around the place day and night and feeling socially connected with the community	
	Peaceful	Peaceful experience of the activities for elderly people	Physical outdoor activities
	Relax	Evaluate the satisfaction of physical exercise in the place	
	Green	Greener urban area displays more positive indicators of good mental health which is associated with the physical activity level that will increase the sense of belonging	Community belonging
	Comfortability	Microclimate conditions (airflow, pollution, solar radiation) in streets	Urban Canyon
	functionality	The impact of art (such as dance, drama, music, visual arts) on mental health	Physical Environment
Sociability	Diversity	The use of the place by a diversity of age and different groups in the place	Number of Women, Children, Elderly
	Pride	Getting involve in social activities	Voluntarism
	visibility	Visible to all Wi-Fi enabled devices and getting access to data everywhere in the place.	The communication network (WiFi)
	Unrestrictedly	Unlimited use of Internet service providers	
	Friendly	Those places that are well used and loved by users	
	Interactive	Multi-use of the place can gather people and make the place liveable	Evening Use
	Welcoming	A place where anyone has a right to be	Street Life
	Communal	Shared by all members of a community; for common use	Community (Ethnic Origin)
	Mix / Mixture	A mix of different diverse community groups in the place	
	Public engagement	The place which can hold public speaking events and it has an excellent visual and physical connection to gather people in the place	Public participation

6.4 Summary

The purpose of this chapter was to promote a consulting review through the Delphi technique that has been used in much current academic research. In fact, the main aim of using the Delphi technique was to explore experts' opinions about applying the proposed framework to assess the quality of public space which highlights just the design aspect of the public space. Also, the purpose of using the Delphi technique with experts was to find out their opinions in respect of the proposed framework to answer the main research questions: *How can the quality of public space be measured and assessed? What makes public space active? T*hrough the Delphi technique survey, the experts achieved a consensus and stability in their responses on the validity and suitability of the proposed framework, as they approved the significance of all categories and their criteria, in order to redevelop a framework to assess the quality of public space. All categories of the proposed framework were rated by experts along with the range between 'moderately important' and 'extremely important', which shows a high level of consensus and stability of the result.

The purpose of the next chapter is to test and examine the final framework of active public space to validate and check the reliability of applying such a framework to assess the quality of public space. The validation process is based on three stages using different approaches to assess and measure the functionality of the target site.

Chapter Seven: Test and examine the framework of active public spaces

7.1 Introduction

This research develops a framework for measuring active public places by taking into account the new communication media and technology development in the twenty-first century. This aim of the research was discussed and developed, as three iteration stages were run to complete the final framework of active public spaces. As one of the main objectives of this research is to test and validate the characteristics of active public places framework using real case scenario, this chapter covers these points and discusses them in more detail.

During the Delphi consultation process, experts expressed their opinion regarding the importance level of all categories of the framework of active public space, as shown previously in Figure 43 in Chapter six. The result demonstrates that the Use and Activities category is the most important category in the framework with a score of 4.72, as all scores are considered between 'extremely important' and 'moderately important'. This result indicates that experts achieved consensus about the contents of this framework. The test and examination of the process in this chapter assessed and measured the criteria from the Use and Activities category due to their level of importance based on the outcome of the Delphi consultation process. Table 16 below demonstrates a final list of criteria in the Use and Activities category ranked based on their level of importance.

Table 16: Final List of criteria in the Use and Activities category ranked based on their level of importance

Categories	Criteria	Weight of criteria	Applicability (Relationship with urban context)
Use & Activities	Functionally	5.09	Rating public life Mix-use of land
	Vitality	4.28	Land-use patterns
	Flexibility	3.94	Physical Layout
	Active - Dynamically	3.06	physical activity

The results from Table 16 above demonstrate that 'Functionality' is the most important criterion in this category, while the 'Active – Dynamically' criterion is rated at the fourth level of importance. This validation process of the framework assesses both 'Functionality' and 'Active – Dynamically' criteria in the Use and Activities category due to the fact that these criteria are more dynamic and can be measured while other criteria in this category are fixed.

The practical implementation is about assessing and measuring the quality of public places through digital technologies, by using different tools and techniques to design a better place. This process is divided into three stages. The first stage is based on observation of the current situation of the target site (social area) to assess people's behaviour and measure the density movement in the target site by using the thermal imaging assessment through thermal imaging record video of the site. The thermal image assessment can give a clear understanding of the movement and pedestrian behaviour in the site. The collected data were used to analysed through two ways, first by using the Matlab software for imagining analysis process to measure the pedestrian density movement in the site, and thermal video used to observe the pedestrian behaviour.

The aim of the second stage is to redesign the current situation of the site for a better place based on the results of the data from the first stage. This redesign process used MassMotion pedestrian simulation software to assess pedestrian movement and measure the density of people in the place to design a better place. The outcome of this simulation was applied again in the real-life context, and the physical layout of the social area (Target site) has been changed based on the new design of the simulation process.

The aim of the third stage of the experiment is to assess and measure the quality of the new design based on the simulation outcome. This process is based on observation by using the infrared camera again of the new design of the social area to measure the density and assess the pedestrian behaviour to validate the new design. The collected data was again run through two analysis tools, Matlab software and thermal video to analysis the users' behaviour with the new design of the place. Both thermal video and thermal imaging analysis provided a clear understanding of users' attributes and pedestrian movement in the site.

Moreover, this chapter assesses and examines and validate the characteristics of the place based on the criteria of the framework of a active public place.

7.2 The selection of the study site.

The experimentation took place in the social area in the Newton Building at Nottingham Trent University, a multicultural semi-public space, where a student, staff and the surrounding community interact with each other, and different activities occur in the place. This stage responds to the research objective to test and examine the characteristics of active public space, as well as indicators and benchmarks for measuring active

implementation. This process of the practical experiment is divided into three stages. The first stage (observation) assessed the current situation of the site by using the infrared camera. The second stage (simulation) redesigned the physical layout of the site to create a better place by using the MassMotion pedestrian simulation software. The third stage applies the new design principles to the target site (real life) and observes the site again to measure density and pedestrian movement. The target site of the experiment is located in the heart of the Newton Building in the central area (social area) in Nottingham Trent University city campus.

The experiment took place between May and June 2017. The target site (social area) was utilised as normal use during the experimentation, there were no events or special activities held in the place. Moreover, the pedestrian density movement in the surrounding area (classes, cafe, bank branch, student support centre) was inactive density level, the users used the site to relax and meet their friend or crossing through. The level of interaction been affected because of the experimentation period was during students examines for some schools at the university. The data were collected by using the FLIR A310 Infrared Camera; the camera was located at a high position (upper-level floor) away from pedestrians as shown in Figure 67, the reason for using the thermographic image is due to ethical issues, so the characteristics of the users cannot be recognised. The collected data through the infrared camera were analysed by using Matlab software to measure density and pedestrian movement in the site.

Figure 67: Infrared camera location

The target site for the study experiment (social area) is located in the heart of the Central Court which was identified as the focal point as a new main entrance on the west side for the visitors of the building as well for the students and staff. A vaulted glazed roof encloses the space, which provides access at two levels to Arkwright as well as to Newton buildings (Nottingham Trent University 2016); figure 68 below shows the social area.

Figure 68: Social area
Source : (Author 2018)

Hopkins Architects (2009) pointed out that the design idea of the Central Court area is to create a link between two buildings to provide a new main entrance and gateway for the surrounding communities; additionally to provide space for social and teaching spaces opening onto a covered central court and link building. The social spaces are the location for the experimentation phase of this research to measure the density and pedestrian movement, Redundant engineering workshops defining the large central forum space were designed to promote more interaction between students and visitors who flew into space at all levels. Different social events, exhibitions, cultural celebrations and, international showcases, which are open to public and surrounding communities to attend, are taking place in the social space. Figure 19, and 20 show pictures of different activities and events such as international showcase, and cultural celebration that occur in the social area.

Figure 69: Social area and the surrounding facilities
Source: (Author 2018)

The light and the airy central hub of the university's city campus located in the social space in Central Court as shown in Figure 69 above is the ideal space for students to relax and share knowledge. The social space is surrounded with different facilities, such as café and,

bar, and the student support service desk is also located there, in addition to resource rooms available for PC use (Nottingham Trent University 2016)

The researcher selected the social area (semi-public space) due to its multifunction nature, where different people in terms of age and ethnicity utilise this place. The researcher observed that the users of this indoor semi-public space and the surrounding community engage with each other in diverse activities, visiting the semi-public space and spending more time during the events.

7.3 Test and examine the framework of active public spaces

The selection of methods used for testing and examing criteria of the framework was based on the framework type and the real world aspect being analysed (Gass 1983). The framework of active public spaces is tested and examined through three stages to ensure that the characteristic of the public spaces is reasonable and applicable to achieve better design. Through the Delphi technique, most of the outcomes and findings have addressed the need for such a framework. During the previous stage of the research (Delphi process), the proposed framework has been validated through two rounds in the Delphi survey. Experts were asked to evaluate the need for such a framework to assess and measure the quality of the place, taking into account new communication media and the digital era. As shown in Figure 45, experts reached a consensus from the first round regarding the contents of the proposed framework and highlighted the significance of the framework. Experts pointed out the role of such a framework to work as a guide for architects, urban designers, and planners to design a better place.

The practical implementation process in this chapter tests and examines criteria from the Use and Activities category due to their level of importance as this category has been ranked as the most important in the framework based on the outcome of the Delphi consultation process. Then, Table 16 (in chapter six), demonstrates a final list of criteria in the Use and Activities category ranked based on their level of importance. Both ‘Functionality’, and ‘Active-Dynamcily’ criteria are tested and examined due to their dynamic nature, while other criteria are fixed.

However, this experimentation (practical work) responds to the research objective, to test and validate the characteristics of active public places framework using real case scenario. This practical implementation answers the research question of, *how to measure and assess active public spaces*. In order to be confident of the applicability of the active public spaces

framework, this process underwent three stages as mentioned before. The social area (secure semi-public place) in the Newton Building was selected as the target site for this experiment. Principles of the final framework have been assessed to measure the quality of a semi-public place.

In order to achieve the aim of this chapter, this research used different methodologies to assess the quality of semi-public place to measure pedestrian movement and density in the place in order to redesign a better place. The following sections describe the assessment process in more details.

7.3.1 First stage: Density and characteristics of the semi-public place

This section describes the observation process and the tools that have been used to collect data. The observation is the first stage of the methodology, which used high-resolution infrared (FLIR) thermal imaging camera, the FLIR A310, to measure the density of people and assess the pedestrian movement of the current situation of the target site. The FLIR camera receives heat signatures (radiation) from a pedestrian in the place, plus radiation from its surroundings such as furniture and floor that have different levels of temperature. The FLIR A310 camera has a field of view of (FOV) of 90 x 73. Also, the minimum focus distance is 0.66 ft. The FLIR was used due to ethical issues and provides more privacy to the users of the place. Data collected were analysed through two tools, first used Matlab software to measure the pedestrian density movement, also thermal video record used to assess and observe the pedestrian behaviour in the site. The target site is an indoor semi-public space, and the temperature is controlled through the climate control system; also the place has a ventilation system through the sky ceiling.

The assessment process (observation) took place between May and Jun 2017 where the level of interaction at the site was normal, there were no any events or special occasions been held in the site, also the experimentation period was during students' exams for some schools at the university. In addition, measurements were carried out during the weekdays hours, which were defined as 8:00 am to 17:00 pm. The measurements were carried out during two days; the first day was to conduct an observation for the current situation of the social area, while the measurement on the second day was to assess the quality of the new design of the place based on the outcome from the simulation process.

Furthermore, the camera was fixed on a stand to make it flexible to change the location if needed, in order to have a better view of the target area, as shown previously in Figure 67.

Collected data were transferred via cable directly to the researcher's laptop to save them, FLIR A310 infrared camera was located in the same place for both assessment days to have the same viewpoint.

a. The current situation

The social area in Central Court is playing an important role in the city centre campus, provide a place to sit, relax and share ideas. The social area gives the users opportunities to socialise in a relaxing learning environment, as there are more facilities that surround the area such as a coffee shop, sandwich bars and a bank. The current situation of the physical layout of the social area is designed to provide a place to sit and relax; and colourful, movable and comfortable furniture was provided in the centre of the site as shown in Figure 70 below.

Figure 70: The Current Situation in the social area

The 'Functionality' and the 'Active-Dynamically' criteria are the aims of this process to be assessed. 'Functionality' describes a place that functions well at all times, in terms of mixed-use of the land or site, and how the social area accommodates different functions that can attract more people to the place, while 'Active-Dynamically' is about the type of activities that are occurring in a place. The more people have an opportunity to practice activities in, and the level and diversity of activities that occur in the place are a tool to assess whether the site is active and dynamic.

EST Newton Arkwright FM Team at Nottingham Trent University who was in charge of the social area illustrated the plan design of the social area. The idea of locating the sitting area in the centre of the social area is to create a strong visual connection with the

surroundings and also to make the place easy to reach and navigate. The sitting area is located in the centre of the social area to be the focal point with strong visual connection for the users in the basement floor and even the ground floor has a central hub which provides a visual connection and focal point to the centre of the social area. The social area is designed to connect the two Newton and Arkwright buildings and make them easy to reach through two main stairs and lifts.

The level of interaction between the users and the physical layout at the target site (social area) was normal during the experimentation, there were no events or special activities held in the place. Regarding where people prefer to sit, Jahn Gehl pointed out that a sitting area that provides a strong visual connection with the surrounding activities is used more compared with sitting areas with the less visual connection (Ghel 2011). The concept of the social area reflects of Gehl's (2011) theory regarding furniture located in the central area of target place, where the site is accessible and easy to reach. Also, a pedestrian can sit and relax with good visual connection with the surrounding activities; this can encourage the users to participate with the surrounding activities and spend more time in the site.

Gehl (2011) also further discussed the location of a 'good' place to sit. Sitting activities take place in the sitting area only when the conditions are comfortable and the location of the sitting area is far more important than the standing location. In fact, the social area is an indoor semi-public space designed to provide a thermally comfortable place for the users, through the climate central system and sky ceiling, the controlled environment place can encourage users to gather in the place.

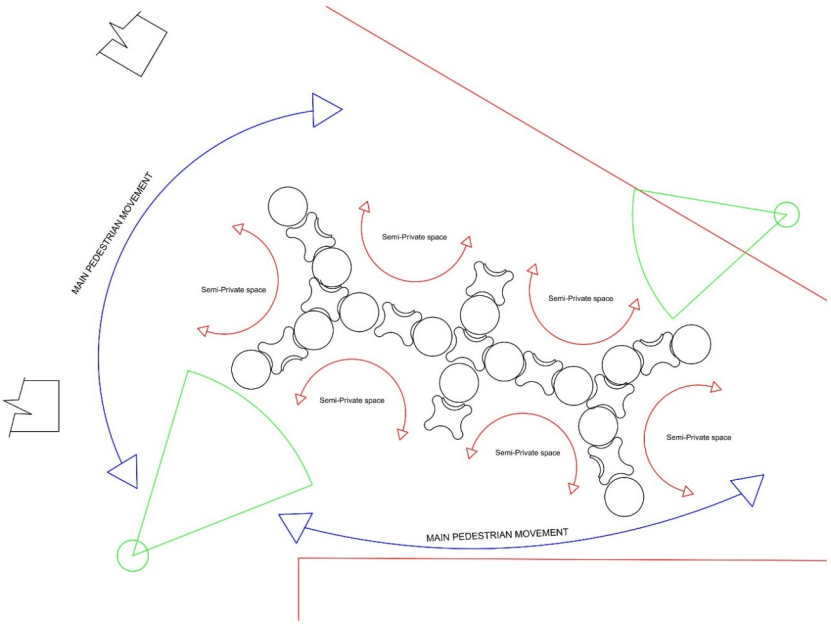


Figure 71: Design concept of the current situation of the social area

Figure 71 above demonstrates the design concept of the social area, based on the ENT FM team's concept. The design of the physical layout or the shape of furniture provided users with different levels of privacy. The idea of dividing the space into semi-public space and semi-private space is to provide users with the opportunity to choose the area they prefer to use; moving from semi-public to semi-private can encourage more users to gather in the place to sit and spend more time. In terms of the pedestrian movement, the idea was to provide pedestrian with the opportunity to choose whether to stop and sit in the site or walk around the furniture, so users can stop in the semi-public space away from the main flow to chat with friends, have their lunch, or relax and enjoy the sun.

According to the ENT FM team, the design concept of the social area is to provide different levels and types of activity in the place (walking, sitting, watching people, talking with friends and so on) through the located sitting area in the centre of the site with strong visual connection with the surrounding area.

The collected data were analysed using thermal video record to understand the users' behaviour and their communication between each other and with the surrounding area, while Matlab analysis software used for thermal imaging analysis process to measure density movement in the site, which based on adding pixels of the images to capture people's pixels, the more time people spend on the site, the more pixels in the accumulative density thermal image. Figure 72 demonstrates a series of thermal images from thermal video record to present the interaction between the pedestrian movements and people use the furniture, allowing for understanding the pedestrian behaviour and their interaction with the physical layout. The outcome illustrates the interaction between the pedestrian movement through the site and the utilise of the sitting area. The interaction between the users and the site was very limited as the series of thermal images in Figure 72 show.

The pedestrians used the site as crossing area to reach their destinations more than to interact with the physical layout of the site, the central sitting area has been used by few pedestrians for a very short time, as the main pedestrian movement in the site was based around the sitting area.

