

Sharing Public Space in an Informally Developed Historic City-
the case of Old Dhaka

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Abstract

Sharing Public Space in an Informally Developed Historic City–the case of Old Dhaka

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Multiple ethnic and religious groups share the limited public space of Old Dhaka for socio-cultural, religious, commercial activities and also for everyday traffic. Shared understanding across religious and cultural groups of the purposes of certain streets, negotiation between users of the street, and tacit agreement on spatial use, describe some of the mechanisms that allow the very intensive use of the street network. Yet this sharing of the public space co-exists with a sense of belonging and spatial focus for Old Dhaka communities. This thesis examines these mechanisms of space sharing firstly by trying to understand how local groups perceive the streets and their degree of involvement in the activities that take place there. Secondly, the details of space self-management are examined in a sample of streets. Thirdly, the roles of informal communications between authorities, landholders and street users were assessed.

Old Dhaka, has almost no shared public spaces except its community streets. Competition for the available space by myriad groups has led to a highly complex spatial and temporal formula for sharing all of the important streets. For

commercial use, the rule of sharing space between formal and informal sectors is highly uniform in practice. This necessary sharing of space explains the remarkable social harmony of this crowded and diverse urban community. This harmony, however, is challenged by the increasing heterogeneity of the community and a tendency to territorialize parts of this shared public space.

Innovative methods for capturing the use of space were necessary in this research and were developed prior to entering the field. Indeed, there are only rare examples in the literature. Existing major behavior recording methods are either too descriptive or abstract and also lack transferability. This thesis developed a method for recording behavior that fulfils a need in existing methods. Unobtrusive observation, key informant interviews, structured questionnaires, and a photographic survey were the major methods of investigation and data collection. This research provides insights on the mechanisms of space sharing as well as the control system, motivations for personal choices and a spatially based sense of belonging.

Key words: Behavior pattern, shared space, urban street, spatial qualities

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Chapter 1: Introduction

1.1 Background

Spatial qualities of urban neighborhoods depend on several tangible and intangible factors where the tangible factors may include buildings, necessary amenities¹, supporting infrastructure and shared public spaces. Intangible factors include social cohesion, satisfaction, sense of security, and belongingness in the community. Shared public space is one of the major tangible factors in the built environment which may integrate people and provide scope to communicate as well as share the intangibles of public life such as thoughts, emotions, and beliefs through verbal and non-verbal interaction. Studies show a powerful and positive impact of shared open space on neighborhood satisfaction (Kearney, 2006). A shared open space can be a street, a park, an open field or a plaza. This type of space provides a great contribution toward strengthening the sense of neighborhood.

According to Rapoport (1975), strengthening the sense of neighborhood in a shared space depends upon certain forms of qualitatively efficient verbal and non-verbal communication. A successful urban public space should have such qualities that would increase the sense of neighborhood to foster effective verbal and non-verbal communication. Only providing an open space does not ensure

¹ Nature and number of amenities may vary depending on the demand of the people in a specific context.

positive outcomes as a successful urban space. Both verbal and non-verbal forms of communication support a sense of cohesion among members of a community or society. Effective communication involves both verbal and non-verbal interactions. Such communications in a spatial setting allow individuals to attribute certain means to territories within those urban spaces. Such communication may be effective if there is broad consensus on the meaning attributable to the space. If this is the case, then the nature and types of territory determine the level of access and interaction between groups, groups and individuals, and between solitary individuals.

Effective communication in a public urban setting depends on several factors, such as homogenous social structure, allowable perceived density, and space quality (Rapoport, 1975; Rapoport, 1980a). Homogeneity in the social group may also lead to more effective non-verbal communication, because there are common understandings of body language, clothing, behavior, and physical cues. Homogeneous social groups also provide mutual mental support, and reduce perceived density and cultural defenses (Rapoport, 1980a). A heterogeneous community shows the opposite of this phenomenon. In a heterogeneous community there could be several territories opposite in nature that are not permeable for the members of other groups (Figure 3.1). The permeability of territory might lead to poor communication between the

members of society. Poor communication can create a sense of high density and crowding, perceived as a negative subjective experience in urban space (Rapoport, 1975). Urban populations are increasingly heterogeneous with the mixture of people of different ethnic background, professional status and lifestyle.

Since effective communication requires homogeneity between members and or appropriate spatial quality, missing one of these could obstruct effective communication. There are some spontaneously developed and high-density cities where streets are left as the only open public spaces. The scarcity of shared open spaces and emerging heterogeneity mean that communities may face obstacles to good interpersonal communication.

In the contemporary world, streets are thought of as means of circulation (both pedestrian and vehicular) only. Evidences in both literature and empirical research show that streets also have the potential of becoming positive open spaces for accommodating effective verbal and non-verbal communications. With this potentiality, streets can also act as one of the major reinforcing factors of achieving a physically active neighborhood through strengthening communication. The scenario of having streets as positive open spaces can be observed in several spontaneously developed urban areas in different areas of

the world. Old Dhaka is one of the examples of this type of urban context where almost no designated open space exists for communal purposes except the streets. The streets of Old Dhaka do not only act as the network for circulation of goods and people but also as community spaces where people perform their everyday social activities. In this case streets serve as places where people usually interact with each other, share their emotions and thoughts and in this way support a community with effective interpersonal communication. The necessity to share the space for both utilitarian and social purposes, because of the severe spatial limits, may in fact support the social purposes.

The failure to provide open spaces in dense residential areas is often seen as a major problem in spontaneously developed urban areas. It is evident that in Old Dhaka streets have the potential of becoming urban public space. The crisis of space and the potential of streets as open space together are in themselves worthy of investigation. For example, how has the necessity for sharing space inspired social interactions and consensus? How people perceive the street as community space, with what conditions and modalities, may help explain the overall sense of cohesion and acceptance of others. Given a complex set of social activities, cultural events and religious events that must be performed outdoors, we could also investigate how such limited space is managed, again informally, by groups that have no formal means to make such decisions. The street system

itself is complex. It is also of considerable interest to understand how people perceive the streets, their uses and hierarchies, as well as their own belongingness in the spatial system of Old Dhaka. Because of the evident success of this spatial model in Old Dhaka, it should not be a mere artefact of development, but rather foundation knowledge for the management of space. The stability of these patterns and the ecology of the street itself need to be understood according to the underlying conditions that support them. In this particular case, it is the social agents, individuals, community and religious groups that are part of this important foundational knowledge. (Carmona, Tiesdell, Heath, & Oc, 2010; Larman & Omer, 2013; Rapoport, 1980b; Rapoport 1982; Shaftoe, 2006; Zacharias, Stathopoulos, & Wu ,2001). This research aims to identify space-behavior patterns in the streets of a spontaneously developed urban area and the mechanisms of those patterns. Old Dhaka is particularly suitable for such a study because of the following particular characteristics:

- The streets are the only community space in Old Dhaka and so must host all activities that do not take place in private space.
- Streets are very heavily used for daily, utilitarian purposes but also for cultural and religious activities.
- There is very little formal organization of the use of the space; rather most of the observed activities have self-organized according to principles that have yet to be understood.

- Co-existence of diverse user groups (age, gender, religion, ethno-cultural background) having different spatial practices and may also express different levels of space preferences and sharing.

1.2 Problem definition

A limited number of studies have been conducted to identify behavior patterns in urban public spaces in different countries with relation to the local environment, but to the knowledge of this author, none has been carried out in Old Dhaka, Bangladesh. Ample research has been conducted on analyzing morphology of buildings and neighborhood, population, physical growth patterns, historical background, residential environment, and street typology (Mowla, 1997., Mowla, 2003., Mowla, 2006., Nilufar, 2000., Nilufar, 2004., Ferdous, 2008., Habib, 2010., Khan, 1982., Islam, 2008), but these previous studies ignored the analysis of behavior in urban streets. Because these are living streets, it is important to know how life invests the identified architectural typologies. The existing architectural research aimed at generalization from a complex reality. While such background is useful, it is rather the other direction that would have been more useful—that is, seeing how specific architectural types have adapted to local conditions. For our purposes, we have treated the spatial network as a two-dimensional structure since activities take place essentially at ground level. But the configuration of the streets in minute detail were thought

to have significant influence on the perceptions on the local communities, the activities that invested those spaces as well as the decisions of religious groups to select those streets for their specific activities. The following section provides more detail on the research problem.

1.2.1 The general problem

Traditional street spaces in Old Dhaka display a variety of spatial and material qualities, purposes, and elicit different perceptions of space. There are, however, very few research findings on how streets of Old Dhaka are used as community space by multiple user groups for multiple socio-cultural activities.

1.2.2 The specific problems

The use of street spaces in Old Dhaka varies with the change of users and time. Occupancy and control of a space by different user groups at different times of the day creates variations of spatial activities, which eventually also change spatial qualities. The mechanisms of temporal changes of functions and the change in spatial qualities are still unexplored for the case of Old Dhaka.

When several groups share a space then there may exist some kinds of negotiation for space use. Studies show that access, control and occupancy of shared spaces often creates conflicts and establishes a negotiation process. For example, a hawker in the street of Dhaka has to negotiate with several other individuals to run his business. The Hawkers' Federation in Dhaka tried to negotiate with the government to get formal permission but at the same time they had to go through informal negotiations with political leaders, gangs and police for the same purpose (Bhoumik, 2005).

Fei (2009, p.2) studied the negotiation of urban space use and found there were *"great social efforts to negotiate the ways in which urban residents lived space was regulated by state institutions and rendered through cultural works"*. Both formal and informal negotiations are necessary for using urban public space. Formality comes from state institutions and informality comes through social practices. Sometimes informal negotiations of space use are helpful in managing urban environment in an efficient way because they may reflect society's own practice and culture. *"Informal urbanism offers alternative ways to negotiate and articulate particular urban practices in finding new urban imagining"* (O'Kelly, 2007, p.104). The informality in negotiating space use thus became an important field to study for professionals and policy makers. Historically Old Dhaka was developed informally where cultural and social rules and regulations were being practiced

in the way space was used and controlled. Negotiations came in the combination of formal and informal modes. Though the proposed study area is under the formal control of Dhaka City Corporation, there exists informality of space control and uses. The coexistence of such space control provided the foundation for exploring the mechanism of sharing space. Fei (2009, p.23) also highlighted an example of mixed negotiation of space use from Beijing where he found, *"...appropriation of public space was acquired via political negotiation and social practices"*. However, the transferability of these findings requires investigations of the Bangladesh case. This research deals with the following specific research problems,

- The knowledge on behavioral pattern in Old Dhaka streets is undocumented.
- There is lack of knowledge on proper method to record and analyze behavior data for street environment without formal demarcations and space allocations.
- The process of negotiation and space sharing in Old Dhaka is undocumented.

1.3 Research questions

This research aims to look for the data on human perception, preference, and spatial qualities of streets in order to address the research problems. Perception

of space is dependent on both human factors and physical factors (Broadbent, 1990). For human factors, perception may vary according to an individual's personality, stage in life, gender, socio-economic status and cultural background (Pugalis, 2009). Human activities are dependent on the nature of the setting in which we live. It has been claimed that a number of homologous oppositions such as, high:low :: light: dark :: male: female should exist in every setting of the universe (Bourdieu, 1979, p.140). Accordingly, there must be differences in use patterns of space from the point of these homologous oppositions such as, gender. Gender is considered a major variable that affects space perception and spatial activity; for example, males and females might be expected to act differently in space. The other major homologous oppositions could be age (young : old), income (high: low), education (educated: uneducated), and so on.

To Broadbent (1990), the physical factors of urban space mean the shape and arrangement of built forms in the urban environment where people live. Krier (1979) proposes that, since urban spaces are bounded geometrically, so to understand that space we must look for the geometric shapes and surrounding elevations. The shape factors of a street space are the width, alignment, and heights of surrounding buildings. Explaining street as urban space, Rapoport (1969) emphasized the quality of any street's connectivity with other streets and spaces instead of width or volume (Figure 2.4, Figure 2.5). Rapoport also

highlighted the relation between street space and socio-cultural activities to understand meaning of space. To identify the co-relations between these variables (physical and socio-cultural) and to solve the research problems it is necessary to answer the following research questions,

- How do multiple user groups (Age, gender, cultural background etc.) share street space at different times of the day?
- What are the changes of behavior pattern when people participate in different socio-cultural activities in street spaces?
- What are the preferred spatial qualities of a street that are needed to perceive a street as a community space?
- What are the relations between 'perception, preference, and practice' and the street's physical environment?

1.4 Research Objectives

The proposed research aimed to fulfill the following research objectives,

- To adopt a method and framework to record and analyze behavioral data.
- To identify the mechanism of space sharing and negotiation.
- To identify spatial behavior at different times and spaces.
- To identify people's preference to accept a street as community space.

There are two assumptions that were considered in this research. It was expected that the following possible result would be obtained after analyzing behavioral data. The assumptions were,

- Behavioral pattern in time and space would be different for Gender, age, cultural background and
- Space preference will vary in different types of streets in a neighborhood.

1.5 Organization of the Dissertation

The dissertation of this research has been organized and presented in several chapters (Figure 1.1). Chapter 1 provides introduction, background of the research topic, research questions and objectives. Chapters 2 and 3 focus on general analysis of theory and empirical work on human-environment and behavior. Specifically Chapter 2 defines urban spaces, and methods of studying urban spaces. Chapter 3 defines the psychology of urban spaces where biological and cultural factors of spatial behavior are explained. In this chapter a special emphasis has been placed on the working principles of communication in environment. Different models of interpersonal communication are also illustrated. Socio-cultural aspects of urban spaces are described in Chapter 4. Cultural background and its impact on the production of urban space and the

people-environment relationship are the points of discussion in this chapter. Process of clustering, negotiation, and sharing of urban public spaces are also explained in this chapter. Chapter 5 and 6 focused on the study area for this research. In chapter 5, Old Dhaka's morphology of community spaces is illustrated. A brief history of Dhaka city's development is also provided at the beginning of the chapter. Old Dhaka's environment has been investigated qualitatively and presented in Chapter 6. In this chapter temporal changes of users and associated activities in streets are documented and analyzed. Streets have been compared using Maslow's hierarchy of basic needs and it is explained how streets are being used as social space for religious and other socio-cultural activities. The controls of space and impact on space use are also an important part in this chapter. Methods of recording behavior in public space have been analyzed in Chapter 7. After comparing the available methods the potentialities and weakness have been identified. A working method of recording behavior has been developed and presented at the end of the Chapter 7. In Chapter 8 the developed method for recording behavior is applied in a space-use identification research. The research result suggested further development for the method to use in future research. Chapter 9 explains the research design and methodology with the application of the developed behavior recording method. Finalized method and framework for data analysis are also explained in this chapter. Analysis and result have been presented in Chapter 10. Conclusion and future direction of research are provided in Chapter 11.

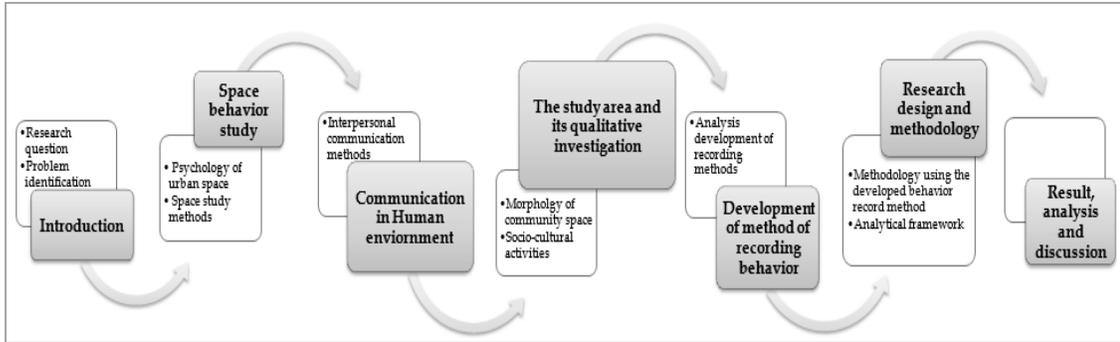


Figure 1.1 Organization of dissertation and flow of research

1.6 Limitation of the Research

Two administrative areas were selected for the case study. The total number of respondents was 80, where the male-female ratio was not equal (80%-20%).

Several observations were conducted during two months of the survey period.

Limitations of time and male-female ratio were considered as the main

limitations for the research. The research result would be more reliable if more

areas and larger number of respondents was covered in the survey. Due to the

refusal to take part in the questionnaire by female respondents, the number of

female participants is less than for males. Due to time constraints, it was not

possible to make observations for the whole year in order to record socio-cultural

activities happening all the year round. A complete immersion in the setting,

which could have been a more effective way to get more information about socio

cultural practices, was also not possible.

Chapter 2: Human Environment and Behavior in Urban Space

2.1 Introduction

Behavior is culture dependent and it varies as culture is different from place to place. This research deals with spatial behavior in community street spaces of old Dhaka. In this chapter the concepts of space, urban spaces, and typology of spaces are discussed. The methods of studying urban spaces are also analyzed in this chapter in order to select and conduct public space study.

2.2 Support for understanding 'space' and 'urban space'

Scholars argue that space is the product of human action, which is usually guided by culture, geo-climatic factors and technology (Rapoport, 1969). It is also believed that spaces may affect and mould human behavior. These opposite directions of cause and effect can be used to divide the methods of spatial analysis into two distinct streams. In one, researchers study the process of forming the urban space and in another stream the researcher emphasizes the end product i.e. physical space. Other secondary but also important categories can be formulated from these two major groups.

Process-oriented theorists such as, Amos Rapoport (1969) argue that culture is the major determinant of any spatial change so it should come first in the discussion. The works of product-oriented thinkers can be arranged into two

groups. One group emphasizes the philosophical understanding of the formation of space. Among scholars in this group, Henri Lefebvre believe that spaces are socially produced and space should be referred to as social space (Lefebvre, 1991). Other scholars, such as Krier (1979) analyzed the space as a product but with a different orientation from Lefebvre. Believers like Krier prefer to emphasize the form, shape and other physical factors primarily and later socio-cultural factors if needed. Other secondary categories can be termed as 'mixed mode' and 'focused mode' of space study and perception. The mixed mode category uses process and product orientated analysis simultaneously. The focused mode studies are highlighting a single factor, or very few specific factor(s) of space.