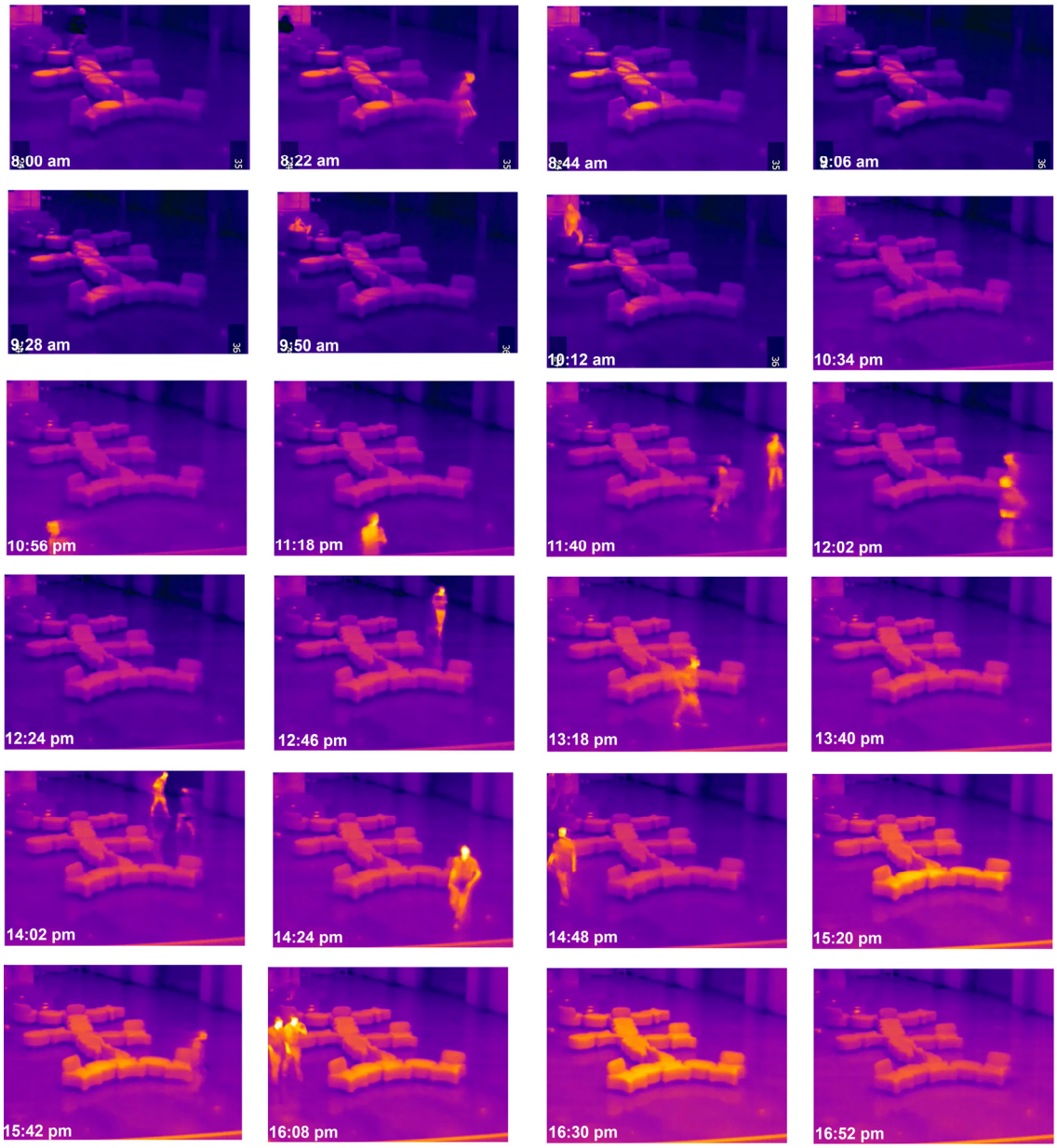


Figure 72: Series thermal images for the first day

Also, the collected data were analysed by Matlab analysis software (Al-Habaibeh et al. 2010). The outcome of the analysis process demonstrates the density of pedestrian in the site, and also measure the pedestrian movement, allowing for understanding the pedestrian behaviour and their interaction with the physical layout. The accumulative density thermal image of the current situation illustrates the pedestrian movement at the site, as well as the interaction between the pedestrians and the furniture during the first day. The accumulative programming through Matlab is based on adding pixels of the images to capture people's pixels, the more time people spend on the site, the more pixels in the accumulative density thermal image we have? the aim was to capture pedestrians who stayed a long time using the place.

Figure 73: The accumulative density thermal image

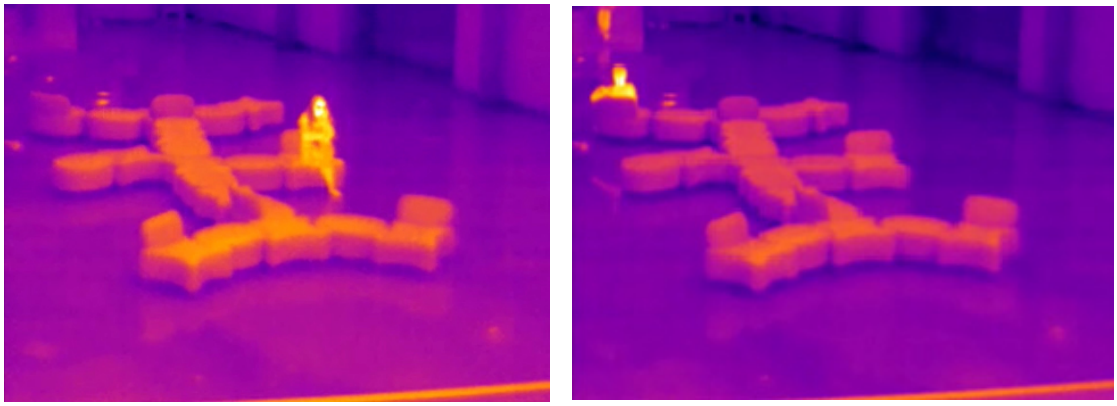
Figure 74: The visual image of the social area

Figure 73 above of the accumulative density thermal image of the current situation shows the design concept of the physical layout of the social area and the current pedestrian density in the site, as well as the interaction between the users of the site and the physical layout during the whole day. However, the outcome from the thermal image Figure 73 above demonstrates that the attraction was less during the first day. The number of people who use the site was very limited; only a few people sat in the furniture, and as can be seen from the thermal image above those people preferred to sit in the back, away from the pedestrian movement. The accumulative density's thermal image shows that pedestrians did not spend more time using the site. In fact, this an indication of the poor function of the social area, as shown in Figure 73 The accumulative density thermal image demonstrates the density of users at all times on the first day. The pedestrian density did not increase even during the break, as the functionality of the site was recorded with a low level of

density. Furthermore, the outcome of the accumulative density thermal image shows the pedestrian flow in the site, people moving around the furniture to reach their destination. Furthermore, the accumulative density analysis uses Matlab software provides an accurate result and more time-efficient.

The current situation of the physical layout of the place created semi-private spaces to attract users from the surrounding area to gather in the place to relax and have coffee, especially during the break time. However, moving from public space to private space can encourage pedestrians to feel more comfortable and provide more opportunity to socialise with others, talking with friends, sitting, have a break, relaxing and enjoying the atmosphere. All these activities can occur in these semi-private spaces, which encourage users to increase the time they spend in the place, as reflected in the dynamicity of the place in providing opportunities for more activities to occur. Actually, dividing the central area of social space into small semi-private spaces with different directions can create a strong connection with the surrounding area, as shown earlier in Figure 71. In this case, users can choose the space that is more comfortable for them to use, as the furniture is also designed to allow the users to choose the direction they want to face. All these techniques and skills in furniture design are meant to increase the utilisation of people of the site, make them spend more time and create a livable place.

In fact, the outcome of the thermal video illustrates the pedestrians' behaviours and their interactions with the physical layout of the social area. Through the accumulative density thermal image of the first day, a few people used the place and chose to sit in the furniture in the central area of the site. The two thermal pictures (A) and (B) from thermal video record in Figure 75 show the location that pedestrians prefer to sit. However, the thermal image in the picture (A) shows one user sitting in the site, using the middle side of the furniture, away from the main pedestrian flow, while in picture (B) another person prefers to sit at the rear side of the furniture, facing the other side of the building. The time spent by the users in both cases is very limited, the average staying time is less than three minutes, which is also another indicator that the place is not providing more opportunities for activities to occur, which decreases the time spent in the place.



Picture (A) Picture (B)

Figure 75: Thermal images of the use of the current situation

The outcome of the accumulative density thermal image of the current situation and the two thermal images above can give an indicator that pedestrian behaviour is uncomfortable about using the site, as the majority of pedestrian used the site as crossing place to reach their destination, as shown in Figure 73 above. Moreover, the two thermal images in Figure 75 above show that people chose to sit at the rear away from the main pedestrian movement; for example, thermal image (A) shows a person sitting in the middle where there is another edge of furniture front of him, while thermal image (B) also shows that the person chose to sit at the rear of the furniture again away from the main pedestrian movement, while facing a less crowded space. This can give an indicator of which place is most likely to encourage people to sit. It is very much about the location of the furniture. Also, moving from private space to public space need to be addressed in more detail to guarantee the functionality of the place. Finally, the location of furniture in the site needs to take into account the level of privacy afforded to the user.

In his book, *'Life Between building'* p156, Jan Gehl stated: "Benches placed in the middle of open spaces look interesting on architectural drawings but are definitely less inviting than more sheltered spaces". Designing a better place needs to address different aspects. Nowadays, involving the community in designing the place is really fundamental, taking into account the user's opinion and understanding people's behaviour and what attracted them to the place is a crucial factor. Providing furniture can gather people to the place creating a strong foundation on which to design better public spaces. Furthermore, the location of this furniture in the place can also play an important role to gather people in the place, by enhancing people to stop and sit and spend time there.

In addition, regarding the location of the sitting area that encouraging people to use it, Ghel (2011a: 156), pointed out the role of choosing the right place to locate the furniture in the place: "the most popular places to sit can be found at the edge of open spaces, where the

sitter's back is protected, the view unobstructed, and the local climate most favourable" (Gehl 2011a). The location that provides people more privacy and is located on the side of the area with a strong visual connection can increase the utilisation of people in the site, comfortable and well-designed sites encourage people to stay longer, which can encourage more activities to occur in the place, as well as make the place function at all times.

Collected data of thermal images of the social area were analysed again by using Matlab software to measure the density and pedestrian movement to give a clear understanding of pedestrian behaviour in the site. Figure 76 below demonstrates the accumulative analysis density thermal images of the current situation of the social area on the first day, where the yellow colour is high infrared radiation and black is low infrared radiation, the more time people spend in the place, the more pixels appears on the accumulative thermal images. Moreover, picture (1) illustrates a few people using the site, while the pedestrian movements are around the furniture. The increase of the pedestrian density can be seen in picture (2). The accumulative density thermal image after mid-day shows more people crossing the site and moving around the furniture; however, the utilisation of the site is still very limited, with few people tending to stop and sit in the sitting area, although, as mentioned above (picture 'A' and 'B': Figure 75) the staying time was very short time.

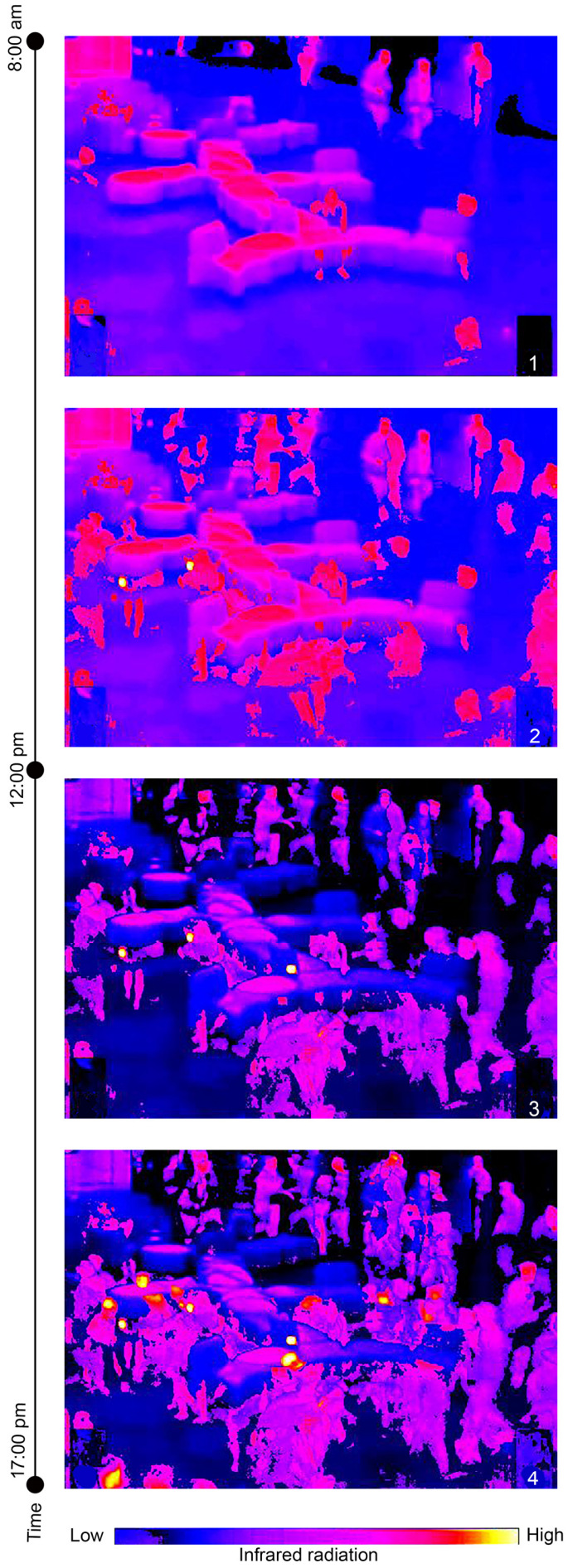


Figure 76: Accumulative analysis density thermal images of the current situation

Meanwhile, thermal image (3) illustrates the progress of increasing the pedestrian density for the first day and can give a clear understanding of pedestrian behaviour, which indicates that a few people use the furniture for a short time or even stop in the site to chat with friends. Moreover, the thermal image (3) shows that the pedestrian movement continues around the sitting area to reach their destinations and the movement was close to the furniture.

Overall, the thermal analysis image method and thermal video were used to assess the quality of the semi-public space of the social area. Both methods that used here give a clear understanding of pedestrian behaviour, pedestrian density related to the physical layout, and pedestrian movement in the site. The thermal image is a tool to assess and measure the quality of place based on different temperature between the users and the physical environment. However, the observation of density thermal movement of the current situation indicated that the sitting area in the social area did not achieve what it was designed for; the furniture provided in the central area of the site failed to attract people to use it. The place was designed to have a strong visual connection with the surrounding area, as well as good access from and into the site. Moreover, dividing the space into public and semi-private did not enhance the comfortability of pedestrians in the place to feel comfortable and less stressed to increase the time spent in the place.

In fact, as shown in Figure 71 above about the current situation of the social area with the design concept of the physical layout, providing a level of privacy in the place can enhance people to use the site, feel comfort, and confident without stress, and increase the chance to get involved in the place's activities. The result shows that the place did not function well, as the level of privacy that was provided through the furniture shape and moving from public space to semi-private space did not attract pedestrians to sit or even to stop. A few pedestrians sit for a short time, and the users choose the rear area away from the main pedestrian flow and prefer to have a barrier in front of them.

These indicators of lack of both 'Functionality' and 'Active-Dynamacitily' characteristics of the place, and why the place did not attract more pedestrians to use the site are taken into account in the next stage of the assessment. In this next stage, simulation tools are used to redesign the physical layout of the place by using MassMotion advanced pedestrian simulation software, in order to assess the pedestrian movement and the density in the site and propose a better quality of place.

7.3.2 Second stage: The simulation development process

This section describes the development process of the site to improve the quality of semi-public spaces by measuring and assessing the pedestrian crowd movement and behaviour in the site through pedestrian simulation tools, for better public spaces design. This stage is based on the outcomes from the previous first stage. failure to address both 'Functionality' and 'Active-dynamically' criteria in the social area caused the poor level of utilisation in the site. These indicators are taken into account in this stage to redesign better social area for a better semi-public space.

Pedestrian crowds have been empirically studied for more than four decades. The pedestrian crowd is becoming a phenomenon that can be observed in squares, parks, and streets. In fact, when the density of pedestrians is high in a place, this can be an indicator of the possibility of accidents and disasters that may occur. Moreover, measuring the density is important in pedestrian crowd movement; an increase in the density means an increase in the chances of creating a dangerous situation in the physical layout. Therefore, many academics and researchers have found the topic of pedestrian crowd movement quite challenging to find solutions to improve the movement of the pedestrian in physical layout, making a more safe place for a pedestrian to move through. A simulation is a tool suitable to assess the pedestrian movement in such an environment. (Kang & Han 2017).

Designing the physical layout of the place is an important role, but urban designers, planners and architects have to make sure the outcome of a project has achieved the project's aims, which takes into account the future experience of the users in time and space during the design process. The purpose of this process is to project the future condition of the built environment that we create. Hence, urban designers and planners need to express their thoughts on the ability to imagine no existing environments in their minds. Representing and the imagining process of no existing environments refer to the *physical* elements and visible value of the place. Previously, the *emotional* or visible value of the place was always the main aim and the priority for urban designers and planners. The main aim of architects and urban designers is to achieve a strong design by increasing the sense of place. In fact, the anticipation of the ambience of the place is hard to measure and assess, even if it has been addressed by the designer. Moreover, during the conceptual design stage, the designer makes a great effort particularly in the intangible values in the project and, in any case, it is really hard to measure and assess how urban designers and architects can manage to control the future ambience in a shareable way and guarantee to achieve the project aims. (Morello & Piga 2015).

The real challenges of anticipating the ambience depend a great deal on the ability of the urban designers and planners to design a better place for the future; in other words, the argument is that when assessing the validity of the physical design outcomes, it is not easy to guarantee that the future ambience and the sense of place will be achieved as intended. (Morello & Piga 2015).

Simulation of a non-existing environment is not a novelty; In fact, the purpose of most experiments of pedestrian crowd movement is to understand pedestrian behaviour and characteristics of pedestrian movement flow under both congested and normal conditions (Shiwakoti et al. 2015). However, nowadays, the field of simulation tools has increased and become widely applied, and digital representation tools are more accessible in everyday design practice. The development of computer-aided design (CAD) and ICT software made a huge change in the design process by exerting significant control over the project outcomes. In fact, these forms of simulation tools are important in supporting designers regarding providing a sense of place to validate the design environment. Moreover, the accuracy and reliability of the validation process of using the simulation tools remain an open question in this field. More research and scholars are focusing on this topic, which will continue to change alongside the development of the simulation tools (Morello & Piga 2015).

Nowadays, society recognises how spatial design has an influence on human well-being and health; this encourages a serious return to the role of users' opinions in the design process, that has increased society's interest in participating in the decision-making process in urban spaces. The simulation process has recently recognised both environmental and social aspects as never before (Morello & Piga 2015).

a. MassMotion Pedestrian movement simulation.

MassMotion pedestrian crowd simulation software was developed by Arup and can simulate the pedestrian crowd movement by using the *social force model* developed by Helbing, Helbing and Molnar in 2005 (Oasys Software Ltd. 2017).

MassMotion is basically a 2D software model with visualisation in 3D which has the ability to create different geometries like floors, escalators, barriers and so on. MassMotion software is able to measure the density of people, the movement time, flow rates. Folk et al. (2016) pointed out that the MassMotion program also can provide congestion outcomes that can assist with sorting overcrowding issues. Also, it promotes

technology knowledge for urban designers, and architects about pedestrian crowd movement, and safety movement. It provides a tool to simulate pedestrian movement within an accurate BIM compatible 3D model (Oasys Software Ltd. 2017).

People or agents with MassMotion software are created at the beginning of the simulation through entry portals. Agents start to appear after the simulation is run through the portals. The agents are created based on the given time (Oasys Software Ltd. 2017). Agents or pedestrians are able to interact with barriers, stairs and other geometry components, and are also able to interact with each other and make decisions individually. In fact, the agents are created at portals and are assigned goals; the agent selects their route based on it's behavioural which compels it to make a series of choices and, subsequently, execute actions that will lead them to their goal (Kinsey 2015).

Pedestrians in MassMotion software have a sense of the surrounding of physical objects such as walls or, stairs. As pedestrians (agents) are able to react to another pedestrian, due to these factors, agents are able to make the best guess of the way forward five times per second as these reactions are occurring automatically in real life. Moreover, the software allows signs to be provided that can be added in the 3D model in order to guide pedestrians (agents) and follow these signs, as agents are able to avoid the congestion and crowded areas to find more space individually, on their way to their destination. Arup developed MassMotion software to deal with the simulation of groups of agents, such as families, people with pushchairs or carrying luggage, or disabled people, so the software allows the user to change the size and speed of agents, that can add realism to the pedestrian movement (Challenger et al. 2009)

Comparison between real-world circulation events, pedestrian movement scenarios with MassMotion pedestrian software, the result of the comparison according to the Arup report (2015) demonstrates that MassMotion pedestrian crowd simulation software was comparable to the real data. Therefore, MassMotion is able to represent the sense of human behaviour and is particularly useful in evacuation scenarios (Kinsey 2015).

b. Redesign a better place.

This section describes the process of testing and examining the framework of active public spaces. The simulation process presents the second stage using simulation tools to improve the quality of semi-public space (target site). Oasys' MassMotion pedestrian crowd simulation software was used to measure the density and pedestrian movement. The aim of

this stage is to redesign the physical layout of the site to achieve a better design of the place, taking into account the outcomes from the previous stage of the accumulative density thermal image of the current situation of the social area.

The new design of the semi-public space was based on the outcome of the observation stage. The current situation of the place failed to attract pedestrians to utilise the place and could not enhance opportunities for more activities to occur in the place. The results from the thermal images indicate that pedestrians did not interact with the physical environment; only a few people used the site for a very limited time. This demonstrates the low level of function and dynamics of the social area.

The physical environment aspect is important to deliver a good quality of public spaces while providing furniture can encourage people to use the site and encourage how long they spend time there as well (Ghel 2011). The contributions of the public space are not just the physical form but also the psychological aspect attached to it (Behera 2017).

The location of the sitting area is one of the key elements to take into consideration in designing better public spaces to gather people, as a successful seating area can provide an opportunity for the users to view, enjoy the surrounding area, and observe, and also, encourage users to spend more time in the place. Moreover, the idea of visual connection and linking the site with its surroundings should be taken into account in choosing the seat location (Healthy Space & Places 2009). Furthermore, the high quality of public spaces with an accessible and comfortable sitting area can enhance the sociability in the place. In fact, social comfort encourages social cohesion and activities in the place (Peinhardt 2017).

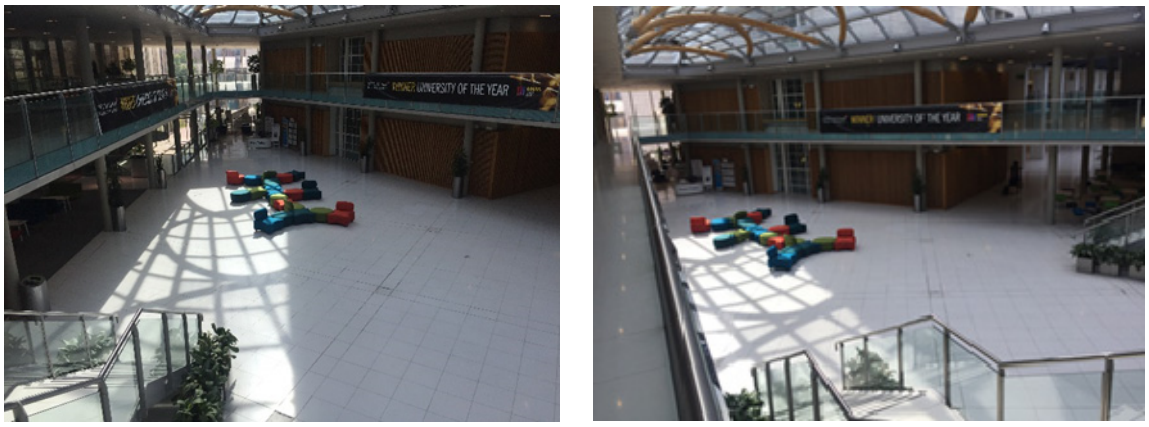


Figure 77: Picture of the current situation of the target site

The results from the thermal image of the observation process illustrate that people did not use the sitting area as it was designed for. The duration of using the sitting area was very limited, also the result indicates that people tend to sit in a rear area away from the main

pedestrian flow. Figure 77 above shows the current situation of the social area from the upper-level (ground floor), and the location of the furniture, which has a strong visual connection even from the ground floor as shown in visual pictures above. In fact, the main purpose of locating the furniture in the centre of the site with a strong visual connection from the surrounding area in both ground and basement floors is to increase the accessibility to the place. This made the furniture a main focal point in the place that can attract the pedestrian during using the site. A comfortable place to sit is about the location where people feel less stress and more confident. Pedestrians prefer to sit on the edges where they have a good visual connection to the place.

Memluk (2013) discusses the role of a focal point in the public space, the focal point factor can attract people to use the site as well as enhance the identity and image of the place. However, a focal point can be made by providing elements such as public art, water fountain. Furthermore, the location of the focal point is not necessary to be at the centre of the place.

Gehl (2006) also identifies the relationship between the sitting area and focal point as follows:

"Passive engagement also requires conditions for seeing, and these correspond to two main issues: vantage points/sightlines and seating areas. Whenever there are activity foci or focal points in space's form, people tend to seek appropriate points from where to watch the scene. These are usually the spaces' edges." (Gehl 2006).

Furthermore, the results from the process of the thermal images illustrate that the idea of dividing the space into two levels of privacy (semi-public and semi-private) did not attract pedestrians to use the furniture. Meanwhile, pedestrian behaviour from the outcome of the thermal image process in the site gives clear indicators that the level of privacy which the shape of the furniture created fail to provide comfort and a less stressful space for the users. Figure 78 below demonstrates the level of privacy in the space.

Ali Madanipour (2003) identified the level of privacy in the social space, which is divided into public and private spaces. These levels of privacy can be identified by physical borders and symbolic objects, while empty space is created due to spatial fluctuations in urban development.

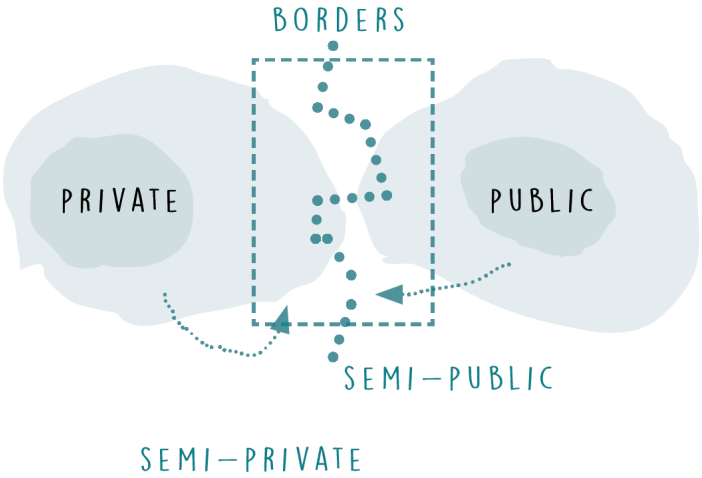


Figure 78: Level of privacy
Source: levels of privacy on the borders of public, semi-public, private residential life (Vassilaki & Ekim 2015).

Semi-public space and semi-private space are transition zones between a human's closed area and common area. In this way, the border creates a relationship between the two areas through regulating communication. Furthermore, the design of the border is an important element which can affect the structure of the space as an open or closed zone. The level of privacy is able to change the social quality of the place, which can affect the perception of the users about the space (Vassilaki & Ekim 2015).

The level of privacy should be addressed in the new design to provide comfortable space for different activities in the place to increase the dynamically and create an active place. The summary of the previous assessment through the observation has been discussed above in detail. The new concept of design of the social area aims to provide an element in the site to be a focal point instead of the furniture. This can enhance the level of privacy in the place (semi-private and semi-public spaces), and these elements (plants) can create semi-private space behind them.

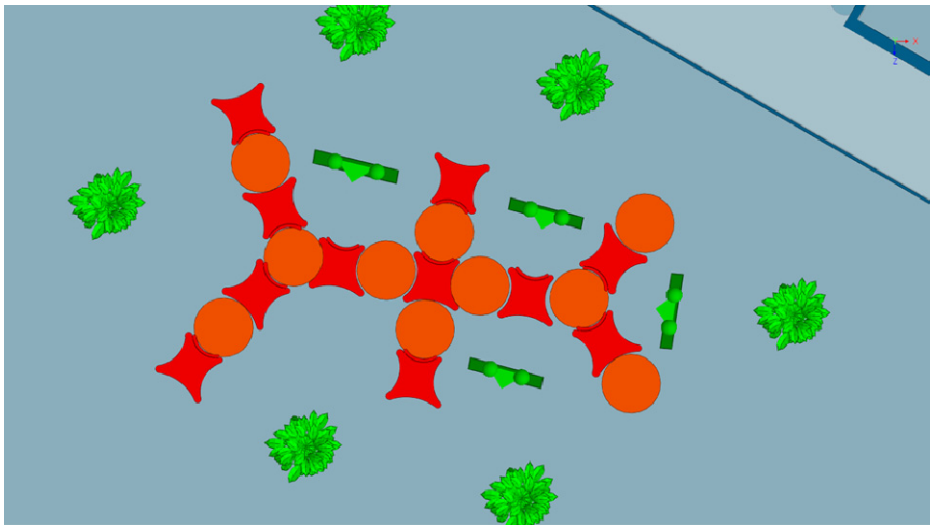


Figure 79: New design of the social area

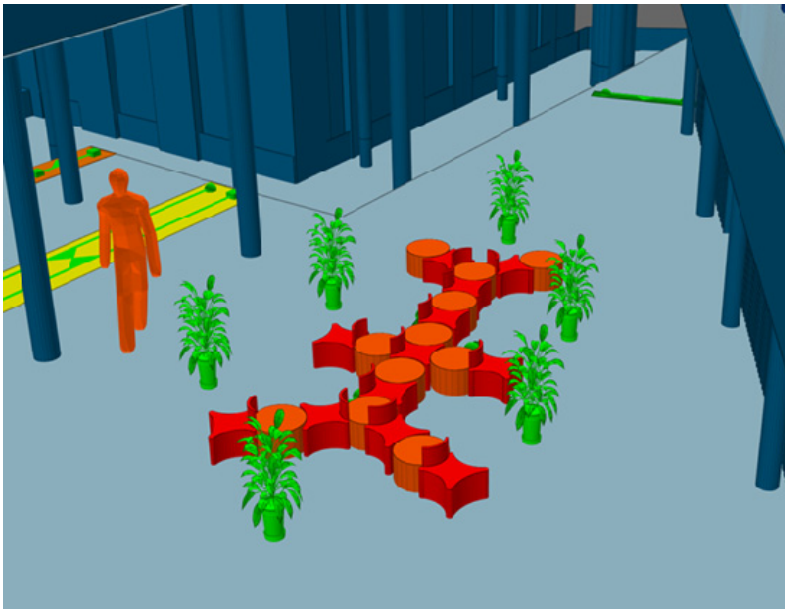


Figure 80: 3D model in MassMotion software for the social area

Figures 79 and 80 above illustrate the new design of the social area, the new design is based on providing plants around the sitting area and located between semi-public space and semi-private space to work as a barrier. These plants aim to take the attention of the pedestrians to a focal point in the place, as well as direct the main pedestrian movement around the furniture to enhance the privacy of the sitting area. In the meantime, the plants provide a barrier between semi-public and semi-private spaces to enhance the level of privacy.

c. The conclusion and result of the simulation

The simulation tools were used to assess the quality of semi-public space by using MassMotion advanced pedestrian simulation software. A 3D model of the site was created by using Sketchup software and imported to MassMotion software to create simulation scenarios based on the outcomes of the observation stage (thermal images).

Data from the observation stage were used to create real-case scenarios in MassMotion software. A number of agents and main destinations flow for the users have been taken into account to add reality to the simulation scenario. Figure 81 and 82 below demonstrate the density map in the new design of the social area from the simulation process.

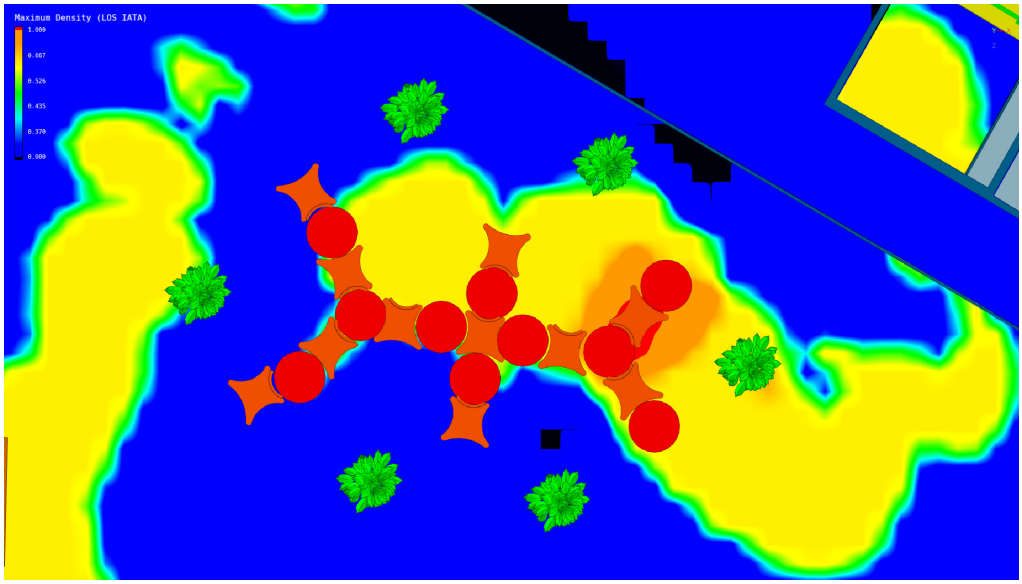


Figure 81: Density map of the new design

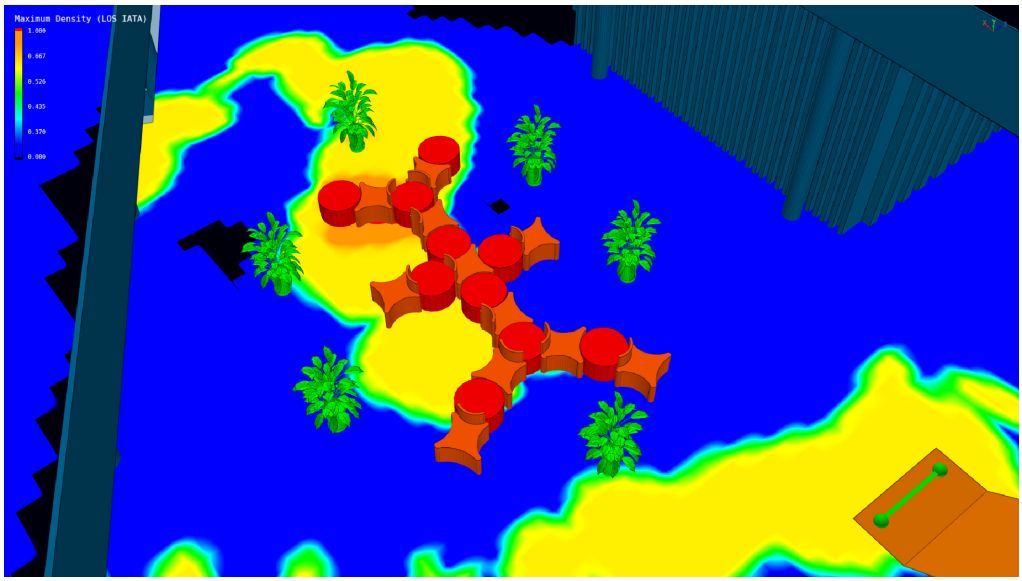


Figure 82: Density map (3D view) for the new design

The map legend in the density map in Figure 82 illustrates the level of density based on the colour. There is a high density of pedestrian in the social area as shown in Figures 81 and 82 above located around the furniture (sitting area) and in the area between the two main stairs. Furthermore, the semi-private spaces between the furniture and plants have a high density of people as well. The increase of the density around the furniture is an indicator of the use of the site.