Regardless of these two opposite ideologies, some of the factors of analyzing space remain common for every theory. The points of interest are, behavioral responses, communication methods, general attributes of geo-climatic factors and so on. The following part of this chapter investigates the methods of studying urban space, their interrelationships and later a comparison between those methods in order to understand their applicability in future research.

2.3 The 'Space' and 'urban public space'

Generally the sense of space is the synonymous of the perception of a specific environment. This depends on attitude, emotion, and personality of persons acts in that particular environment (Golledge and Stimson, 1987). Character of space depends on the nature of built forms in and around that space, people's use pattern, historic and cultural values attached, the contribution of the space for the society, and the capacity to accommodate social functions. Lefebvre (1991) argues that we need to deal with three fields for studying space i.e. physical, mental, and social fields. These fields should be studied together for a complete study of space. The terms in our everyday discourse such as, 'corners' of streets, market 'place', a shopping 'centre' convey a specific meaning of those places and those meanings are common and uniformly recognizable to everybody. Lefebvre (1991) also pointed out that these names are only to distinguish a space from another but not to isolate them. The spaces (with specific names) correspond to particular functions of a society where interactions and communications are ordered in a specific way.

Lefebvre (1991) claimed three fundamental and conceptual dialectics that we must consider for understanding space i.e. i. Spatial Practice, ii. Representations of space, and iii. Representational space. 'Spatial practices' are what is being practiced socially. 'Representations of space' are conceptualized spaces of

professionals such as architects and planners. Their representations depend on the identification of what are lived, perceived and conceived. The third conceptual dialectic is 'Representational space' which is the space of 'users' and 'philosophers'. The philosopher's descriptions and aspires of space provides passive experience of that space (Lefebvre, 1991).

2.4 Typology of 'space'

In the field of built environment, spaces have been classified according to their functions and purposes, their socio-cultural backgrounds and contexts. Absolute space, social space, mental space, physical space, cultural space, abstract space, experiential space, architectural space, urban space, and street space, are some of the major types of space found in contemporary research (Broadbent, 1990; Lefebvre, 1991; Mowla, 2006; Ferdous, 2008; Parkes & Thrift, 1980). By defining *absolute space* we actually look for the process of space formation from completely natural to social use. "*Absolute space was made up of fragments of nature located at sites which were chosen for their intrinsic qualities (cave, mountain top, spring, river)*" (Lefebvre, 1991,p.48). The process of space formation begins with some socio-political involvement; later, architecture selects that absolute (natural) space in nature and transforms it for specific social use. *Abstract space* deals with signs and their formal relationship in a space where those signs convey objective expressions of space. Lefebvre (1991) provided the example of abstract space as a

'mount', which may have phallic aspects and a 'tower', may exude arrogance.

The concept of *social space* got wide acceptance due to the works by Henri Lefebvre, which highlights it (Social space) "*incorporate social actions, the actions of subjects, both individual and collective, who born and who die, who suffer and who act*" (Lefebvre, 1991, p.33).

Ferdous (2008) argues that in a cultural space; the organization of space, time, meaning, and communication are systematically linked to culture. Ferdous also proposes that this space is concerned with people and their relations with environment within a framework of natural and cultural values. In illustrating spatial components of cultural space, the author claimed that 'cultural space' and 'social spaces' are similar in a sense that both highlight behavior, perception, and cultural activities of social members. If we consider that social actions and behavior are guided by culture, then existing definitions specifically 'social space' and 'cultural space' point to a common meaning. Both of them can be explained by analyzing social settings, its user groups, norms and beliefs, and social practices.

2.5. Complexity of studying urban space

Sonnenfeld (1972) claims that our built environment has both human and non-human components. These components are in a complex relation *with social and non-social* components. Humans have been altering the character of nature and thus creating the built environment. Culture, behavior and geographic factors are acting together as major guiding forces for human actions. It is evident that culture is the underlying influencing factor that is continuously promoting human behavior in changing the environment. It is also claimed that environment also impacts human behavior (Shaftoe, 2008; Carmona et al, 2010; Rapoport, 1980b; Baldassare, 1978; Zacharias, 2001). It is important to note that man first changes the natural environment to satisfy his needs and thereafter environment gradually moulds human behavior in turn. The urban environment is perhaps the result of the maximum alteration of natural environment.

Historically, urban public spaces played a vital role in providing a stage for socio-cultural activities.

The dynamic and heterogeneous nature of urban public space ensures that it presents many opportunities simultaneously, including channels for communication, a source for livelihood and trade, a setting for social interaction and an arena for political activism (Pugalis, 2009, p.215).

Referring to Lefebvre (1991), Pugalis (2009) noted that urban spaces are animated theatres where people perform activities of everyday life such as interaction, encounter and movement. With such qualities, urban public space can be considered as a social binder that may increase successful social interactions. For these potentialities of urban public spaces, it is important for the professionals of urban planning to understand how the functions of urban public spaces work. By understanding the mechanisms and characters of spatial activities as behavior and spatial qualities, professionals are expected to do their jobs in urban planning more effectively. Scholars in philosophy, sociology, urban planning, and architecture have investigated the definition and core components of generic space. To most scholars spaces are the outcome of social activities in a society. The following discussion will provide an analytical investigation of space in urban environment and methods of studying urban space.

2.6 Defining 'Space' in urban environment

Urban public space is perhaps the single most important and powerful component that characterizes the environment and contributes strongly to urban development. An urban space is defined as *"a kind of 'hole' in the texture of the city. This is the place to watch and be watched, to practice and to avoid participation safely. It is a focus, a change of pace, a node or a point of emphasis or a breathing space"* (Specter,

1974). Specter's definition can be elaborated with the words of Krier (1979) where Krier added the recreational activities along with sporting and shopping events as the expected functions of urban space.

People have different expectations of urban spaces. For example expectations could be space as meeting place, market place, sacred place and so on. To identify how and in what level an urban space can fulfill the expectation; we must analyze and understand the space properly. Researchers argue for generalizing human desires and expectations from an urban space and according to that they try to define urban space objectively. There are also opposite arguments, i.e. human expectations/desires cannot be generalized objectively as they belong and represent specific cultural activity, which is subject to variation from culture to culture. Differences in cultures obviously hold differences in expectations and preferences. This variation of choice is also the matter of continuous change over time. Time factor inspired another group of scholars who strongly supports to define urban spaces as subjective matter that consciously changes. Scholarly definitions of space provide two major categories i.e. space as process and space as product.

There are contradictions among scholars in perceiving a space either as process or product. Process oriented thinkers posit, "*the appearance of space is tied to social use and identity and the actual processes that bind them together*" (Shuffield, 2002,

p.19). Shuffield also claims that economics, legal control and destruction of space as regulatory processes of space formation that need to be explored. Low (2002) studied urban public spaces in Costa Rica and explained how those spaces are socially constructed. She explained how the changes of economy and political situation changed social condition and public behavior that were eventually expressed in the construction and transformation of those public spaces. Low's study clearly expresses the process of constructing social spaces.

Lefebvre's (1991) definition stands in between process and product mode of spaces. For him space is social product. This "*social space is produced and re-produced in connection with forces of production*" (Lefebvre, 1991, p.72). In this statement, the terms 'production and re-production' are indicating the links with historical changes i.e. process. By analyzing these categories it is noticed that though the definitions of spaces are philosophically different but they deal with some common components such as interactions, society, behavioral responses, enclosure, comfort, and so on. The difference arises with the basic questions, i.e., how the spaces are created in a course of time (for process oriented studies), and what is the nature of space irrespective of its generative process (for product oriented studies)?

2.6.1 The process mode of study

To understand urban space, one should look at the process through which the space was created. The next point would be to understand person to person and person to environment relationships² as a continuous process. It is important to know the nature of people, components of environment and the points where their relationships are connected. The focal point of this argument is the process not the physical components. In this process, form and shape of a space continuously changes over time as its users and geo-climatic factors change (Figure 2.1). If we call it a process oriented approach, then the socio-cultural analysis over time would be the fundamental guideline to understand that process. According to Rapoport (1976) a socio-cultural analysis of human-environment relation should begin with the discussions on the following points, i.e.

- Characteristics of people (ranging from individual person to social groups).
- The effects of built environment on human behavior, mood or wellbeing (the most significant/important aspects which affects most).
- The presence of mutual interaction between people and environment, and the mechanism that links people and environment.