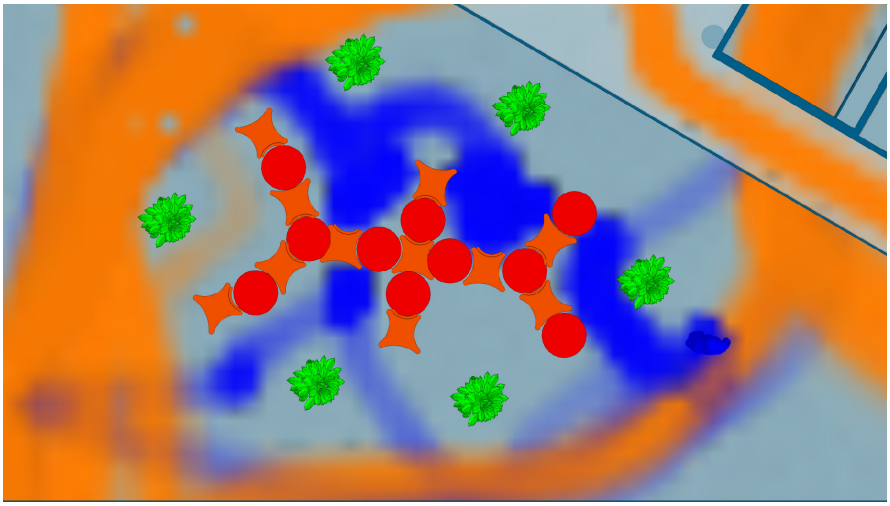


Figure 83: Agent path in the new design of the social area

Figure 83 above illustrates the agents' path in the social area. The orange colour is the pedestrian movement path around the site, while the blue colour is the pedestrian path that was used both in the sitting area and semi-private space. The aim of installing plants around the furniture was to create borders between the semi-public space and semi-private space, as well as to direct the pedestrian movement flow around the sitting area. Figure 83 above shows how these plants controlled the pedestrian path direction and created comfortable spaces (semi-private space) to provide an opportunity for more activities to occur in the place. Providing a place with different levels of privacy can encourage people to get involved with the activities in the place as well as enhance the sociability in the place. The agent path map shows that most of the space on the site was being used. The main pedestrian movement was around the furniture and did not cross the semi-private space between the furniture and plants; it is important to keep these spaces away from the main movement in order to provide more comfort and less stress in the space for the users to enjoy their time in the social area.

Figure 84 below demonstrates the Agent Density Graph; the red colour is high density while the blue colour is low density. The agent density changed during the nine hours simulation. The graph in Figure 84 shows that the highest density was during peak time (lunchtime), as most people spend their free time in the social area, while during the rest of the day the density was average, which indicate that the place is functioning well as it is being used most of the time.

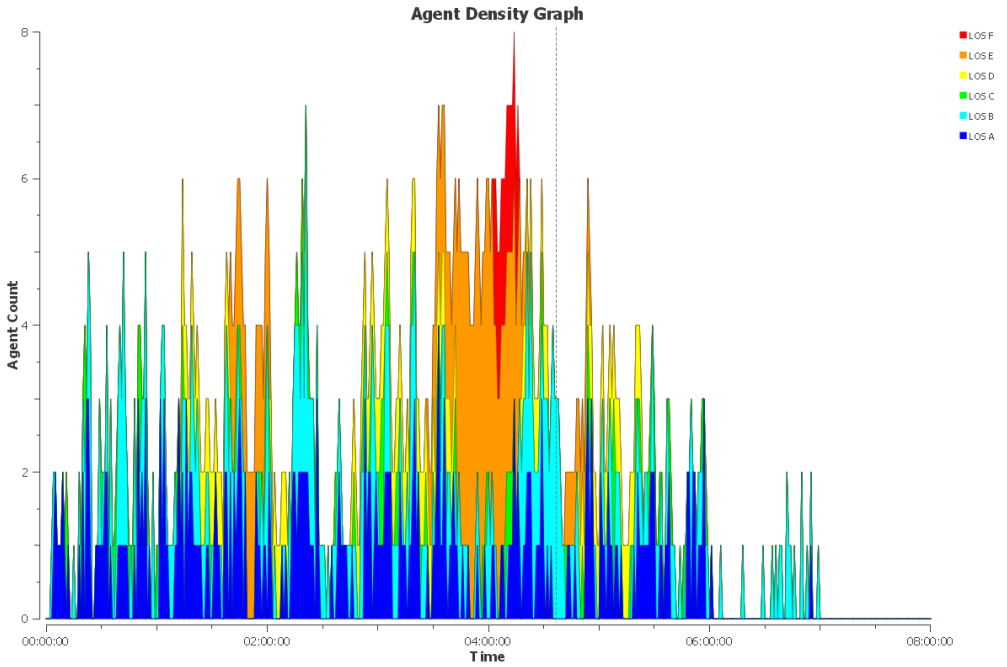


Figure 84: Agent density graph

The simulation tools increased the quality of semi-public space in the social area. The installation of plants in the site enhanced the level of privacy and acts as a barrier between the two semi-public space and semi-private space; the plants also changed the direction of the main pedestrian movement flow in order to provide more private space for the users.

Furthermore, designing the physical layout is a significant element to deliver a good quality of public space. Therefore, designing active public space should take into account the psychological aspect of the design process. Installing plants in front of the semi-private space which is created by the shape of the furniture is to draw the pedestrian's attention and reduce the stress on the users. Moreover, the location of plants is designed to be a focal point in the site as, the strong visual connection from both floors can be directed to these plants, which again reduces the stress on the users, as plants create semi-private space for the pedestrians to use.

The summary of this stage is to design a new physical layout taking into account the functionality and dynamics of the place, as well as the main reason for why the current design fails to attract people to use the place. The outcome of the simulation stage validates the new design of the social area. The principles of the new design were applied to the physical layout of the social area based on the results of the simulation process. These principles were to (i), provide a new focal point in the site to create a semi-private space and produce a comfortable space for the users, and (ii) direct the pedestrian movement flow around the furniture by creating barriers (plants) to enhance the level of privacy in the site. These two key principles enhance the dynamics of the place and make the social area

functional at all time. The next stage uses the FLIR A310 infrared camera again to assess and measure density and pedestrian movement in the new design. The principles of the new design were applied to the social area, and the outcomes of this observation (thermal images) were analysed via Matlab software to add more value and reliability to the criteria of active public space that were applied in the new design of the physical layout of the social area.

7.3.3 Third stage: Assessing the new design

This section describes the third stage of the methodology of the test and validates the characteristics of active public place framework; this process is based on observation of the new design of the social area by using the FLIR A310 infrared camera again. The principles and criteria that were used in the simulation stage to redesign the social area as a better place are applied in real life. The physical layout was changed based on the new design, and the FLIR A310 was used again to observe the density of pedestrian in the place, pedestrian movement flow, and the pedestrian behaviour in the site, the FLIR A310 infrared camera was used due to ethical issue to protect the privacy of the users in the site.

a. Current situation of the new design

The observation process took place again carried out in June 2017 during week-days hours, which were defined as 8:00 am until 17:00 pm. The place had no events and the level of interaction between the users and the physical layout was normal. Furthermore, the same furniture was used. The FLIR A310 infrared camera was located in a height position in the ground floor in the same high and location as the previous observation from the first day in order to have the same perspective of the social area before and after the changes were made.

Figure 85: Picture shows the preparation for the second-day experiment

Figure 85 above shows the location of the FLIR A310 camera and preparation for the second observation process. The camera was fixed on the stand to have a better angle to cover most of the target area. Also, data collected was transferred via cable to the researcher's laptop to save them.

The principles of the new design of the physical layout were applied to the site, as shown in Figure 86 and 87 below. Medium-sized plants were used as a main focal point in the site. This can also enhance the level of privacy by acting as a barrier to separate the semi-public space from the semi-private space. The only change to the current situation of the site was providing plants around the furniture to encourage pedestrians to use the site.

Figure 86: New design of the social area

Figure 87: New design of the social area in use

The purpose of this stage (observation) is to validate the new design of the social area based on the new principles applied to the physical layout of the social area to make public space more attractive and livable. The previous stage of simulation has identified the criteria 'Functionality', and 'Active-dynamically' that need to be addressed in the new design of the place, as the outcome of the simulation gave more value and validity to the new design.

The collected data for the second day were analysed by two tools, first through using Matlab analysis software to measure pedestrian movement density. The aim of analysing the thermal images is to measure the density and pedestrian movement in the site as well as assess pedestrian behaviour in the new design of the social area, while the second tool through using thermal video record to understand and observe the users' behaviour and their communication between each other and with the surrounding area. However, Figure 88 demonstrates a series of thermal images from thermal video record, allowing for

understanding the pedestrian behaviour and their interaction with the physical layout. The outcome illustrates the interaction between the pedestrian movement through the site and the utilise of the sitting area. The analysed data demonstrated more use of the place where, people tended to sit and spend more time in the sitting area, particularly at in the front.

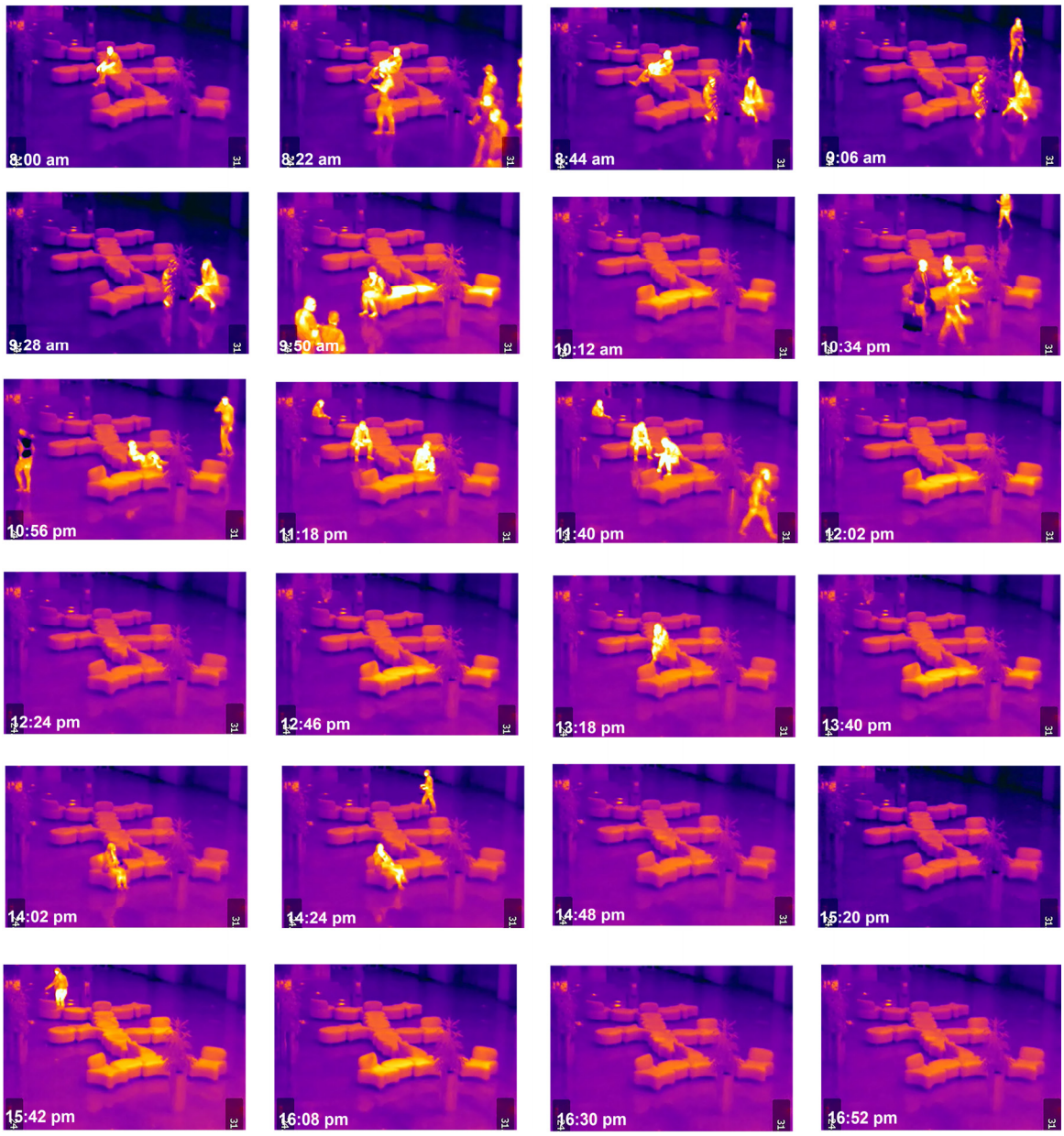


Figure 88: Series thermal images for the second day

Also, the collected data were analysed again by Matlab analysis software (Al-Habaibeh et al. 2010). The outcome of the thermal analysis process to demonstrates the density of pedestrian in the site, and also measure the pedestrian movement flow. The accumulative density thermal image of the current situation illustrates the pedestrian movement at the site, as well as the interaction between the pedestrians and the furniture during the first day. The accumulative programming through the Matlab software is based on adding pixels of the images to capture people's pixels, the more time people spend on the site, the more

pixels in the accumulative density thermal image. the aim was to capture pedestrians who stayed a long time using the place.

The outcome of the thermal images of the accumulative density analysis map in Figure 89 below demonstrates the interaction between the pedestrians and the furniture provided in the place. It also shows a high density of people using the site during the day.

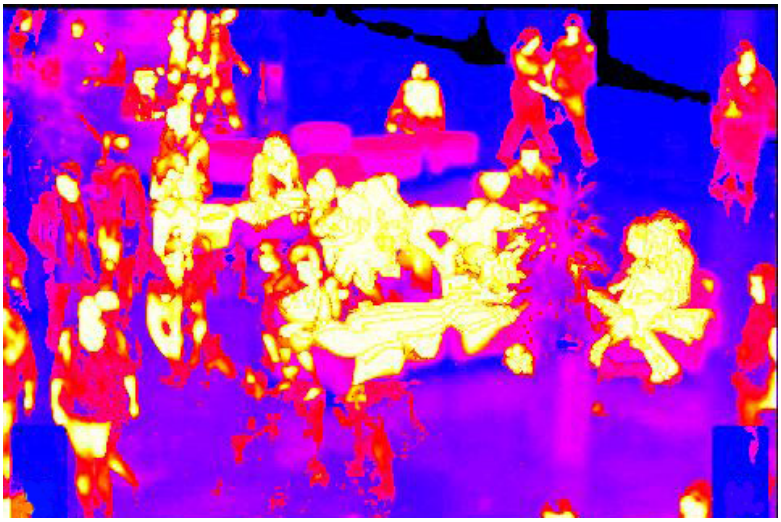


Figure 89: Accumulative density thermal image for the new design

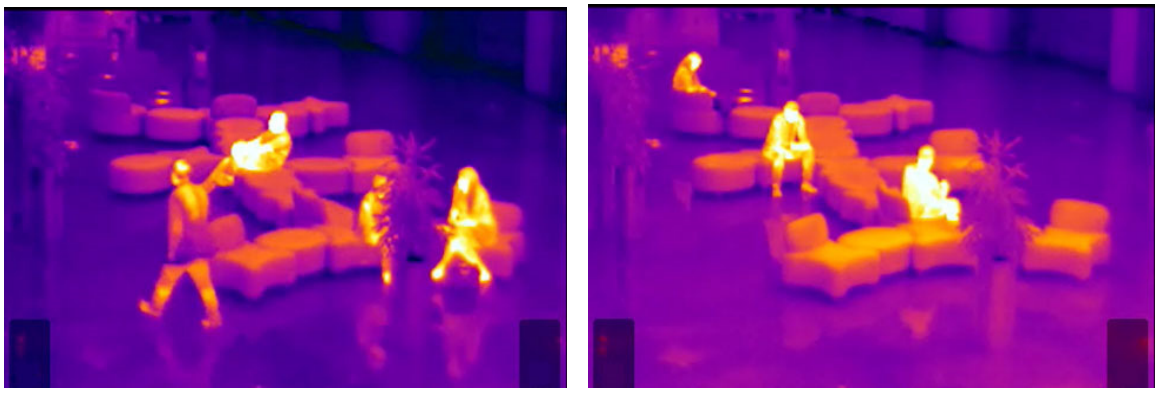
Figure 90: Visible image for the new design of the social area

The outcome from the accumulative density thermal image of the second day demonstrates more interaction between the users and the physical environment. More pedestrians use the site and sit on the furniture for a longer time compared with the old design of the social area. Pedestrians tend to use most of the semi-private space that is provided by the furniture more confidently, while the installed plants encourage the pedestrians to sit even in the front of the semi-private space for a long time, without feeling the stress of being the main focal point in the site. These are indicators that the location of plants around the

furniture enhances the level of privacy as well as drawing attention and being the main focal point in the site.