² These relations are described in Chapter 3

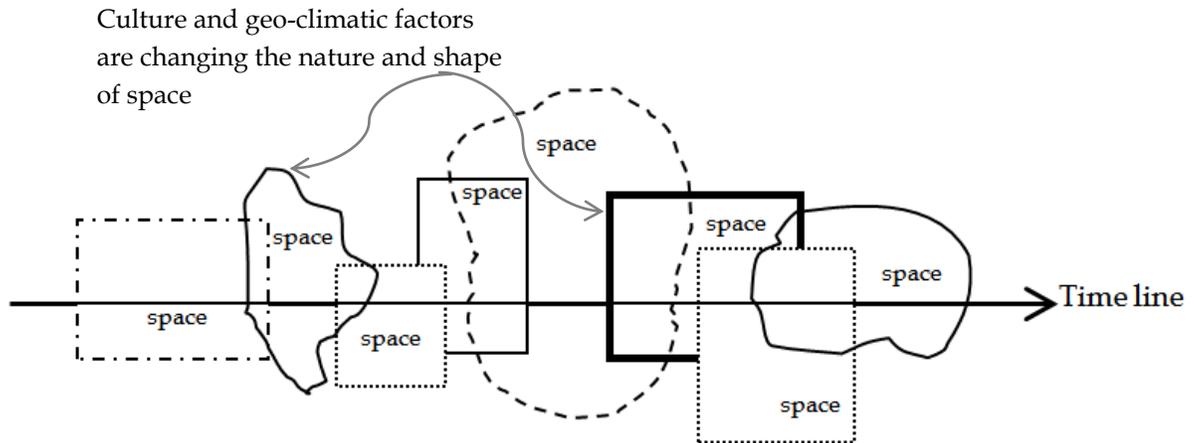


Figure 2.1 The conceptual process of space formation. (Source: Author)

In several research studies Rapoport attempted to establish the importance of human-environment relations and the role of process mode in studying urban space. Rapoport's arguments are also supported by Golledge and Stimson (1987) and Parr (1970). Golledge and Stimson proposed a framework called 'Spatial Interaction and Proximity Based Analysis' to study urban space. They observed two conceptual types of spaces i.e. 'action space' and 'activity space' which do not refer to any physical qualities of spaces. They also discussed the process of interaction between home locations, individual perception of urban environment, various socio-economic attributes and so on (Figure 2.2).

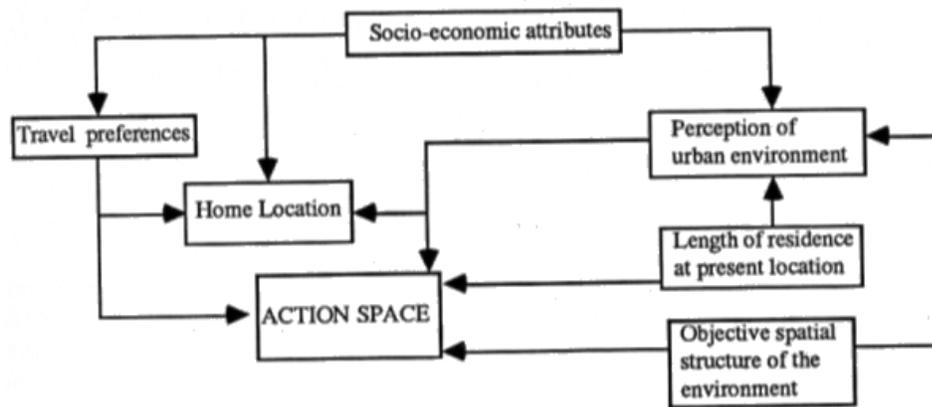


Figure 2.2 The conceptual model of action space

(Source: Golledge and Stimson, 1987)

The supports for process orientation are also found in Parr's (1970) analysis of the magnitude of space-behavior interaction in the urban environment rather than mentioning physical attributes of space. To understand behavior in a spatial context (urban or any other) the form and dimension of space where social interaction occur should be studied (Parr, 1970). Supporting this statement, Parr is also indicating a process where spaces exist conceptually as territory but not in any specific shape. Parr's dimension of space ranges between the spans of two magnitudes, i.e. territory and orbit³ (Figure 2.3). This dimension does not deal with physical attributes (length or width) rather it indicate how frequently the spaces are used which is definitely the author's inclination towards studying the process as the fundamental guideline.

³ 'Territory' is the space that an individual/ as a member of a group holds and defends if needed. On the other hand 'Orbit' has a wider range than territory where individual habitually or occasionally moves. An orbit may have two or more territories (home, office, club etc) (Parr, 1970).

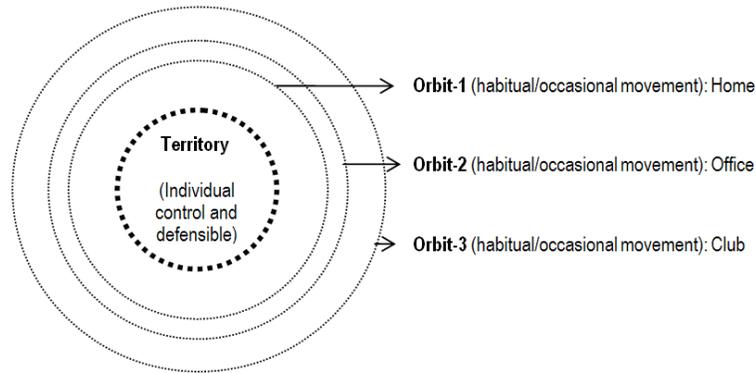


Figure 2.3 Conceptual model: Magnitudes of space-behavior domains

(Source: Author. Adapted from Parr,1970)

2.6.2 The product mode of study

the fundamental point of view of the product-oriented thinkers argue urban spaces should be judged primarily by their shape or scale, where socio-economic factors can be studied later. For example, Krier (1979) claimed, since urban spaces are bounded geometrically so to understand the spatial quality of that space one must look for its geometric shape and the surrounding elevations. To Krier urban space, spatial forms, and their derivatives can be categorised into three basic shapes, i.e. the square, the circle, and the triangle (Figure 2.7). But in Krier's study the process of space formation was not mentioned. The question may arise - for example, was there any reason behind those geometric forms? If the answer is *yes* then there will come another question against grouping urban space according to the geometric forms instead of highlighting the process of

their generation. This is one of the fundamental points of contradiction between process and product oriented thinkers.

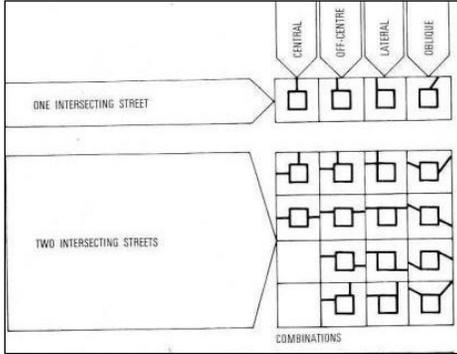


Figure 2.4 Space-street intersection as product oriented thought .(Part of original figure)
(Source: Krier, 1979)



Figure 2.5 Space-street intersection as process oriented thought.
(Source: Rapoport, 1969)

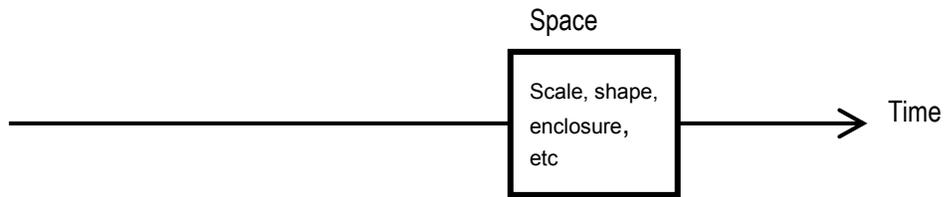


Figure 2.6 The space as product with fixed shape.
Physical attributes are discussed in this model.(Source: Author)

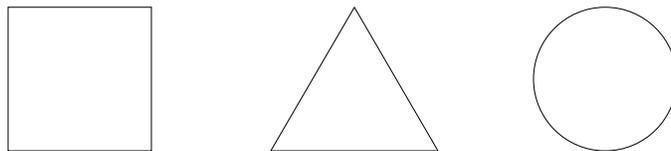


Figure 2.7 The basic shapes of urban spaces
(Source: Krier,1979)

2.6.3 The mixed mode of study

The mixed mode orientation neither individually focuses on the process of space generation nor the physical attributes rather they highlight both of the study modes. One such study was done by Parkes and Thrift (1980)⁴, where they analyzed urban spaces from experience and different scales of perceptions about the environment. In their scales both process and product attributes are discussed. In their examples, the Primitive space definitely focuses on the process of generating space where behavioral factors are concerned. On the contrary 'geographic spaces' deal with the physical attributes of spaces that stand for the product oriented study.

⁴ *"a. Primitive: Primitive space is the space of instinctive behavior devoid of images or concepts. b. Perceptual: Perceptual space has content and meaning as a space of action centring on immediate needs and practices. However perceptual space is not isolated, because we live in a culture-realm of experiences and institutions in inter subjective world. c. Existential: Existential space is lived space; the inner structure of space as it appears to us is our concrete experiences of the world as members of culture group socialised according to a common set of experiences, signs, and symbols. Existential space is never entirely passive but is continuously remade by human activity including architectural and other planning process.*

d. Sacred: Sacred space is continuously differentiated and repeat with symbols, sacred centers and meaningful objects. e. Profane: Such space reflects experiences and intentional links with environment. Profane space is above all homogenous and neutral, "without structure or consistency, amorphous." Such relativity and lack of orientation is virtually equivalent to an experience of space as chaos (Shiner, 1972).f. Geographic: The space which is unique and has its own name is a geographic space. The structure of geographic space has been examined through the images(or mental maps)that people seem to hold. h.Cognitive and abstract: Abstract space however is the space of logical relation and does not need empirical observation. i.Experiential: This is essentially the experiential space and the scheme to be outlined in a moment. But it is now clear that time needs to be seen as an integral part of space and it is to incorporation of time into place that we now turn" (Parkes and Thirft,1980).