Furthermore, the accumulative density thermal image demonstrates the pedestrian movement flow in the place pedestrians crossing the site; moving around the furniture to reach their destination; some stopping in the space to talk to a friend. The level of privacy that the new design added to the social area has enhanced the pedestrian movement and the density in the place. Pedestrian felt more confident to stop and use the furniture, the installed plants created comfortable space between the furniture and the crowded movement in the site. Also, the new design directed the pedestrian movement around the furniture, so plants gave more space for the sitting area and functioned as a barrier between the main movement and sitting area to make sure pedestrians do not cross the semi-private space at least to stop or sit on the furniture.

Figure 91 pictures 1 and 2 below shows the thermal images from the thermal video record of the new current situation of the site. The interaction between pedestrians and the physical environment has increased during the second day of the experiment. In fact, thermal image (1) demonstrate two people sitting in the front space and having a chat; the plants in front of them provide them with a more privacy and a comfortable place to sit to stay in the place for a long time, while another person was sitting in the middle enjoying the surrounding environment and relaxing. Meanwhile, the thermal image in the picture (1) shows the pedestrian movement in the site around the plants without crossing the semi-private space which between the sitting area and the plants.



Picture (1) Picture(2)

Figure 91: Thermal images display the use of the new design of the social area

The thermal image in the picture (2) demonstrates the function of the new design of the physical layout of the social area. It shows, different users in different places sitting on the furniture, sharing the furniture at the same time, and spending more time sitting on the

furniture. These are clear indicators that the principle of the new design made the change in attracting more people with the physical layout and bringing them back to the site.

Figure 92 demonstrates the process of accumulative analysis density thermal images of the new design. The purpose of this process is to measure density and pedestrian movement in the place as shown in Figure 92 below. Accumulative density thermal picture (1) illustrates the density of pedestrians use the place, how people tend to sit on furniture, and also pedestrian movement moving around the furniture, while accumulative density thermal picture (2) shows the increase of the density in the place using the furniture to sit or for crossing the place around the physical layout. Accumulative density thermal picture (3) is the final accumulative density thermal image for the whole day (8.00 am to 17.00 pm), which demonstrates the accumulative analysis for all collected thermal images. The accumulative density thermal image demonstrates the functionality of the new design to attract more people to the social area at all times, not just for crossing the site, but also to interact with the physical environment and use the provided furniture, while more activity occurred in the place that encouraged more pedestrians to participate in.

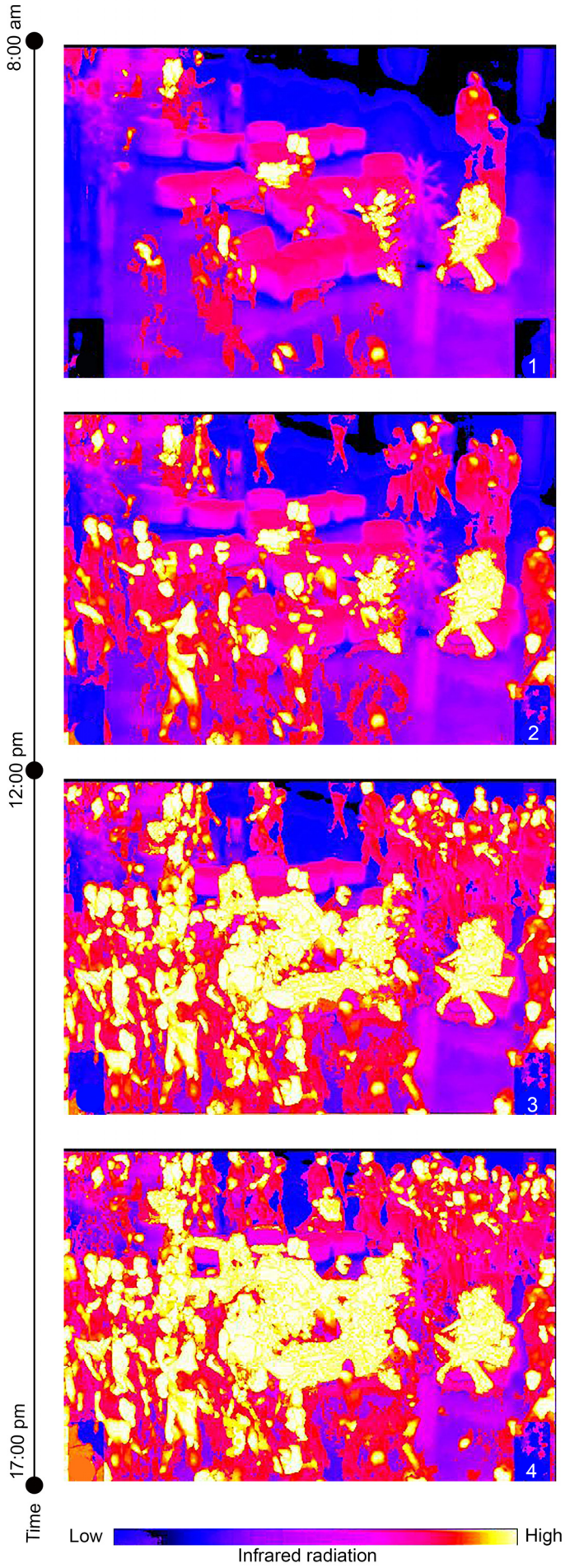


Figure 92: The process of accumulative analysis density thermal images of the new design

A summary of the thermal observation process (third stage), both of the thermal image analysis method and thermal video record method used to assess and measure the quality of the new design of the semi-public space in the social area, the density of people and pedestrian movement in the place is presented through the accumulative density thermal images and thermal video record. However, the observation of the new design of physical layout by using an infrared camera demonstrates the success of the new design in attracting more pedestrians to use the place. The installed plants around the furniture enhance the level of privacy and worked as a focal point in the site; the duration of time that pedestrians spend in the site increased; more activities occurred in the site, and the social area was used throughout the day, which reflects the level of functionality. All these indicators are enough evidence that the new design provides a pedestrian with a more comfortable environment to use.

7.3.4 Conclusion

Testing and examine the final framework of the active public spaces process has been achieved through three stages. First, the methodology used to test and examine the characteristics of active public spaces based on the criteria of the proposed framework of active public spaces validated and offered more reality to the proposed framework through the three stages of the implementation process.

The social area (target site) was assessed and measured based on the content of the framework of active public spaces. ‘Functionality’ and ‘Active-Dynamically’ criteria in the Use and Activities category are applied to the test and examine the process to design better public space due to their level of importance. The outcome of this practical implementation process adds more validation and applicability to the framework.

The physical environment is a significant element to ensure active public space. The physical layout can encourage the utilisation of the public space, and make the place more accessible. In fact, the contributions active public space to the community are not just about the physical environment but also about the psychological aspect, which leads the users to a more comfortable and confident environment to encourage them to be part of the social activities in the place.

The methodology that used can predict the future condition of the built environment that we create. However, the anticipation of the ambience of the place is hard to measure and assess during the design process architects, where urban designers and planners find it

difficult to guarantee that their projects can achieve what they are designed for. In fact, the simulation method in the test and examination of the framework of active public space process benefited from the reliability of using the simulation and thermal imaging tools as this methodology could provide an essential advantage measuring and assessing active public spaces.

Chapter Eight: Conclusion and Recommendations

8.1 Introduction

The current research has been conducted in a public space that includes square, parks and, streets. This chapter presents the thesis summarises of the main findings obtained. The purpose is to respond to the research questions that were highlighted in Chapter one. In addition, the chapter summarises the research limitations that emerged during the research, also makes recommendations for practitioners and conclude, with suggestions for further research that can be conducted in the future.

Chapter eight is divided into three sections. The first section demonstrates the responses and answers to the research questions based on the outcome of this thesis. The second section states the limitations that been faced during the research. Finally, the third section makes recommendations for future research.

8.2 Research Conclusion

The aim of this research was to develop a framework for measuring active public spaces by taking into account the new communication media and technology development in the twenty-first century. This aim has been achieved through a number of fundamental stages. First, the researcher reviewed the concept of the place through time and also identified which criteria can make public spaces active, which was discussed in Chapter two. The researcher presented the background of the place-making agenda and compared the existing frameworks to assess the quality of public spaces, which was discussed in Chapter three to create a theoretical background and to identify the limitations, strengths and weaknesses in the existing frameworks of assessing the quality of public spaces.

As mentioned in Chapter One, the aim was to address the following research questions: How can active public spaces be measured and assessed? This main research question generated a number of sub-questions, which are stated as follows:

- What is the concept of public spaces in the digital era?
- What are the most significant indicators and assessment tools to assess and measure the quality of public spaces?
- What are the gaps in the current frameworks for assessing the quality of public spaces and how can this be improved?

- How does the new communication media (Internet) affect the future of public spaces?

All the research questions addressed through four main stages. The first, second and third stages were the theoretical stages, whereas the fourth stage was the practical stage. The first stage highlighted the literature review, provide a clear background of the concept of place, explored the criteria that make the public spaces more successful and create a list of criteria for active public spaces. The researcher also investigated the role of the place-making agenda in designing better public spaces and, undertook a comparative analysis of three existing frameworks for active public spaces. The second stage was a theoretical study, which sought the opinion of public spaces' users through an online survey targeting the users of public spaces to enrich the list of criteria drawn from the literature review stage that make public spaces more successful.

The third stage is also considered as a theoretical stage, which involved the Delphi technique through an online survey to evaluate and enrich the outcome of this research which is the proposed a framework to assess the quality of public spaces based on experts' opinions. Furthermore, experts were asked to evaluate and enrich the proposed framework, as well as to give a weight to each category and criterion. They were also asked to add and remove criteria from the proposed framework based on their opinions. Additionally, the fourth stage tested and validate the characteristics of active public spaces framework, using real case scenario. This practical stage confirmed the validity and applicability of the proposed framework. The next paragraphs respond to the research questions.

- Research question (1)

What is the concept of public spaces in the digital era?

The literature review section has given the responses to this research question. The development of the concept of the public spaces over time was highlighted in the literature review chapter, as well as the effect of the technology development on the concept of the public spaces. This presents a new approach which discussed how technology affects the concept of place and how this change will continue. Through the investigation of the concept of public spaces in the digital era, the research identified the role of technology in shaping the future of the places.

- Research question (2)

What are the most significant indicators and assessment tools to assess and measure the quality of public spaces?

Research question (2) was answered in the literature review (Chapter two) through exploring criteria that make public spaces active, understanding public spaces, and forms of public space. Different dimensions of public spaces were analysed, addressing the role and *quality* of public spaces in the satisfaction level of the people who use the place. This stage ends up with a list of criteria of active public spaces based on the literature review section.

- Research question (3)

What are the gaps in the existing framework for assessing the quality of public spaces and how it can be improved?

This research question has been answered in the literature review in Chapter three. In this regard, three international well-known frameworks were chosen to assess the quality of public spaces, the Project for Public Space framework, the Green Flag Award, and the Creating Successful Place framework. These three existing frameworks were discussed in detail in Chapter three. They provide different approaches to assessing and measuring the quality of public spaces in terms of selection of their categories and criteria. The researcher investigated the fact that each framework was established in a different country for a different goal; however, all aimed to achieve sustainable urban regeneration, and all of them have been applied in the UK. Furthermore, Chapter three highlighted the critiques of the three frameworks, and the comparative analysis identified the strengths and weaknesses of each one.

Overall, the argument at this stage is that all three frameworks have points of weaknesses and strengths. The most significant and common strengths were addressing the issues of the quality of public space in an urban area. For instance, frameworks concentrate more on the environmental concerns that have an influence on the urban area; for instance, the issues of climate change and the comfort of the users in the place, and green infrastructure. Furthermore, the three frameworks have a common concern in terms of sociability and accessibility, and this common interest was illustrated in their strategies.

On the other hand, some weak points were highlighted in the critique section of the three frameworks. One of these weaknesses is the failure to address the users' perceptions of the

place and how they feel. Also, none of the frameworks concentrates on the mental health and well-being of the users. In fact, Creating a successful place framework mentioned wellbeing as only one criterion under the social and cultural life category (The Berkeley Group 2014).

These three well-known frameworks come from different countries - the United Kingdom, the United States of America, and Europe, and all have been applied in the UK to assess the quality of public spaces. In fact, the comparative analysis of the three frameworks investigates and illustrates their strengths and weaknesses and also criteria that should be taken into account in the process of assessing the quality of public spaces. The outcomes of this analysis. The research aim was to develop a framework to assess the quality of public spaces. The new framework was designed based on the strengths of the existing frameworks and concentrated just on the design aspect of the public spaces. Its main aim was to gather the issues of the quality of public spaces assessment to learn how to best meet the needs of the users of public spaces.

- Research question (4)

How can the new communication media such as (Wi-Fi) affect the future of public spaces?

The result obtained in this research has answered this question. An investigation was carried out in this research in Chapter four about the most important criteria that play a significant role in designing better public spaces. During this study, a list of criteria was identified as connected to different categories. An online survey was carried out that targeted the users of public spaces in Nottingham city centre to ask which criteria would make them come to visit and use the public spaces in the city. One hundred (100) users of public spaces participated in the online survey.

The results and findings through analysis via SPSS software identified the need for providing Wi-Fi in the public space to attract people to use the public spaces. The majority of the participants asked for Wi-Fi as the most important criterion to attract them to the place. The participants were different age groups and gender. At the same time, the finding confirmed most of the criteria that been identified from the literature review stage in the three frameworks to create the first list of criteria that make public space active as the first iteration.

Also, the finding of the need for the Internet (Wi-Fi) was also identified through the Delphi process, as confirmed through two rounds by experts. They agreed the need to include Wi-

Fi within the proposed framework of active public space, due to the fundamental role of technology in shaping our daily lives. Experts showed a achieved a consensus among their responses about including Wi-Fi within the proposed framework of active public space.

- Main research question: Research question 5

How can active public spaces be measured and assessed?

The above question was addressed through the Delphi technique and the testing and validation of the characteristics of active public space, using real case scenario. The Delphi technique was used to enrich the proposed framework, which obtains an online survey that targeted experts from different areas, such as architecture, planning, health, and social science, among others. The 40 experts who participated in the online survey enriched the proposed framework of active public spaces by adding and removing criteria based on their experiences, and also identified the significant need of applying such a framework to assess and measure the quality of public space, which needs to be addressed to make a better place.

The experts discussed that the quality of public spaces assessment has ignored the psychological aspect, and, over the past decades, has not involved users' opinions, or those of the community, in shaping the public spaces to incorporate the 'Wellbeing' aspect.

The proposed framework has been tested and examined. This assessment process was achieved through three stages; the first stage used infrared imaging to observe the current situation of semi-public space and raise the current issue. The second stage used simulation tools to redesign the physical layout of the place by applying the criteria from the proposed framework to design a better place. The third stage was to use infrared imaging again to assess and validate the new design of the place. The results of this assessment process have raised the need to address the psychological aspect in the design process; the process, also conferred more validity and applicability to the proposed framework of active public space.

The research investigated which criteria can make public spaces active. It identified a number of significant criteria in different categories such as Sociability, Use and Activities, Mental health, Environment, and Accessibility which need to be addressed to design a better place. The proposed framework of active public spaces was then classified into five categories; these are Use and Activities, Identity and Image, Access and Connectivity, Wellbeing, and Sociability as can be seen in the table (27) below of the final version of the

proposed framework of active public space. Moreover, each of these five categories has a number of criteria.

The final version of the proposed framework has been developed through different iterations. The first iteration started with a literature review and then comparative analysis of the three existing frameworks. The second iteration included the users'opinions to develop the list of criteria, while the third iteration evaluated and enriched the proposed framework through experts opinion by using the Delphi technique.

In fact, most of the findings and results obtained through this research have identified and confirmed the role and importance of including the effect of the Internet (Wi-Fi) as one of the issues nowadays that need to be addressed while designing public spaces. Users responses and experts' opinions collected from three iterations identified the significance of the Internet in bringing people back to the public spaces. This research also identified the need to include the 'wellbeing' aspect as one of the categories of the proposed framework. Through the Delphi technique survey, experts who participated in this study have achieved a consensus of their responses regarding including wellbeing, which has raised the significance of taking into account the users' perceptions and mental health - especially wellbeing - of the users in designing the place. Wellbeing needs to be considered within the proposed framework; this criterion has the ability to connect different categories within the framework together to achieve better understanding among architects, planners and designers of what makes public space more successful.