Broadbent's (1990) analysis of urban space is a comprehensive example of mixed mode study. Broadbent's proposal is primarily based on Gordon Cullen's 'Scanner'; where all the factors are attached with urban space and grouped into 'Human factors' and 'Physical factors'. Human factor is understood as the total relationship where the conditions of emotional states are well expressed. Physical factor indicates shape, arrangement of components in environment where human live (Broadbent, 1990). The checklists are the combinations of human and physical factors within a framework that represents a product oriented study. Within the framework Broadbent also mentioned two processes (named as 'integration chain' and 'space chain') fitted within the checklists (Figure 2.8 and Figure 2.9). Presence of these chains indicates the importance of process for spatial analysis.

HUMAN FACTORS

| | | | | |
|---------------------|---|---|--|--|
| TENURE | <p>PHYSICAL Use of body in exercise Population drift in old age Preventive medicine in planning</p> <p>HEALTH</p> <p>MENTAL Effects of high density Loneliness symptoms: going to old doctor (b) job (c) church</p> | <p>PERSONAL Money buys the best sites 2 house, 2 car families Wealth sets trend for mass imitation</p> <p>WEALTH</p> <p>REGIONAL Population drift to favoured areas Balanced use of wealth for amenities</p> | <p>WORTH Personal character contributions, as a 'card', etc. Leadership in marginal skills, spare time activity and sport</p> | <p>PHYSICAL Railings Segregation of motor car etc. Security of person and property</p> <p>SECURITY</p> <p>MENTAL Assurance Leasehold Rights of ownership C.P.O.'s</p> |
| WORK/LEISURE | <p>WORK FOUND IN LEISURE Employment for the old .. for housewives .. for the financially independent .. for doors of good works .. during vacations</p> | <p>LEISURE SCALE</p> <p>DAY Lunch clubs Tea breaks TV Pub Entertaining Homework Extra musical studies</p> <p>WEEKEND Spectator activity Sport Theatre, gardening Shopping Gatherings: social political</p> <p>HOLIDAYS First holiday travelling: tourism Second holiday at home: park, communal facilities such as workshops, labs, arena</p> | <p>LEISURE FOUND IN WORK Vocation Dedication Religious orders</p> | |
| ASSOCIATION | <p>PRIMARY</p> <p>CHILDLESS COUPLE Place of one's own Town centre Entertainments Near work Minimum maintenance</p> <p>MARRIED WITH CHILDREN Life-cycle housing Mechanization in home Flexibility of plan Garden Quiet Hygiene</p> | <p>SECONDARY</p> <p>ENTERTAINMENT Pubs and clubs Societies Parade and loitering Town centre Library Home entertainment</p> <p>PLACE OF WORK Working groups Leadership Social clubs Sports</p> <p>EDUCATION Schools as community centres Youth club Walking distance to school Car rota</p> | <p>RELIGION Place of worship Place to preach Needs of various religions (e.g. education, lay activities, rites, calendar events)</p> | |
| INTEGRATION | <p>INTEGRATION CHAIN</p> <p>INDIVIDUAL $\xrightarrow{\text{MAZE FACTOR}}$ FAMILY $\xrightarrow{\text{MAZE FACTOR}}$ COMMUNITY</p> <p><i>opening out</i> $\xrightarrow{\text{MAZE FACTOR}}$ <i>opening in</i></p> <p>The Key $\xrightarrow{\text{MAZE FACTOR}}$ House boundary $\xrightarrow{\text{MAZE FACTOR}}$ Identity of place Solitude $\xrightarrow{\text{MAZE FACTOR}}$ family $\xrightarrow{\text{MAZE FACTOR}}$ Church Retreat $\xrightarrow{\text{MAZE FACTOR}}$ family lunch $\xrightarrow{\text{MAZE FACTOR}}$ Shopping Withdrawal $\xrightarrow{\text{MAZE FACTOR}}$ Pubs $\xrightarrow{\text{MAZE FACTOR}}$ Sundry groups $\xrightarrow{\text{MAZE FACTOR}}$ Tenant groups $\xrightarrow{\text{MAZE FACTOR}}$ Village, town</p> | | | |
| ZESTS | <p>OUT THERE Adventure playgrounds Speed, danger, climbing, sailing, walking, pot boiling</p> <p>CONFORMING</p> <p>GROUP OR TEAM Dancing, choir music, games</p> <p>THE SENSES Sex Food and drink Arts Human spirit Search for meaning</p> | <p>OUT THERE Rebellion Nomsads and tramps Hooligans</p> <p>NON - CONFORMING</p> <p>GROUP OR TEAM Gangs Vandalis</p> | <p>BETWEEN AGES Graduated retirement Total flow to common ground between age groups Life cycle housing</p> <p>BETWEEN INCOMES Mixed housing Common ground through marginal skills, spare time activity and sport</p> | <p>THE SENSES Privation Drunkennes Pain pills Car-ability</p> |

Figure 2.8 Human factors of Urban space showing Integration chain.

(Source: Broadbent, 1990,p.220)

PHYSICAL FACTORS

| | | | | | |
|--------------------------|--|---|--|--|--|
| COMMUNITY | SIZE Order of climatic sizes based on: Time cycle (e.g. weekly sufficiency) Growth of amenities Transport capacity | COMPOSITION Balance of imbalance of: Ages Occupation Wealth | LOCATION The art of siting Catchment area Dominant or dependent Economic viability Communications | REGION Regional characteristics Seasonal fluctuations | GROWTH Projected growth Change of composition Self-feeding community |
| PATTERN | DENSITY LOW Peace, tranquility, space, health, low land use, random building, high cost of land, difficult for industrialized building, cash sale of houses, limited traffic, segregation MEDIUM Degree of privacy and space, medium land use, possibility of public transport, suitable for industrialized building, mortgage, horizontal segregation (Hedburn etc.) HIGH Maximum need for amenity space, optimum land use, high cost of land, public cohesion, public transport, optimum industrialized building, council rent, vertical traffic segregation | TRANSPORT TRAFFIC TO PEOPLE Transport flow; motorway, clearway, amenity of traffic PEOPLE TO TRAFFIC Peace of mind Environment Communing Ease of contact or segregation | BY-LAWS Daylighting Road widths Sight angles Fire access | TRENDS Snob designs and colours Pop-art Layouts and gimmicks | INDUSTRIALIZED BUILDING Crane swing Unit weight Factory siting Production flow |
| LANDSCAPE | CATEGORIES Wild nature National park Uplands Coastline, estuary Available land Industrial land Parkland Green Belt | CLIMATE Prevailing wind Local climate Artificial climate Population drift | NATURE Wild life Nature reserves Ecology Air pollution Industrial waste | AGRICULTURE & INDUSTRY New patterns of farming Factory farming Clean industry Automation Power/service grids | |
| OPTICS | SPACE CHAIN INTERNAL → MAZE FACTOR → EXTERNAL (BUILT) → MAZE FACTOR → EXTERNAL (NATURAL) INTERNAL: A room, Sequence of rooms, Flow of spaces, Connection: stairs, ramps EXTERNAL (BUILT): Courtyard, Street, Square, Plaza, Formal garden EXTERNAL (NATURAL): Avenue, Lake, Hills and sea, Horizon and sky, Panorama | AMBIENCE City Market town Suburb Quarter Village Genius loci | LIGHT Cubism Geometry Silhouette Texture Colour Artificial light Direction Power of light | PERSPECTIVE Effects of foreshortening Division and organization of space Intrusion and exclusion by height The visual globe | SERIAL VISION Seeing in movement Development Joining and separating Growth of apparent size |
| IDENTITY OF PLACE | SITE SYMPATHY OBJECTS Character of building Historical appraisal Vitality Significant position NATURE Levels Sky Water Trees and plants | COMBINATION HOMOGENEITY Conformity Manners Hierarchy Enclosure FOILS Scale Style Surprise Follies | | | |

Figure 2.9 Physical factors of Urban space showing Integration chain.

(Source: Broadbent, 1990,p.220)

2.6.4. Focused mode of study

In recent decades researchers in the field of human geography studied different sensory factors (heat, smell, noise, wind flow etc.) in urban environments (Figure 2.10, Figure 2.11 and Figure 2.12). Figure 2.10 shows the structure of a focused mode of study where individual researcher focuses are studied in spatial context. Analysis with single or very few variables like these can be categorized as a focused mode of study. These sensory factors are subjective and person-dependent and have strong influence on human behavior. Researchers are focusing on how and in what extent those sensibles affect human behavior in urban space. (Zacharias et al, 2001; Nikolopoulou, Baker and Steemers, 2001; Studer, 1970).