Table 27: Active Public space framework

Categories	Criteria	Description	Applicability (Relationship with urban context)
Use & Activities	Functionally	A place that functions well at all times	Rating public life Mixed-use of land
	Vitality	A place that is well used in relation to its predominant function(s). The most appropriate mix of use	Land-use patterns
	Flexibility	In terms of physical arrangements which can promote the use of the space to accommodate different types of activities	Physical layout
	Active (Dynamically)	The more activities that are going in a place, the more people have an opportunity to participate in them.	physical activity (Local Business Ownership)
Access & connectivity	Connectivity	How well different places are connected to each other using the transport system. If trains, buses and highways work more efficiently then the level of connectivity improves	Transportation Info (Mode Splits)
	Accessibility	Providing different types of parking and how a place can be reached by users. A place that is easy to get to and move through	Parking Usage Patterns
	Walkability	Activities in the street encourage people to enjoy their walking	Pedestrian Activity
	Visibility	How easily people can get the information	Traffic Data
	Convenient	Type of activities that suit people's needs in the place	Pedestrian Activity
	Continuity	continuing data processed for the purpose of the conveyance of a communication on an electronic communications network	Traffic Data
	Readability	The readability of the transportation schedule	Transit Usage
	Proximity	How accurate timing foreground information regarding traffic	Traffic Data
Well-being	Safety	Feeling safe and walking around the place day and night and feeling socially connected with the community	Social interaction And human capital
	Green	Greener urban area displays more positive indicators of good mental health which is associated with the physical activity level that will increase the sense of belonging	Community belonging
	Accessibility	Getting access to art, cultural and leisure amenities promotes happiness.	Social interaction And human capital
	Comfortability	Microclimate conditions (airflow, pollution, solar radiation) in streets	Urban Canyon
	functionality	The impact of art (such as dance, drama, music, visual arts) on mental health	Physical Environment
	Relax	Evaluate the satisfaction of physical exercise in the place	Physical outdoor activities
	Peaceful	Peaceful experience of the activities for elderly people	
	Calm	Feeling less worried increases being part of social activities in the place	Social interaction And human capital
Sociability	Diversity	The use of the place by a diversity of age and different groups in the place	Number of Women, Children, Elderly
	Pride	Getting involve in social activities	Voluntarism
	visibility	Visible to all Wi-Fi enabled devices and getting access to data everywhere in the place.	The communication network (Wi-Fi)
	Unrestrictedly	Unlimited use of Internet service providers	
	Friendly	Those places that are well used and loved by users	Evening Use
	Interactive	Multi-use of the place can gather people and make the place liveable	
	Welcoming	A place where anyone has a right to be	Street Life
	Communal	Shared by all members of a community; for common use	Community (Ethnic Origin)
	Mix / Mixture	A mix of different diverse community groups in the place	
	Public engagement	The place which can hold public speaking events and it has an excellent visual and physical connection to gather people in the place	Public participation
Identity & Image	Safety	Somewhere that feels safe from harm	Crime Statistics
	Livability	Liveable place reduces crime assault	
	Walkability	A measure of how friendly an area is for walking	
	Sittablilty	The place provides people with the opportunity to stop and sit	Physical Layout (Furniture)
	Hygiene	The place is clean and free of litter (Waste Receptacles)	
	Attractively	The way environment information can attract and gather people in the place	Environment Data
	Aesthetics	Study of art and beauty of the place	Local culture or history
	Historically	Archived data of environment can give a clear image of the place	Environment Data

8.3 Research Limitations

During any research, it is known that there will be a number of limitations. The list below captures a few areas in this research with some limitations:

One of the limitations was during conducting the test and examining the proposed framework was selecting a target site to carry out the experimentation proved challenging as it was difficult to obtain permission to use the open of public space in Nottingham city centre. Due to this issue, the semi-public space of the social area in Newton Building at Nottingham Trent University city campus was selected to be the target site to conduct the experimentation, which is one of the research limitations due to the target site was controlled environment semi-public space, different context can affect the quality of place assessment. Eventhow, shopping centre and public library which are indoor place and controlled environment, they are considered as public spaces where people gather and have equal access to it. Active public space framework aims to address the quality of public space in general. Furthermore, the availability of the social area was another limitation raised during this research; the social area is considered as the heart of the main building in the city campus of Nottingham Trent University. The arrangements to get permission to observe the social area were discussed with EST Newton Arkwright Team, who in charge of the site. Due to the busy events and celebrations that take place in the site, EST Newton Arkwright team suggested a few days during the weekdays that the social area would be available to do the experimentation. The time of reservation was chosen very carefully to ensure that the place was in normal use.

During the experimentation, the first stage was using an infrared camera to carry out an observation of the current situation of the social area. One of the limitations the researcher faced was the location of the infrared camera; the camera should be located far from pedestrians where it can achieve a better overall view of the site to cover the whole site. The social area in the Newton Building has a skylight roof, which was hard to fix the infrared camera. In order to have a better perspective and to cover the target site in its entirety, the camera was fixed on a stand in the ground floor where it could have a better possible view of the social area in the basement floor. The camera location was secured away from the users of the place so they were not aware that the place was being recorded so that the pedestrian behaviour in the place would not be affected.

As a high-resolution infrared (FLIR) thermal imaging camera, the FLIR A310 was used to measure the density of people in the area and assess the pedestrian movement in the experiment stage. The FLIR A310 camera has a field of view (FOV) of 90 x 73. Also, the minimum focus distance is 0.66 ft. The FLIR A310 infrared camera has been used due to ethical issues and affords more privacy to the users of the place. In fact, the FOV of the FLIR A310 infrared camera is 45º: 45º x 33.8º; this means that infrared camera needs to be located far in the distance to have a better perspective to cover the site. During the experiment, the infrared camera was located on the ground floor in the highest location possible where it had a visual connection to the social area on the basement floor. The camera covered the target area, but it would have been better if it had covered the surrounding area to get a better overall view of the place.

Finally, the observation was conducted in the experimentation relied on the data from thermal videos, where the direct observation can be used as another tool to observe the people movement and their behaviour in the site. Sketches, notes and images from direct observation can be used to compare the data from the thermal image, in order to cover more activities and users' behaviour in the site.

8.4 Recommendations for Future Research

The findings and knowledge of this research can be a valuable guideline for future research that will implement different techniques in different places. Future research can focus on developing a digital planning guideline, more applicable to the digital era.

The development of the proposed framework of active public spaces was based on established assessment and measurement techniques such as the Project for Public Space (PPS), the Green Flag Award and the Creating Successful Places framework. A recommendation for future research could investigate the possibility of future collaboration to enhance the quality of public space assessment.

The sampling technique that used to collect data during the questionnaire survey targeted users of public space in Nottingham city centre was a random technique, the participants been selected randomly used online survey and smart devices to collect data, while the total participants were 100 completed the survey, the diversity of the participants sample was enough to validate the result, where most of the users categories participated in the questionnaire which represents the users of the public space in city centre, the research

recommendations for future research is to conduct different sample technique to gather responses from users of the public space.

The selected target site for the experimentation in this research was controlled environment semi-public space, the recommendation for future research could select outdoor public space to test and validate the framework of active public space, different context can affect the quality of the place assessment.

Finally, the proposed framework of active public spaces can be developed and expanded to deal with the specific issue of the framework. For example, future research can be a focus on one category of the proposed framework that was designed and developed through this research. Further study on accessibility and the effect of technology are recommended due to the concentration nowadays on future cities as well as a greater focus on including well-being and users' opinions on shaping the place. This is highly recommended as future work. The greater focus could be on how to engage society to play an important role in designing active public spaces from the social aspect. Taking into account climate change in developing a framework to assess the comfortability of people in place is highly recommended as well. These ideas can help to establish sustainable public spaces in the future.

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APPENDIX A

ETHICAL APPROVAL FORMS

JOINT INTER COLLEGE ETHICS COMMITTEE
ETHICAL CLEARANCE CHECKLIST

College of Art, Architecture, Design and Humanities; College of Science and Technology; and the Centre for Academic Development and Quality (CADQ)

(TO BE COMPLETED FOR ***ALL*** INVESTIGATIONS INVOLVING PARTICIPANTS)

All staff and PGR students wishing to conduct an investigation involving participants in order to collect new data in either their research projects or teaching activities are required to complete this checklist before commencement. It may be necessary after completion of this form to submit a full application to the Joint Inter College Ethics Committee (JICEC). Where necessary, official approval from the JICEC must be obtained ***before*** the research is commenced. This should take no longer than one month.

IF YOUR RESEARCH IS BEING CONDUCTED OFF CAMPUS AND ETHICAL APPROVAL FOR YOUR STUDY HAS BEEN GRANTED BY AN EXTERNAL ETHICS COMMITTEE, PLEASE SEND DETAILS TO THE PROFESSIONAL SUPPORT RESEARCH TEAM FOR CONSIDERATION BY THE CHAIR. YOU WILL BE EXPECTED TO PROVIDE EVIDENCE OF APPROVAL FROM THE EXTERNAL ETHICS COMMITTEE AND THE TERMS ON WHICH THIS APPROVAL HAS BEEN GRANTED.

IF YOUR RESEARCH IS TRANSFERRING INTO NOTTINGHAM TRENT UNIVERSITY AND APPROVAL WAS OBTAINED FROM YOUR ORIGINATING INSTITUTION, THERE IS A REQUIREMENT ON THE UNIVERSITY TO ENSURE THAT APPROPRIATE APPROVALS ARE IN PLACE.
If you believe either of these statements applies to your research, please contact the Professional Support Research Team adbresearch1@ntu.ac.uk with evidence of former approval and the terms on which this approval has been granted.

IT IS THE RESPONSIBILITY OF INDIVIDUAL INVESTIGATORS AND/OR SUPERVISORS TO ENSURE THAT THERE IS APPROPRIATE INSURANCE COVER FOR THEIR INVESTIGATION.
If you are at all unsure about whether or not your study is covered, please contact the Finance & Planning Manager in your Finance team to check.

Name of Applicant:	**HAITHEM AHMED ALBEERA**		
School:	**ARCHITECTURE & DESIGN AND BUILT ENVIRNOMENT SCHOOL**		
Title of Investigation:	**THE FUTURE OF PLACE "INTERACTION BETWEEN VIRTUAL AND PHYSICAL PLACES"**		
STAFF	☐	**STUDENT**	☒(*if student, please complete)
RESEARCH	☐	**CONSULTANCY**	☐
Degree Title and Level*:	**RSCH107 - PHD (ADBE) FT**		
Supervisor (List Lead supervisor first)	1. **Prof . Benachir Medjdoub** 2. **Prof . Amin Al-Habaibeh**		

Briefly outline the objectives of the research. [75 words]
The objectives of the research are:
1.To identify the different definitions of place, taking into account digital revaluation and to investigate

critically the evidence and need to provide the idea of place in the future.
2.To analyse the role of technology within the form of future place.
3.To test and examine the characteristics of successful places, as well as indicators and benchmarks for measuring successful implementation.
4.Develop set of criteria to asses or measure the quality of place and propose a framework that represent an interaction of virtual and physical place.
5.Summarise the research and identify the areas of future research

Briefly describe the principal methods, the sources of data or evidence to be used, and the number and type of research participants who will be recruited to the project. [150 words]

The research approach will involve both of quantitative and qualitative methods within a theoretical perspective. Wider range of previous studies will be taken into account. Extensive literature review and documentary analysis of materials on the concept of place, successful places, and characteristic of interaction between virtual and physical world. Documentary review, new articles and research papers will be taken into account to develop place assessment criteria list of successful place to support the main data in the research.

Data will be collected via semi-structured questionnaire . Besides, we will analyse and observe a number of real case scenario based at Nottingham to gather first hand data. Survey will be carried out using Delphi method to support and enrich the development of our place assessment criteria list in order to measure the success of a place, sample consist 30 expert panels, expert panels will be initiated comprising , Researchers on social , humanity, planners and architects. Made up of varieties of individuals which would be grouped under academics, professionals (experts) and government officials. Expert panels will be selected based on individual expertise and their role within the case study.
The experts answer questionnaires in two or more rounds. After each round, a researcher provides a summary of the experts' forecasts from the previous round as well as the reasons they provided for their judgments, Thus, experts are encouraged to revise their earlier answers in light of the replies of other members of their panel. It is believed that during this process the range of the answers will decrease and the group will converge towards the "correct" answer. Finally, the process is stopped after a predefined stop criterion (e.g. number of rounds, achievement of consensus, and stability of results) and the mean or median scores of the final rounds determine the results of characteristic of successful place. The outcome of this process will be examined in phase 2.
Online Survey (questionnaire) will be taken place in collecting data process to target general users of public space (sites has been chosen) in Nottingham city centre, this survey will test and exam the outcome of using Delphi method which is the list of criteria of successful place ,through online survey (Survey Monkey) to identify the satisfaction of the users in the place, survey will target sample 50-100 participants . Data will be collected via semi-structured questionnaire via (Survey Monkey) online survey, once research collect data from participants, data will be analysed by using SPSS.
Some experimentations will be run in a couple of sites, which are located in Nottingham city centre, have been chosen as case study . These comprises monitoring the density of people by using infrared cameras which will be fixed in high-position and far from the crowd, their result is just a set points in the space which makes it impossible to identify the participants characteristics. Data will be analysed by using MATLAB
Extensive documentary analysis will be taken into account to form the basis of the research progression, the final step will illustrate the evaluation of findings both of virtual and physical place, and compare them to identify the future area research.

Do you intend to use published research instruments/resources (e.g., questionnaires, scales, psychometrics, vignettes)?
If YES, complete the next 3 questions NO
If NO, proceed 4 questions

Have you included with this application a full electronic copy or link to each published research instrument/resource?

If you are using published research instruments/resources, do you have permission to use them in the way that you intend to use them?
What steps will be taken to ensure compliance with the requirements of copyright rules for the use of published scale?
Are you developing your own research resources/instruments to collect data? If YES, complete the questions below. I **am developing my own, but using existing tools to collecting data.** If NO, proceed to the next section.
Briefly describe the research resources/instruments you are developing. [50 words] I am developing my own tool by analysis existing tools to measure the quality of place and what make successful place, to develop set of list of criteria to asses and measure the quality of place, then using Delphi methods to discuss this list with number of experts panels to enrich the characteristic list of place and create waiting list to identify which criteria is most important than others.
If applicable, please include an electronic copy of your own bespoke/self-developed research instrument(s) that you will use to collect data with this application.

A. **Familiarisation with policy** - Please answer *as appropriate*			
Please confirm if you are fully acquainted with the policies for guiding ethical research named below:			
NTU research ethics policy, and the procedures for ethical approval	Yes☒	No☐	N/A☐
The guidelines for ethical research promulgated by a professional association, as appropriate	Yes☒	No☐	N/A☐
NTU Data Management Policy	Yes☒	No☐	N/A☐
The Regulations for the Use of Computers (*see* NTU website)	Yes☒	No☐	N/A☐
Guidelines for Risk Assessment in Research	Yes☒	No☐	N/A☐
If you answered **NO** to any of these questions, please note that you must study these guidelines and regulations before proceeding to complete the remainder of this form.			

B. **External Ethical Review** – *Please answer as appropriate*			
Has a favourable ethical opinion already been given for this project by any other external research ethics committee[1]? An external research ethics committee means any research committee *other* than those at Nottingham Trent University. Submission of this form is *not* a submission to an external research ethics committee.	Yes☐	No☒	N/A☐

[1] This includes the research ethics committee of another academic institution.

Will this project be submitted for ethical approval to any other external research ethics committee[2]? An external research ethics committee means any research committee *other* than those at Nottingham Trent University. Submission of this form is *not* a submission to an external research ethics committee.	Yes☐	No☒	N/A☐
If you answered **YES** to either of these two questions, please complete section C sign the declaration at the end of the form and submit it (together with a letter confirming ethical approval from the external committee) before starting any research. If you answered **NO** to both questions, please proceed to the next section.			

C. **Investigators**			
Do investigators have previous experience of, and/or adequate training in, the methods employed?		Yes☒	No**☐
If involved will junior researchers/students be under the direct supervision of an experienced member of staff?	Yes☒	No**☐	N/A☐
If involved will junior researchers/students be expected to undertake physically invasive procedures (not covered by a generic protocol) during the course of the research?	Yes**☐	No☒	N/A☐
Are researchers in a position of direct authority with regard to participants (e.g. academic staff using student participants, sports coaches using his/her athletes in training)?	Yes**☐	No☒	N/A☐
** If you select ANY answers marked **, please submit your completed Ethical Clearance Checklist accompanied by a statement covering how you intend to manage the issues (indicated by selecting a ** answer) to the JICEC.			

D. **Participants**		
Vulnerable Groups		
Does your research involve vulnerable participants? If not, go to the next section UNITEM If your research does involve vulnerable participants, will participants be knowingly recruited from one or more of the following vulnerable groups?		
Children under 18 years of age (please refer to published guidelines)	Yes*☐	No☒
Pregnant women	Yes*☐	No☒
People with mental illness	Yes*☐	No☒

[2] This includes the research ethics committee of another academic institution.

Prisoners/Detained persons	Yes*☐	No☒
Other vulnerable groups please specify: _____	Yes*☐	No☒
Is a DBS/Overseas Police Check required?	Yes☐	No☒
If required, do you have a DBS/Overseas Police Check? *Please contact NTU Disclosures, details can be found on the address book.*	Yes☐	No☒
To the best of your knowledge, please indicate whether the proposed study:		
Involves procedures likely to cause psychological, social or emotional distress to participants	Yes*☐	No☒
Is designed to be challenging psychologically in any way	Yes*☐	No☒
Exposes participants to risks or distress greater than those encountered in their normal daily life	Yes*☐	No☒

Chaperoning Participants

If appropriate, e.g. studies which involve vulnerable participants, taking physical measures or intrusion of participants' privacy:

Will participants be chaperoned by more than one investigator at all times?	Yes☐	No*☒	N/A☐
Will at least one investigator of the same sex as the participant(s) be present throughout the investigation?	Yes☒	No*☐	N/A☐
Will participants be visited at home?	Yes*☐	No ☒	N/A☐

If you have selected N/A please provide a statement in the space below explaining why the chaperoning arrangements are not applicable to your research proposal:

If you have selected any of the * answers for any question in section D please provide details (50-75 words):

Advice to Participants following the investigation

Investigators have a duty of care to participants. When planning research, investigators should consider what, if any, arrangements are needed to inform participants (or those legally responsible for the participants) of any health related (or other) problems previously unrecognised in the participant. This is particularly important if it is believed that by not doing so the participants well-being is endangered. Investigators should consider whether or not it is appropriate to recommend that participants (or those legally responsible for the

participants) seek qualified professional advice, but should not offer this advice personally. Investigators should familiarise themselves with the guidelines of professional bodies associated with their research.

E. **Observation/Recording** - *Please answer: yes or no*		
Does the study involve data collection, or the observation or recording of participants? Note that data collection includes the re-use of material originally collected for a non-research purpose (e.g. client or student data already in your possession) and includes anonymous data	Yes☒	No☐
Will those contributing to the data collected (or being observed or being recorded), or the appropriate authority, be informed that the data collection, observation or recording will take place?	Yes☒	No☐
If you have answered **NO** to question to the first question in section E, because you are not undertaking empirical work, proceed to the declaration at the end of this form. If you have answered **NO** to question the second question, an application for ethical approval needs to be made to the JICEC.		

F. **Consent and Deception** - *Please answer: yes or no*		
Informed Consent & Data Withdrawal Will participants, or the appropriate authority, be fully informed of the objectives, and of all other particulars of the investigation (preferably at the start of the study, but where this would interfere with the study, at the end)?	Yes☒	No☐
Will participants, or the appropriate authority, be fully informed of the use of the data collected (including, where applicable, ownership of any intellectual property arising from the research)?	Yes☒	No☐
For detained persons, members of the armed forces, employees, students and other persons who may not be in a position to give fully independent consent, will care be taken over the gaining of freely informed consent?	Yes☒	No☐
If your research involves children under the age of 18 or participants who have impairment of understanding or communication:		
- will consent be obtained (either in writing or by some other means)?	Yes☐	No*☐

- will consent be obtained from parents or other suitable person?	Yes☐	No*☐
- will they be informed that they have the right to withdraw regardless of parental/ guardian consent?	Yes☐	No*☐
For investigations conducted in schools, will approval be gained in advance from the Head-teacher and/or the Director of Education of the appropriate Local Education Authority?	Yes☐	No*☐
For detained persons, members of the armed forces, employees, students and other persons judged to be under duress, will care be taken over gaining freely informed consent?	Yes☐	No*☐
Will participants, or the appropriate authority, be informed of their right to withdraw from the investigation at any time (or before a specific deadline) and to require their own data to be destroyed?		

Deception		
Is deception part of the study? If the answer is no, proceed to section G	Yes☐	No*☒
If yes, please explain the rationale and nature of deception (50-75 words):		
Will participants be de-briefed and the true object of the research revealed at the earliest stage upon completion of the study?	Yes☒	No*☐
Has consideration been given on the way that participants will react to the withholding of information or deliberate deception?	Yes☒	No*☐

G. Storage of Data and Confidentiality		
Please see University guidance on https://www.ntu.ac.uk/intranet/policies/legal_services/data_protection/16231gp.html. If you are a member of NTU staff you can obtain direct access to this with your staff username and password. If you are not a member of NTU staff, please request of copy from your supervisor or course leader.		
Does your research need to be compliant with the RCUK Regulations. If yes, please attach your data management plan (please use dmponline.ddc.ac.uk to design your plan based around the funders requirements, if you have any queries please email: ResearchDataManagement@ntu.ac.uk).	Yes☐	No☒
Will all information on participants be treated as confidential and not identifiable unless agreed otherwise in advance, and subject to the requirements of the law of the relevant jurisdiction?	Yes☒	No☐
Will storage of data comply with the Data Protection Act 1998 and the law of any non-UK jurisdiction in which research is carried out?	Yes☒	No☐
Will any video/audio recording of participants be kept in a secure place and not released for use by third parties?	Yes☒	No☐
Will video/audio recordings be destroyed within six years of the completion	Yes☒	No☐

Incentives		
Have incentives (other than those contractually agreed, salaries or basic expenses) been offered to the investigator to conduct the investigation?	Yes**☐	No☒
Will incentives (other than basic expenses) be offered to potential participants as an inducement to participate in the investigation?	Yes**☐	No☒

** If you select ANY answers marked **, please submit your completed Ethical Clearance Checklist accompanied by a statement covering how you intend to manage the issues (indicated by selecting a ** answer) to the JICEC.

The design of the participant information sheet/consent form and of any research instrument (including questionnaires, sampling and interview schedules) that will be used, have been discussed with my supervisor(s). YES

Compliance with Ethical Principles

If you have completed the checklist to the best of your knowledge and selected an answer marked with * or ** your investigation you will need to seek full formal approval from the JICEC.

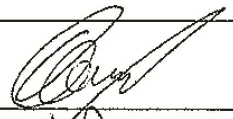
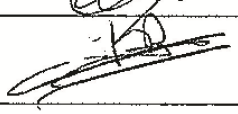
Please return to compieted Ethical Approval Checklist with the following documents as necessary to the Research Team, Maudslay 312, City Campus, or via email adbresearchteam1@ntu.ac.uk:

- A copy of the research tool you are using
- Consent Form (if necessary)
- Data Management Policy (if necessary)
- Risk Assessment (if necessary)

Please note that the ethics form does not abrogate your need to complete a risk assessment

Declaration

I have read the Ethics & Governance Statement http://www.ntu.ac.uk/research/research_at_ntu/research_integrity/index.html. I confirm that the above named investigation complies with published codes of conduct, ethical principles and guidelines of professional bodies associated with my research discipline.

Signature of Applicant *(Research Student or Principal Investigator)* Date 15/01/2016	
Signature of Supervisor/Line Manager *(Director of Studies/ATL)* Date 15/01/2016	
Signature of JICEC Chair Date	

APPENDIX B

USER'S EXPERIENCE AND THE QUALITY OF PUBLIC SPACE QUESTIONNAIRE

Future of place survey

Section 1 : Information about your visit to public space in Nottingham city centre

* Required

1. **How often do you visit public spaces in Nottingham City Centre?** *
   Mark only one oval.

   - ◯ Every weekdays
   - ◯ Several days per week
   - ◯ Every weekend
   - ◯ once a month
   - ◯ once a year
   - ◯ Other: _____

2. **When you use public space, what do you usually do ? (check all that apply)** *
   Check all that apply.

   - ☐ Walk/Jog/Excercise
   - ☐ Sit/ Relax
   - ☐ Eat/ Have coffee outside
   - ☐ Socialise/ Spending time with Co-workers
   - ☐ Watch people
   - ☐ Attend organised events/ Celebrations/ Performance
   - ☐ Other: _____

3. **How would you normally travel to public space ?** *
   Mark only one oval.

   - ◯ Walking
   - ◯ Car
   - ◯ Taxi
   - ◯ Bicycle
   - ◯ Bus
   - ◯ Tram
   - ◯ Train
   - ◯ Other: _____

4. **Do you normally visit the public space alone or with a group ? (please tick one only)** *
   Mark only one oval.

   - ◯ Alone
   - ◯ In group
   - ◯ Both (equally divided)
   - ◯ Other: _____

5. **If you mostly visit as part of a group , who normally visit the place with you ? (check all that apply)**
Check all that apply.

- [ ] Partner
- [ ] Freinds
- [ ] Children
- [ ] Team / Club
- [ ] Other family
- [ ] School group
- [ ] Other: _____

6. **What kind of amenities / features could be provided in the short term to make public spaces more comfortable and attractive for you ? (check all that apply)** *
Check all that apply.

- [ ] Landscaping / gardens
- [ ] Comfortable place to sit
- [ ] Water feature / fountain
- [ ] Colourful movable chairs
- [ ] Large tables / picnic tables
- [ ] Sculptures / art displays
- [ ] Interactive, child-friendly art
- [ ] Play feature
- [ ] Carousel
- [ ] Information / Signage
- [ ] Lighting
- [ ] Wi-Fi
- [ ] Food carts / Trucks
- [ ] Pop-up stores / markets
- [ ] Other: _____

Section 2 : Participant information

7. **What is your connection to Nottingham city centre ? (check all that apply)** *
Check all that apply.

- [ ] I live in the city centre
- [ ] I live in Nottingham
- [ ] I work in city centre
- [ ] I study in city centre
- [ ] Other: _____

8. **What is your gender ?** *
Mark only one oval.

- ◯ Female
- ◯ Male

9. **Which of the following categories best describes your age ?** *
Mark only one oval.

- ◯ under 21
- ◯ 21-24
- ◯ 25-34
- ◯ 35-44
- ◯ 45-54
- ◯ 55-64
- ◯ 65 or older

10. **What is your marital status ?** *
Mark only one oval.

- ◯ Single
- ◯ Married
- ◯ Divorced
- ◯ Other: _____

11. **What is your occupation ?** *
Mark only one oval.

- ◯ Student
- ◯ Employee
- ◯ Retired
- ◯ Unable to work
- ◯ Other: _____

APPENDIX C

INVITATION TO PARTICIPATE IN THE RESEARCH

Invitation to participate in the Delphi Technique Questionnaire

Dear Participant,

I am a PhD student at the School of Architecture at Nottingham Trent University in the United
Kingdom. As a part of my Research, I am undertaking research that aims to assess the quality of public space based on a proposed framework of active public space. This framework has been designed based on two main sources. Firstly, scientific research and knowledge, which include academic research reports and papers. Secondly, based on the existing frameworks of the active place such as Project for public space framework (PPS), Green Flag Awards Assessment Criteria, and Office for National Statistics (Personal Well-being in the UK, 2014/2015).

This stage of research will focus primarily on the evaluation of this proposed framework in order to ensure that it is acceptable, reliable and valid.
This process will be done through the use of one of the most valuable techniques to evaluate the framework, which is the Delphi method, the Delphi method will be used to obtain the view of expects regarding the proposed framework in terms of the categories and criteria and will involve three rounds of questionnaires. Undoubtedly, the views and the opinion will play a great role to obtain the desired objectives of this study.

Your contribution to this research is very significant to the success of this study work. Therefore, I would be grateful if you accept this invitation to participate in this study. Reading and answering the questionnaire will take approximately 20 minutes. The survey is very brief and will take two to three rounds to complete. I am looking forward to your participation. All information submitted from the participants will be used for research purpose only and will be treated and analysed confidentially. Only statistical summary and summarised information will be reported or published.

Please confirm if you are going to participate in this survey.

Thank you in advance for your contribution

Haithem Albeera
PhD Researcher at School of Architecture and Built Environment, Nottingham Trent University
Nottingham
United Kingdom
E-mail: haithem.albeera2014@my.ntu.ac.uk
Mobile:

APPENDIX D

DELPHI TECHNIQUE QUESTIONNAIRE (ROUND ONE)

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Successful public space

The Scope of the study

Public spaces enhance community cohesion, civic identity, and quality of life. The liveliness and continuous use of public space as a public good leads to urban environments that are well maintained and safe, making the city an attractive place in which to live and work.

The contribution of this research is to measure successful public space (**design aspect**), based on a proposed framework of successful public space that can be seen below in Figure 1. The proposed framework has been designed based on two main sources. Firstly, the scientific research and knowledge , which include the academic research reports and papers. Secondly, based on the existing frameworks of the successful place such as Project for public space framework (PPS), Green Flag Awards Assessment Criteria , Office for National Statistics (Personal Well-being in the UK, 2014/2015).

Figure.1 Proposal Framework of successful public space with categories ,criteria and applicability.

Categories	Criteria	Description	Applicability (Relationship with urban context)
Use & Activities	Active (Dynamically)	The more activities that are going in a place, the more people have an opportunity to participate in.	physical activity (Local Business Ownership)
	Vitality	A place that is well used in relation to its predominant function(s). the most appropriate mix of use	Land-use patterns
	Usefully	Well-planned public space has a positive impact on the rent level of nearby properties	Rent Level
	Integration	How activities can come together form a unified space	Mix use
	Functionally	a place that functions well at all times	Rating public life Mix use of land
Identity & Image	Liveability	Liveable place reduce crime assault	Crime Statistics
	Safety	somewhere that feels safe from harm	
	Walkability	A measure of how friendly is an area for walking	
	Sittablilty	Place provide people opportunity to stop and sit	Physical Layout (Furniture)
	Hygiene	Place is clean and free of litters (Waste Receptacles)	
	Aesthetics	Study of art and beauty of place	Local culture or history
	Reflectively	Showing the history image of the place	
	Attractively	The way environment info can attract and gather people in the place	Environment Data
	Historically	Archived data of environment can give clear image about the place	
Access & connectivity	Continuity	continuing data processed for the purpose of the conveyance of a communication on an electronic communications network	Traffic Data
	Visibility	How can people get the information easily	
	Proximity	How accurate timing foreground information regarding traffic	
	Connectivity	How well different places are connected to each other using the transport system. If trains, buses and highways work more efficiently then the level of connectivity improves	Transportation Info (Mode Splits)
	Readability	The readability of transportation schedule	Transit Usage
	Walkability	Activities in the street enhance people to enjoy their walking	Pedestrian Activity
	Convenient	Type of activities that suit people needs in the place	
	Accessibility	Providing different types of parking and how can a place be reach by users. A place that is easy to get to and move through	Parking Usage Patterns
Well-being	Calm	Feeling less worry increase to be part of social activities in the place	Social interaction And human capital
	Chill	Somewhere to chill and have opportunity for social contact	
	Accessibility	Getting access to art, cultural and leisure amenities promote happiness.	
	Safety	Feeling safe and walking around the place day and night and feeling socially connected with the community	
	Peaceful	Peaceful experience of the activities for elderly people	Physical outdoor activities
	Relax	Evaluate the satisfaction of physical exercise in the place	
	Green	Greener urban area displays more positive indicators of mental health which associated with the physical activity level that will increase sense of belonging	Community belonging
	functionality	The impact of art (such as dance, drama, music, visual arts) on mental health	Physical environment
Sociability	Diversity	The use of place divers of age and different of groups in the place	Number of Women, Children, Eldery
	Stewardship	Providing each group's needs in the place	
	Pride	Getting involve in social activities	Voluntarism
	Encouragement	Motivate people to contribute to knowledge between each other	Sharing knowledge
	Ubiquitous	Getting access to data everywhere in the place	Social Network (Wi-Fi networks)
	visibility	visible to all Wi-Fi enabled devices	
	unrestrictedly	Unlimited use of internet service provider	
	Friendly	Those place that are well used and loved by users	Evening Use
	Interactive	Multi use of the place can gather people and make place liveable	
	Welcoming	place where anyone has a right to be in	Street Life
	Communal	Shared by all members of a community; for common use	Community (Ethnical Origin)
	Mix / Mixture	Mix of different diverse community groups in the place	

This stage of research will focus primarily on the evaluation of this proposal framework in order to ensure that it is acceptable, reliable and valid.

This process will be done through the use of one of the must valuable technique to evaluate the framework, which is the Delphi method, it will be used to obtain the view of expects regarding the proposal framework in terms of the (categories , criteria, applicability). Undoubtedly , the views and opinion will play a great role to obtain the desired objectives of this study .

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Successful public space

2. Personal Information

*** 1. Personal Information**

Name	
Company	
Your Specialisation	
Years of experience	
Age	
Gender	
Country	
Email Address	

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Successful public space

3- Proposal Framwork of Successful Public Space

Th core of this framework has five key categories, which must be integrated in order to achieve the desired goal of this proposal framework. Namely Use and Activities , Identity and image , Access and connectivity , Well-being and finely Sociability.Furthermore, each one of these categories has a number of major criteria. This proposed framework focuses on the physical layout design of the public space (design aspect), the framework can be seen in Figure 1 which include its main criteria, description and applicability.

*** 2. To what extent do you agree or disagree with the contents of this proposed Framework?**

- ◯ Extremely agree
- ◯ Moderately agree
- ◯ Slightly agree
- ◯ Neither agree nor disagree
- ◯ Slightly disagree
- ◯ Moderately disagree
- ◯ Extremely disagree

Add comments (please specify)

*** 3. Does this Framework have too many, too few, or about the right number of categories and criteria ?**

- ◯ Much too many
- ◯ Somewhat too many
- ◯ Slight too many
- ◯ About the right number
- ◯ Slightly too few
- ◯ Somewhat too few
- ◯ Much too few

Add comments (please specify)

*** 4. How do you rate the level of importance of the following categories ?**

	Extremely important	Very Important	Moderately Important	Slightly Important	Not important at all	**Remove** this category
Use & Activities	◯	◯	◯	◯	◯	◯
Identity & Image	◯	◯	◯	◯	◯	◯
Access & Connectivity	◯	◯	◯	◯	◯	◯
Well-being	◯	◯	◯	◯	◯	◯
Sociability	◯	◯	◯	◯	◯	◯

Other (please specify)

*** 5. Do you think there are more categories to be included within this Framework ?**

◯ Yes

◯ No

◯ I am not sure

If YES please specify

6. If you have suggested a new category. Please can you suggest the criteria of the suggested category ?

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Successful public space

3- Use and Activities category

Activities and use are the basic building blocks of a place. Having something to do gives people a reason to come to a place – and return. When there is nothing to do, a space will be empty and that generally means that something is wrong.