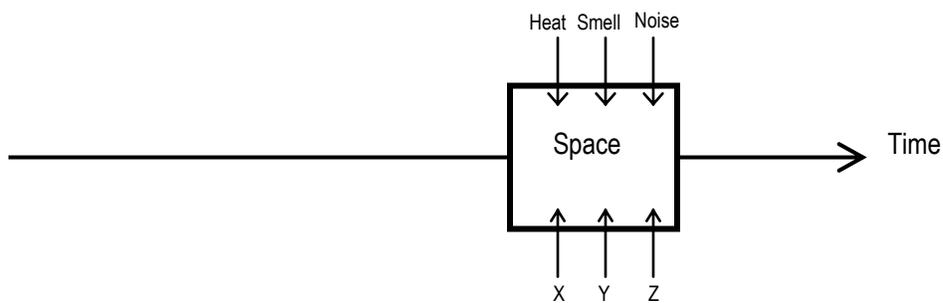


Figure 2.10 Conceptual model of Focused study of urban space

(Source: Author)

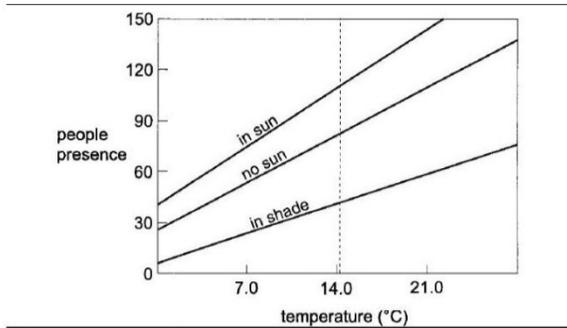


Figure 2.11 People presence in relation to sun and temperature.

(Source: Zacharias et al., 2001)

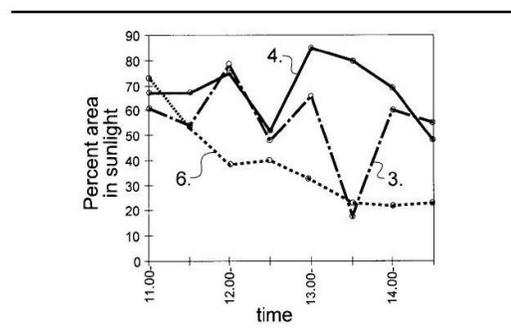


Figure 2.12 People presence in relation to sunlight at different time of the day.

(Source: Zacharias et al., 2001)

As an example of this type of study, Figure 2.11 and Figure 2.12 indicate people's preference within certain ranges of temperature and also presence/absence of sun in space. Studies in both Zacharias et al (2001) and Nikolopoulou et al (2001) found presence of people increases with the increase of temperature. These studies were focused specifically on temperature change and people's presence in public space where social, economic and cultural factors were not considered. This mode of study neither goes for process nor product oriented analysis. For example if they would have studied the relation between the rise of temperature and peoples movement pattern from sunny place to a shade or escape from the space then it may exhibit some sort of process analysis.

2.6.5. Complexity with process/product factor to study urban space

"Space is neither a subject nor an object but rather a social reality - That is to say a set of relations and forms" (Lefebvre,1991, p.116). As such, the primary focus of our general understanding of space should be the interrelation between the people in

a given environment and observe how behavior and environment (both natural and built) connect, communicate and mutually affect each other. In the urban realm, there exist different kinds of urban public spaces such as, plaza, street space, and bazaar that we undoubtedly call social space. Standing apart from the arguments of process/ product, and subject/ object dilemma, it is also possible that urban spaces can be understood by analyzing the space perceptions of users, physical characteristics of that geographical area, connectivity with other spaces, and memories attached with that space (Mowla, 2006). Shortridge (1997) identified six critical elements of great urban spaces and claimed that by applying these elements in analysis it is possible to understand an urban space. The critical elements are *character, ownership, authenticity, accommodation, nature, social and private space*. He divided urban space into six elementary components for an easy, clear and deeper understanding. Those elements may be assessed systematically by looking on how people interact in environment and how certain environmental components impact behavior.

In previous research space and time variables have been studied but less emphasis has been given on the communication and interactions between person and environment in a spatial context. It is claimed that the mode of communication between the components of environment should get the higher

priority in the study of urban space. The transactional⁵ method is one of the approaches for communication between human and environment (Aitken and Bjorkund, 1988). The process of communication analysis indicates how environmental components send and receive information from each other. The basic environmental components are people and thing and the possible maximum ways/combination of communication would be i. people and people, ii. people and thing, and iii. thing and thing (Rapoport, 1989).

Coming back to Lefebvre's (1991) concept; '*space as social reality.... as set of relations and forms*' and analysing other scholar's arguments about interacting and communicating in space we can conclude that two major kinds of relations can be found in urban space. The relations are *i. people to people and ii. people to space relations*. People to people relation describe behavior as social actions i.e. how people interact with each other. On the other hand, people to space relation studies the impact of spatial factors (physical and socio-cultural) on interaction in an urban space. Chapter 3 is focused on identifying the patterns of relations and communication between environmental components (human and other objects) in order to understand spatial qualities and preferences in urban public space.

⁵"Transactional approaches begin with an event or phenomenon- a confluence of spatial qualities, temporal features, and psychological processes. The principal focus of this perspective is the event, and concomitant changing relationships or transformations among aspects of the whole. Unlike things, which are static and discrete, events are selections from a continuous process within a particular context"(Aitken and Bjorklund, 1988).

Chapter 3: Meaning and communications in environment

3.1 Introduction

Public space frequently refers to an area that fulfills the needs of several social functions such as, meeting and conversing, resting, and trading. The potential of public space to meet psychological needs along with the physiological ones has been examined by Shaftoe (2008). The argument of the importance of both physiological and psychological potentialities of public space is also supported by the 'Hierarchy of Needs' proposed by Maslow (Figure 4.6 and Figure 4.7) (Childs, 2006). In this chapter the psychological aspect of environment and ways of communication between a. environment - people, and b. people-people are discussed.

3.2 The psychology of public space

Physical quality of space could influence human behavior directly or indirectly (Shaftoe, 2006; Carmona, Tiesdell, Heath, & Oc, 2010; & Rapoport, 1980b).

Whether the influence of space is direct or indirect, a change in the psychological or perceptual state is obvious. There is a need for a person to have perception of space to link himself/herself to become an integrated part of that space. To analyze the mechanism of perception, we have to look for how people respond to certain factors of space and how they make adjustments in themselves or with the environment. There are fundamentals that need to be emphasized for

understanding behavioral influences and space perception (Shaftoe, 2006). The fundamental factors are territoriality, interpersonal distance, distribution, and types of communication and observations.

Baldassare (1978) analyzed spatial behavior and summarized that spatial behavior is guided by three factors such as, biology, culture, and environment. These factors can explain the possible individual factors of space behavior relations. Thus, Shaftoe's (2006) 'territoriality' can be considered as one of the 'biological factors'. Interpersonal distance, distribution, and communication are the components of cultural study. If it is accepted that environmental perception is regulated by both physical and psychological factors then Shaftoe's category becomes incomplete. Baldassare's three factors have been followed as a guideline in the following discussion.

3.3 Biological factors of spatial behavior

When spatial behavior becomes a point of discussion then 'territoriality' appears as one of the important factors. According to the Oxford Dictionary⁶ 'territory' refers to *"an area of land under the jurisdiction of a ruler or state"* and the definition in terms of biological reference is *"an area defended by an animal or group of animals"*

⁶ Source:

<http://www.oxforddictionaries.com/definition/english/territory?q=territory>
(Accessed on 27.10.2013)

against others of the same sex or species". In urban environment human territory is urban space where different interests between groups exist (Shaftoe, 2006). The groups can be ordered according to gender, ethnic background, caste, professional background and so on.

Territoriality regulates social life and in the territory associated with social context can also be termed 'social zones' or 'spatial zones'. Each spatial zone imposes (directly and indirectly) certain conditions and under those conditions "*... people will avoid the use of spatial zones that are occupied by ongoing groups*"(Figure 3.1)(Baldassare, 1978,p.32). Baldassare's review also shows that inclusion of a newcomer could be incompatible with the present group. A geographic area does not always define the boundary for human territory; rather it is a social zone (Bride & Clancy, 1976). For example, a geographically bounded territory would be that area where people have the same profession or caste. *Shakharibazar* in old Dhaka, Bangladesh is that kind of territory where most of the people have the same religion and profession (Ahmed, 2006). Currently "territory" has taken new meaning in electronic space. For example, a social network in electronic media like *Facebook* and *Twitter* allows forming groups in electronic space. In these social networks, members of groups can meet, share thoughts and ideas but not physically in real space. Similarly, as in a territory in

physical space a new comer has to seek permission to join an ongoing group in electronic space.