Use and Activities category

Categories	Criteria	Description	Applicability (Relationship with urban context)
Use & Activities	Active (Dynamically)	The more activities that are going in a place, the more people have an opportunity to participate in.	physical activity (Local Business Ownership)
	Vitality	A place that is well used in relation to its predominant function(s). the most appropriate mix of use	Land-use patterns
	Usefully	Well-planned public space has a positive impact on the rent level of nearby properties	Rent Level
	Integration	How activities can come together form a unified space	Mix use
	Functionally	a place that functions well at all times	Rating public life Mix use of land

*** 7. How do you rate the level of importance of the following criteria of Use and Activities Category?**

	Extremely Important	Very Important	Moderately Important	Slightly Important	Not important at all	**Remove** this Criteria
active (Dynamically)	◯	◯	◯	◯	◯	◯
Vitality	◯	◯	◯	◯	◯	◯
Usefully	◯	◯	◯	◯	◯	◯
Integration	◯	◯	◯	◯	◯	◯
Functionality	◯	◯	◯	◯	◯	◯

Do you want to add new criteria to the list ? and Why ?
(Please Specify)

*** 8. How do you rate the level of importance of the following criteria of Use and Activities Category?** ***(rank with 1 being the most important , and 5 being the least important)***

- active (Dynamically)
- Vitality
- Usefully
- Integration
- Functionality

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4- Identity and Image category

The place reflects the identity of area and presents itself well , has a good image is key to its success. Identity includes perceptions about safety, cleanliness, and the availability of places to sit – the importance of giving people the choice to sit where they want is generally underestimated.

Identity and Image category

Categories	Criteria	Description	Applicability (Relationship with urban context)
Identity & Image	Liveability	Liveable place reduce crime assault	Crime Statistics
	Safety	somewhere that feels safe from harm	
	Walkability	A measure of how friendly is an area for walking	
	Sittablilty	Place provide people opportunity to stop and sit	Physical Layout (Furniture)
	Hygiene	Place is clean and free of litters (Waste Receptacles)	
	Aesthetics	Study of art and beauty of place	Local culture or history
	Reflectively	Showing the history image of the place	
	Attractively	The way environment info can attract and gather people in the place	Environment Data
	Historically	Archived data of environment can give clear image about the place	

*** 9. How do you rate the level of importance of the following criteria of Identity and Image Category?**

	Extremely Important	Very Important	Moderately Important	Slightly Important	Not important at all	**Remove** this Criteria
Liveability	○	○	○	○	○	○
Safety	○	○	○	○	○	○
Walkability	○	○	○	○	○	○
Sittability	○	○	○	○	○	○
Hygiene	○	○	○	○	○	○
Aesthetics	○	○	○	○	○	○
Reflectivity	○	○	○	○	○	○
Attractively	○	○	○	○	○	○
Historic	○	○	○	○	○	○

Do you want to add new criteria to the list ? and Why ?
(Please Specify)

*** 10. How do you rate the level of importance of the following criteria of Identity and Image Category?**

(rank with 1 being the most important , and 9 being the least important)

- Liveability
- Safety
- Walkability
- Sittability
- Hygiene
- Aesthetics
- Reflectivity
- Attractively
- Historic

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Successful public space

5- Access and Connectivity category

You can judge the accessibility of a place by its connections to its surroundings, both visual and physical. A successful public space is easy to get to and get through; it is visible both from a distance and up close. The edges of a place are important as well: For instance, a row of shops along a street is more interesting and generally safer to walk by than a blank wall or empty lot. Accessible places have a high parking turnover and, ideally, are convenient to public transit.

Access and Connectivity category

Categories	Criteria	Description	Applicability (Relationship with urban context)
Access & connectivity	Continuity	continuing data processed for the purpose of the conveyance of a communication on an electronic communications network	Traffic Data
	Visibility	How can people get the information easily	
	Proximity	How accurate timing foreground information regarding traffic	
	Connectivity	How well different places are connected to each other using the transport system. If trains, buses and highways work more efficiently then the level of connectivity improves	Transportation Info (Mode Splits)
	Readability	The readability of transportation schedule	Transit Usage
	Walkability	Activities in the street enhance people to enjoy their walking	Pedestrian Activity
	Convenient	Type of activities that suit people needs in the place	
	Accessibility	Providing different types of parking and how can a place be reach by users. A place that is easy to get to and move through	Parking Usage Patterns

*** 11. How do you rate the level of importance of the following criteria of Access & Connectivity Category?**

	Extremely important	Very important	Moderately important	Slightly important	Not important at all	**Remove** this Criteria
Continuity	◯	◯	◯	◯	◯	◯
Visibility	◯	◯	◯	◯	◯	◯
Proximity	◯	◯	◯	◯	◯	◯
Connectivity	◯	◯	◯	◯	◯	◯
Readability	◯	◯	◯	◯	◯	◯
Walkability	◯	◯	◯	◯	◯	◯
Convenient	◯	◯	◯	◯	◯	◯
Accessibility	◯	◯	◯	◯	◯	◯

Do you want to add new criteria to the list ? and Why ?
(Please Specify)

*** 12. How do you rate the level of importance of the following criteria of Access & Connectivity Category?**

(rank with 1 being the most important , and 8 being the least important)

- Continuity
- Visibility
- Proximity
- Connectivity
- Readability
- Walkability
- Convenient
- Accessibility

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Successful public space

6- Well-being category

It is argued in this research that successful public space is not only based on the use and activities, Identity and image , sociability, access and connectivity, but also on a strong foundation of good health and well-being. Well-being highlights several concerns in terms of mental health aspects. It contains seven criteria.

Well-being Category

Categories	Criteria	Description	Applicability (Relationship with urban context)
Well-being	Calm	Feeling less worry increase to be part of social activities in the place	Social interaction And human capital
	Chill	Somewhere to chill and have opportunity for social contact	
	Accessibility	Getting access to art, cultural and leisure amenities promote happiness.	
	Safety	Feeling safe and walking around the place day and night and feeling socially connected with the community	
	Peaceful	Peaceful experience of the activities for elderly people	Physical outdoor activities
	Relax	Evaluate the satisfaction of physical exercise in the place	
	Green	Greener urban area displays more positive indicators of mental health which associated with the physical activity level that will increase sense of belonging	Community belonging
	functionality	The impact of art (such as dance, drama, music, visual arts) on mental health	Physical environment

*** 13. How do you rate the level of importance of the following criteria of Well-being category ?**

	Extremely important	Very important	Moderately important	Slightly important	Not important at all	**Remove** this Criteria
Calm	○	○	○	○	○	○
Chill	○	○	○	○	○	○
Peaceful	○	○	○	○	○	○
Relax	○	○	○	○	○	○
Accessibility	○	○	○	○	○	○
Safety	○	○	○	○	○	○
Green	○	○	○	○	○	○
Functionality	○	○	○	○	○	○

Do you want to add new criteria to the list ? and Why ?
(Please Specify)

*** 14. How do you rate the level of importance of the following criteria of Well-being category ?**

(rank with 1 being the most important , and 8 being the least important)

- Calm
- Chill
- Peaceful
- Relax
- Accessibility
- Safety
- Green
- Functionality

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Successful public space

7- Sociability

It is believed that sociability is a difficult quality for a public space to achieve, but once attained it becomes an unmistakable feature. When people see friends, meet and greet their neighbours, and feel comfortable interacting with strangers, they tend to feel a stronger sense of place or attachment to their community – and to the place that fosters these types of social activities.

Sociability Category

Categories	Criteria	Description	Applicability (Relationship with urban context)
Sociability	Diversity	The use of place divers of age and different of groups in the place	Number of Women, Children, Eldery
	Stewardship	Providing each group's needs in the place	
	Pride	Getting involve in social activities	Voluntarism
	Encouragement	Motivate people to contribute to knowledge between each other	Sharing knowledge
	Ubiquitous	Getting access to data everywhere in the place	Social Network (Wi-Fi networks)
	visibility	visible to all Wi-Fi enabled devices	
	unrestrictedly	Unlimited use of internet service provider	
	Friendly	Those place that are well used and loved by users	Evening Use
	Interactive	Multi use of the place can gather people and make place liveable	
	Welcoming	place where anyone has a right to be in	Street Life
	Communal	Shared by all members of a community; for common use	Community (Ethnical Origin)
	Mix / Mixture	Mix of different diverse community groups in the place	

*** 15. How do you rate the level of importance of the following criteria of Sociability category ?**

	Extremely important	Very important	Moderately important	Slightly important	Not important at all	**Remove** this Criteria
Diversity	◯	◯	◯	◯	◯	◯
Stewardship	◯	◯	◯	◯	◯	◯
Pride	◯	◯	◯	◯	◯	◯
Encouragement	◯	◯	◯	◯	◯	◯
Ubiquitous	◯	◯	◯	◯	◯	◯
Visibility	◯	◯	◯	◯	◯	◯
Unrestrictedly	◯	◯	◯	◯	◯	◯
Friendly	◯	◯	◯	◯	◯	◯
Interactive	◯	◯	◯	◯	◯	◯
Welcoming	◯	◯	◯	◯	◯	◯
Communal	◯	◯	◯	◯	◯	◯
Mix / Mixture	◯	◯	◯	◯	◯	◯

Do you want to add new criteria to the list ? and Why ?
(Please Specify)

*** 16. How do you rate the level of importance of the following criteria of Sociability category ?**

(rank with 1 being the most important , and 12 being the least important)

- Diversity
- Stewardship
- Pride
- Encouragement
- Ubiquitous
- Visibility
- Unrestrictedly
- Friendly
- Interactive
- Welcoming
- Communal
- Mix / Mixture

APPENDIX E

DELPHI TECHNIQUE QUESTIONNAIRE (ROUND TWO)

Successful public space (Round 2)

Feedback and Revision from Round 1.

Dear expert,

First of all, I would like to thank you for your valuable contribution in Round 1 of this study and I would be grateful if you could participate in the second Round which contains the feedback and suggestions from the experts regarding Round 1. In Round 2 , there will be a review for the categories and criteria that obtained an acceptable rating during the Round 1, in addition to assess the new criteria that were given by the experts during the Round 1.

Once again thank you for your valuable participation with my great appreciation for your time and effort.

* **1. Please write your full name:**

Next

Successful public space (Round 2)

Proposal Framwork of Successful Public Space

This section illustrates the weight of existing categories of the proposed framework for successful public space from Round 1.

1- Identity & Image (1.93)
2- Sociability (1.73)
3- Well-being (1.68)
4- Use and Activities (1.27)

Prev Next

Successful public space (Round 2)

Use and Activities category

This section aims to review the selected and recommended criteria of Use and Activities category.
These criteria are as follow:

Use and Activities category

Categories	Criteria	Description	Applicability (Relationship with urban context)
Use & Activities	Active (Dynamically)	The more activities that are going in a place, the more people have an opportunity to participate in.	physical activity (Local Business Ownership)
	Vitality	A place that is well used in relation to its predominant function(s). the most appropriate mix of use	Land-use patterns
	Usefully	Well-planned public space has a positive impact on the rent level of nearby properties	Rent Level
	Integration	How activities can come together form a unified space	Mix use
	Functionally	a place that functions well at all times	Rating public life Mix use of land

*** 2. The following criteria are recommended to be *(REMOVED)* from the list of Use and Activities category**

	AGREE (Remove this criteria)	**Disagree** (Keep this Criteria)
active (Dynamically)	○	○
Usefully	○	○
Integration	○	○

New Criteria

Categories	Criteria	Description	Applicability (Relationship with urban context)
Use & Activities	Flexibility	in terms of physical arrangements which can promote the use of the space to accommodate different types of activities	Physical layout

*** 3. The following criteria are recommended to be *(ADDED)* to the list of Use and Activities category**

	Agree (add this criteria)	**Disagree** (Remove this criteria)
Flexibility	○	○

4. IF you are AGREE to add (Flexibility) to the list , Please can you rate the level of importance of the following criteria of use and activities category ?
(rank with 1 being the most important , and 5 being the least important)

- ⠿ [ ] active (Dynamically)
- ⠿ [ ] Vitality
- ⠿ [ ] Usefully
- ⠿ [ ] Integration
- ⠿ [ ] Functionality
- ⠿ [ ] Flexibility

Successful public space (Round 2)

Identity and Image category

This section aims to review the selected and recommended criteria of Identity and Image category.
These criteria are as follow:

Identity and Image category

Categories	Criteria	Description	Applicability (Relationship with urban context)
Identity & Image	Liveability	Liveable place reduce crime assault	Crime Statistics
	Safety	somewhere that feels safe from harm	
	Walkability	A measure of how friendly is an area for walking	
	Sittablilty	Place provide people opportunity to stop and sit	Physical Layout (Furniture)
	Hygiene	Place is clean and free of litters (Waste Receptacles)	
	Aesthetics	Study of art and beauty of place	Local culture or history
	Reflectively	Showing the history image of the place	
	Attractively	The way environment info can attract and gather people in the place	Environment Data
	Historically	Archived data of environment can give clear image about the place	

*** 5. The following criteria are recommended to be *(REMOVED)* from the list of Identity and Image category**

	Agree (Remove this criteria)	**Disagree** (Keep this criteria)
Liveability	○	○
Walkability	○	○
Reflactivility	○	○
Attractively	○	○
Historic	○	○

Prev Next

Successful public space (Round 2)

Access and Connectivity category

This section aims to review the selected and recommended criteria of Access and Connectivity category.
These criteria are as follow:

Access and Connectivity category

Categories	Criteria	Description	Applicability (Relationship with urban context)
Access & connectivity	Continuity	continuing data processed for the purpose of the conveyance of a communication on an electronic communications network	Traffic Data
	Visibility	How can people get the information easily	
	Proximity	How accurate timing foreground information regarding traffic	
	Connectivity	How well different places are connected to each other using the transport system. If trains, buses and highways work more efficiently then the level of connectivity improves	Transportation Info (Mode Splits)
	Readability	The readability of transportation schedule	Transit Usage
	Walkability	Activities in the street enhance people to enjoy their walking	Pedestrian Activity
	Convenient	Type of activities that suit people needs in the place	
	Accessibility	Providing different types of parking and how can a place be reach by users. A place that is easy to get to and move through	Parking Usage Patterns

*** 6. The following criteria are recommended to be (REMOVED) from the list of Acess and Connectivity category**

	Agree (Remove this criteria)	**Disagree** (Keep this criteria)
Walkability	○	○

Other (please specify)

Prev Next

Successful public space (Round 2)

Well-being category

This section aims to review the selected and recommended criteria of Well-being category.
These criteria are as follow:

Well-being Category

Categories	Criteria	Description	Applicability (Relationship with urban context)
Well-being	Calm	Feeling less worry increase to be part of social activities in the place	Social interaction And human capital
	Chill	Somewhere to chill and have opportunity for social contact	
	Accessibility	Getting access to art, cultural and leisure amenities promote happiness.	
	Safety	Feeling safe and walking around the place day and night and feeling socially connected with the community	
	Peaceful	Peaceful experience of the activities for elderly people	Physical outdoor activities
	Relax	Evaluate the satisfaction of physical exercise in the place	
	Green	Greener urban area displays more positive indicators of mental health which associated with the physical activity level that will increase sense of belonging	Community belonging
	functionality	The impact of art (such as dance, drama, music, visual arts) on mental health	Physical environment

*** 7. The following criteria are recommended to be *(REMOVED)* from the list of Well-being category**

	Agree (Remove this criteria)	**Disagree** (Keep this criteria)
Chill	○	○
Peaceful	○	○

Other (please specify)

New Criteria

Categories	Criteria	Description	Applicability (Relationship with urban context)
Well-being	Comfortability	Microclimate conditions (air flow, pollution, solar radiation) in streets	Urban Canyon

Successful public space (Round 2)

Well-being category

*** 8. The following criteria are recommended to be *(ADDED)* to the list of Well-being category**

	Agree (Add this criteria)	**Disagree** (Remove this criteria)
Comfortability	○	○

Other (please specify)

9. IF you are AGREE to add (Comfort-ability) to the list , Please can you rate the level of importance of the following criteria of Well-being category ?

(rank with 1 being the most important , and 8 being the least important)

- Calm
- Chill
- Peaceful
- Relax
- Accessibility
- Safety
- Green
- Functionality
- Comfortability

Prev Next

Successful public space (Round 2)

Sociability

This section aims to review the selected and recommended criteria of Sociabiltiy category.
These criteria are as follow:

Sociability Category

Categories	Criteria	Description	Applicability (Relationship with urban context)
Sociability	Diversity	The use of place divers of age and different of groups in the place	Number of Women, Children, Eldery
	Stewardship	Providing each group's needs in the place	
	Pride	Getting involve in social activities	Voluntarism
	Encouragement	Motivate people to contribute to knowledge between each other	Sharing knowledge
	Ubiquitous	Getting access to data everywhere in the place	Social Network (Wi-Fi networks)
	visibility	visible to all Wi-Fi enabled devices	
	unrestrictedly	Unlimited use of internet service provider	
	Friendly	Those place that are well used and loved by users	Evening Use
	Interactive	Multi use of the place can gather people and make place liveable	
	Welcoming	place where anyone has a right to be in	Street Life
	Communal	Shared by all members of a community; for common use	Community (Ethnical Origin)
	Mix / Mixture	Mix of different diverse community groups in the place	

*** 10. The following criteria are recommended to be *(REMOVED)* from the list of Sociabiltiy category**

	Agree (Remove this criteria)	**Disagree** (Keep this criteria)
Stewardship	○	○
Encouragement	○	○
Ubiquitous	○	○
Unrestrictedly	○	○
Mix / Mixture	○	○

Other (please specify)

New Criteria

Categories	Criteria	Description	Applicability (Relationship with urban context)
Sociability	Public engagement	The place which can hold public speaking events and it has excellent visual and physical connection to gather people in the place	Public participation

Successful public space (Round 2)

Sociability

*** 11. The following criteria are recommended to be *(ADDED)* to the list of Sociability category**

	Agree (Add this criteria)	**Disagree** (Remove this criteria)
Public Engagment	○	○

Other (please specify)

12. IF you are AGREE to add (Public Engagement) to the list , Please can you rate the level of importance of the following criteria of Sociability category ?
(rank with 1 being the most important , and 8 being the least important)

- Diversity
- Stewardship
- Pride
- Encouragement
- Ubiquitous
- Visibility
- Unrestrictedly
- Friendly
- Interactive
- Welcoming
- Communal
- Mix / Mixture
- Public Engagement