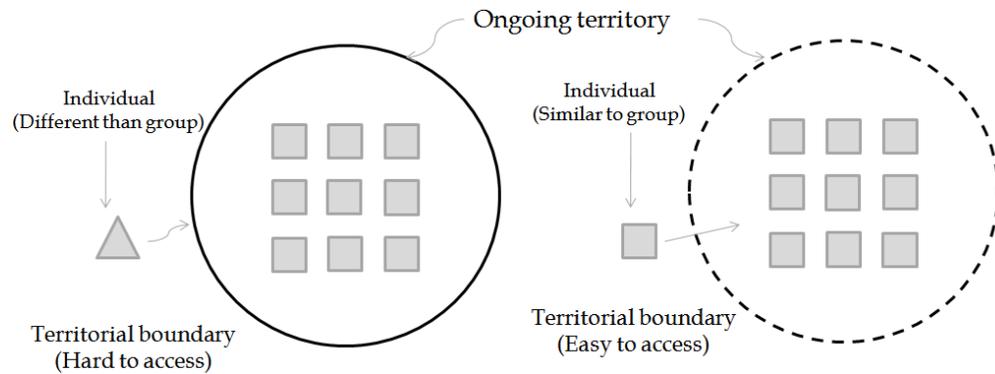


Figure 3.1 Accessibility to on-going territory by individuals in conceptual model.

Source: Author, Adapted from Baldassare (1978)

Territorial property is the primitive social property of place and access to this territory is determined by relationship between the neighbors (McBride & Clancy, 1976, p.162). The concept of territory is applicable for a group as well as for an individual. For an individual, we call it 'personal space'. This personal space is a physical space surrounding a person that he maintains and controls. Nature of personal space determines the 'interpersonal distance' and 'distribution' in urban space, which eventually regulate the formation of social group.

Interpersonal distance is not fixed and hard to measure. The distance between individuals is minimal in a homogenous group. The homogeneity of the group could be based on the same profession, gender, or same culture in broader scale.

Every part of urban space is not the same and thus not preferable for all activities and grouping. According to the nature of preference of individuals or groups, people tend to distribute themselves differently throughout a public space (Shaftoe, 2006). This distribution occurs either on the basis of preference for clustering or avoidance to form a cluster in a particular place. Beside the factor of distribution, the 'sense of ownership' is another important factor that also regulates formation, maintenance, and accessibility of social groups/territory (McBride and Clancy, 1976).

3.4 Cultural factors of spatial behavior

Any activity that is primarily based on culture and spatial behavior is culturally defined (Rapoport, 1987., Baldassare, 1978). Cultural background guides how an individual would perceive the environment and behave accordingly. According to Rapoport (1980b, p.9) the subject matter of culture is "*about a group of people who have a set of values and beliefs which embodies and are transmitted to members of the group through enculturation*". Here Rapoport highlighted 'group of people', 'set of values and beliefs', and 'transmittance' as working functions of a given culture. The first two factors help to explain the concept of territory; interpersonal distance and distribution determine the formation of groups according to a set of values and beliefs. But Rapoport's other important factor of

culture i.e. transmitting the message through sign and symbol is not included in the definition of territory.

People from varying culture usually have different concepts of 'interpersonal distance' and sense of 'density'. Baldassare (1978,p.33) mentioned ... (as cited in Hall, 1966) that, culturally, world population could be divided into two groups considering interpersonal distance as factor of assessment. The groups of population are,

- Contact culture
- Non-contact culture

People within a contact culture prefer/or possess small interpersonal distance, high density, and frequent contact. On the other hand non-contact culture is opposite. Examples from Arab and Latin cultures have been mentioned as contact-cultures with Europeans and North Americans represent non-contact cultures (Baldassare, 1978). This was an example to show how cultural factors impact the group formation, which is a reflection of distinguishable spatial behavior.

There is also another argument that suggests spatial behavior is guided by biological instinct (Baldassare, 1978). Baldassare also postulated that there are

effects of cultural training on spatial choices. For example, a student from an Asian country coming to a North American University generally would face a cultural shock. Gradually cultural training (either formally or informally) guides him/her in adapting to the new culture. This process of adaptation affirms that behavior is also not completely a biological trait.

3.5 Environmental factors of spatial behavior

Physical environment has great impact on spatial choice and behavior. It is believed that physical characteristics of a setting impact attitude and actions (Baldassare, 1978). Environmental factors are subject to change according to choices and time. For example, the philosophy of Bio-climatic Architecture has inspired a large number of professionals and people who prefer their environment more passively controlled. This notion eventually changes the character of their desired environment.

3.6 Environmental perception and Communication

The effect of human and environment is a both way action (Carmona et al., 2010). A person cannot affect or be affected by environment unless he/she understands the message that the environment is transmitting. At the same time a person

must be able to convey messages to others in the environment. By receiving messages from the environment properly a person achieves a complete perception of that environment. Perception is more than just watching, or listening to the environment rather it's a process of understanding the stimuli from environment. There are four approaches to environmental perception (Carmona et al., 2010), cognitive, affective, interpretive, and evaluative. People apply one or more of these approaches for environmental perception.

Biological factors also affect environmental perception, which in turn, guides spatial behavior. Perception is culturally learned and is subject to change over time and context. Identical environmental stimuli could be received, filtered, perceived and reacted to differently by different people. This difference of perception varies according to socio-cultural and environmental factors such as, age, gender, ethnicity, length of residence in an area and physical, social and cultural environment (Carmona et al. 2010).

The understanding of communication between 'person and person' and 'person and environment' is important for environment perception. Perception depends on how people send and receive messages in the environment. In an environment humans are continuously communicating signs and symbols

through their posture, gesture, talking, and with the artefacts they use. These signs and symbols carry specific meanings that are important for environmental perception. The basic difference between 'sign' and 'symbol' is in the numbers of meaning that they are able to convey. Sign is univocal; it is a one to one correspondence and carries only one proper meaning. Symbol is multi-vocal; it is one to many correspondences and have many meanings (Rapoport, 1982,p.46). Rapoport summarized the method of studying environmental meaning in three ways;

- Linguistic model; mainly based on semiotics
- Study of symbols
- Non-verbal communication approach

The semiotic approach deals with 'sign' for extracting meaning from environment. This method is claimed as weak in research application since it shows less importance on pragmatics and syntactic. Rapoport (1982) claims that a symbolic approach is more applicable than semiotics for understanding traditional culture, but there should be condition that symbols need to be expressed clearly and shared properly. In some traditions there are some symbols that are strong in appearance but not well understood and shared by people of other cultures or societies.

Another argument for symbol is stated as 'Symbols are neither 'signs' nor something that represents or stands for something else, rather they are a form of

communication' (Rapoport, 1982, p.47). The groups of 'signs and symbols' and 'verbal and non-verbal' components of culture, contained in a culture, determine what meanings are being transmitted from culture. To understand that culture, one needs to decode those signs and symbols. This demand requires knowledge on how people communicate in environment. Selection of a specific communication approach should be guided by what kind of meaning is needed and possible to extract. In the environment, people communicate verbally, vocally, and non-verbally (Rapoport, 1982). In verbal and non-verbal way, perception occurs generally through auditory and tactile senses respectively.

"Non-verbal communication can be thought of broadly as all forms of direct communication not exclusively relying on the use of words, written, or spoken"(Hargie and Dickson, 2003,p.43). Non-verbal communication occurs in two ways as outlined in Figure 3.2.

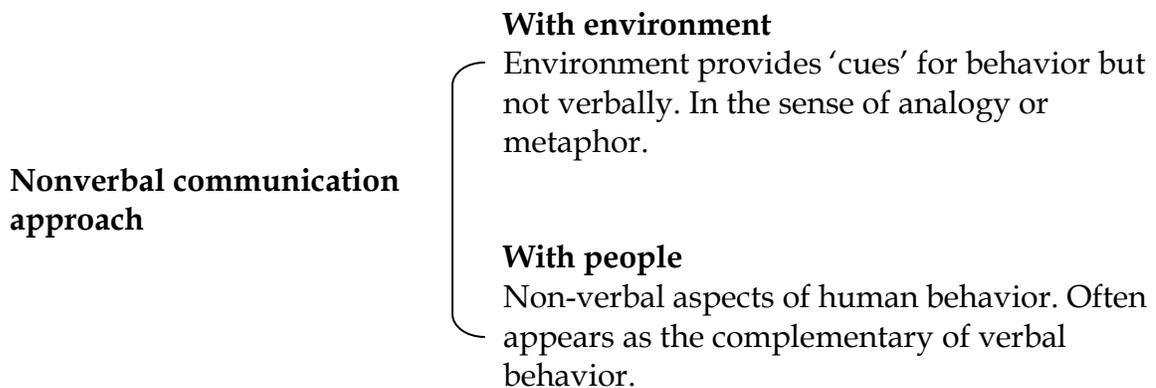


Figure 3.2 Nonverbal communication approach
(Source: Author. Adapted from Rapoport, 1982)

3.6.1 Importance of Nonverbal Communication approach in behavior study

To highlight the importance of nonverbal communication, Hargie and Dickson (2003,p.45) presented a scenario followed by questions. They questioned what would happen in the scenario: an individual expresses (verbally), information that is not matched with the cues (such as body language); on which message should we rely, verbal or nonverbal? The authors provided help with their research result to come up with the answer. In daily life overall human conversation occurs in three channels of message setting; body language, paralanguage (non-verbal aspects of speech), and verbal. The proportions of overall message transmitted through these channels are, 55% from body language, 38% from paralanguage, and 7% from verbal message. Thus humans cannot rely solely on verbal messages instead of nonverbal messages. As a result, non-verbal messages must be considered with importance for communication (Hargie and Dickson, 2003).

In addition to the research cited above there are some basic points through which researchers highlighted the importance of nonverbal communication over verbal communication. Therefore, non-verbal communication may be used to

1. Replace verbal communication in situation where it may be impossible or inappropriate to talk.
2. Complement verbal communication.
3. Modify spoken word.

4. Contradict, either intentionally or unintentionally, what is said.
5. Regulate conversation by helping to mark speech turns.
6. Express emotions and interpersonal attitude.
7. Negotiate relationships in respect of, for instant, dominance, control and liking.
8. Convey personal and social identity through such features as dress and adornments.
9. Contextualize interaction by a particular setting.

(Hargie and Dickson, 2003,p.49).

The major types of nonverbal communication are Kinesics, Proxemics, Haptics, Vocalic, Physical characters, and environmental factors (Hargie and Dickson, 2003).Rapoport (1982) emphasized more on environmental factors creating a proper nonverbal communication.

3.6.2 Nonverbal communication with environment

In non-verbal communication cues from Environment can be understood by reading three elements (Rapoport, 1982). The elements are,

- Fixed feature elements
- Semi fixed feature elements
- Non-fixed feature elements

Fixed feature elements are generally permanent and that seldom changes over time. These are also regulated by code and have less scope for personalization. Figure 3.3 shows a building façade around an urban plaza in Montreal. The building itself is a part of the enclosure for the plaza. The images of different artists displayed on façade are transmitting specific messages to people who are attending the festival. Those displays are non-fixed feature elements. Semi fixed feature elements covers almost everything that are in touch with fixed feature elements such as furniture, screens, a temporary shed in space and so on. Rapoport (1982, p.90) hypothesizes that it is difficult to extract meaning from fixed feature elements alone. We need to study semi-fixed and non-fixed feature elements complementarily to infer behavior.



Figure 3.3 Image display on building façade, Place des Arts, Montreal

(Source: Author)

Non-fixed feature elements are related to expressions of body gesture (*Kinesics*)⁷ and relative positions (*Proxemics*) in a given setting. It is claimed that there might be a gap between the information regarding spatial behavior that obtained from non-fixed feature elements (Rapoport, 1982). For example, a person may show anger or discomfort in an environmental setting but that may not be the effect of that environment. The anger/discomfort might have different cause that is out of that setting. At this situation Rapoport again proposes to combine three of these elements (fixed, semi-fixed, and non-fixed) in studying spatial behavior in order to get authentic message. Figure 3.4 is showing gathering around a fireplace in an urban plaza, Place des Arts, Montreal during festival. The fireplace, wood logs, as seating is semi-fixed feature elements of environment. Two kinds of message can be extracted for the photographs. The smaller size of seating is indicating that the expected groups would be of 2-3 persons. The unfinished tree logs around a fire are giving a sense of campfire as if in a natural environment. These messages are coming in non-verbal way for semi-fixed feature elements. One can extract interpret more message from the same photograph according to his own experience and knowledge.

⁷ Please see the details of Proxemics and Kinesics in Chapter 7



Figure 3.4 Non-Verbal communication in urban plaza.

People are sitting around a fire place. (Place des Arts), Montreal

Source: Author



Figure 3.5 Verbal communication in urban plaza.

People are sitting in front of story tellers stage.(Place des Arts), Montreal

Source: Author

3.6.3 Communications- Interpersonal and Group: A mix of verbal and nonverbal approach

“Interpersonal communication is a process by which information, meaning, and feelings are shared by persons through the exchange of verbal and non verbal message” (Hargie and Dickson, 2003,p.12). This process exclusively concerns person(s) to person(s) communication. Interpersonal communication also occurs in groups. Groups or clusters are formed when there is a common point of interest between the members. Points of interest could be intensified with the similarity of age, gender, ethnic background, family, clan, and so on. Although each group is assumed to have some kind of common interest, it should be noted that personal interest could be different since each person in the group is different. If we

consider that individual personality is different, then the question is how that individuality is maintained in the group. Hargie and Dickson (2003, p.408) highlighted the factors of 'structure' and 'process' by which order in a group is maintained. Norms, roles, and status as factors of structure and conformation and cohesion as factors of process generally act together to influence the maintenance of order in-group. In figure 3.5 a cluster is formed temporarily in front of a storyteller's stage in an urban plaza (Place des Arts, Montreal). Norms and roles are acting behind the formation of such group. Only the people who are sitting there believe that listening to the story in this environment is a part of social life. The listeners who are in sitting position belong to an ongoing territory.

3.6.4 Components of communication with person and environment

The methods of studying meanings from environment i.e. communication methods may have different ideology but have some common components.

Rapoport (1982), Hargie and Dickson (2003) simplified the essential components of communication that are compared in Table 3.1. Two of the lists contain the basic stages of communication, which have some matched and unmatched points (Table 3.1). Rapoport's list is proposed for communication between man and physical environment; on the other hand Hargie and Dickson's list is proposed for interpersonal communication. In interpersonal communication there exist no

individual sender or decoder (except linear communication) rather all participants in the communication are sender and decoder simultaneously.

| Essential components for communication, Man-built environment (Rapoport, 1982,p.52) | Common components of communication, Interpersonal (Owen and David's(2003,p.14)) |
|---|---|
| 1. "a sender } 2. a decoder } 3. a channel 4. a message form 5. a cultural code (the form of encoding) | 1. "Communicators 2. Message 3. Medium 4. Channel 5. Code |
| 6. a topic- the social situation of the sender, intended receiver, place, the intended meaning 7. The context or scene, which is part of what is being communicated. " | 6. Noise 7. Feedback" |

Table 3.1 Comparison of common components of communication in environment.

(Source: Author. Adapted from Rapoport (1982, p.52), and Hargie and Dickson (2003,p.14)

Feedback is not essential for communicating with built environment but important for interpersonal communication. The 'message' is similar for both of

the processes that are able to encode, transmit, and decode. A 'channel' connects 'sender-receiver' or 'communicators' and establishes a medium. Through mediums, a message is transferred where the mediums could be voice, face, books, paintings, TV and so on. 'Codes' are the system of meanings shared by groups. Noise is any kind of interference between communicators not necessarily should be sound only (Hargie and Dickson, 2003). Based on these factors researchers have developed three models of communication.

3.7 Models of interpersonal communication

In interpersonal communication the main component is the 'human' who shares messages in the forms of sign, symbol, and meaning through verbal and non-verbal communication. In interpersonal communication "*we create meaning as we figure out what each other words and behavior stands for*" (Ramaraju, 2012, p.70).

Communication can occur in one-to-one and in-group settings. Interpersonal communication can be defined into three basic models (Baldassare, 1978). The models are,

- Linear.
- Interactive.
- Transactional.

Linear model: A linear model is a one-way communication process where speaker/sender and listener/receiver hold two ends on the process. It is a linear one-way process where sender speaks or sends information through media and the receiver receives and decodes that information (Figure 3.6). Between these sender and receiver sometimes noise interferes with receiving a message. This model has been criticized as it lacks the scopes of providing feedback after reading the messages from receivers such as, receivers body language could not be even studied. In this model sender is active and receiver is passive whereas in real communication both are active.

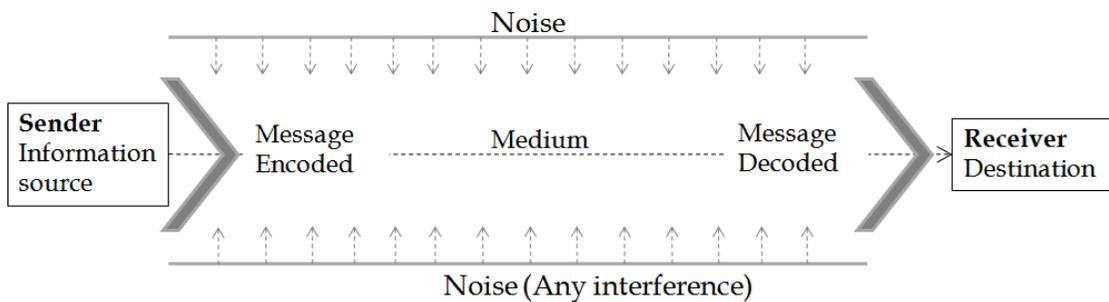


Figure 3.6 Linear interpersonal communication model

(Source: Author. Adapted from Rapoport, 1982)., and Hargie and Dickson, 2003)

Interactive model: In this model the receiver provides feedback to the received message. Sending a message and receiving feedback define this process as interactive. By including feedback, the interactive model overcomes some of the

limitations of a linear model. This model works better in that proper message transmitting and decoding work effectively when the fields of interests of sender and receiver overlap (Figure 3. 7). A larger common field of experience means better communication.

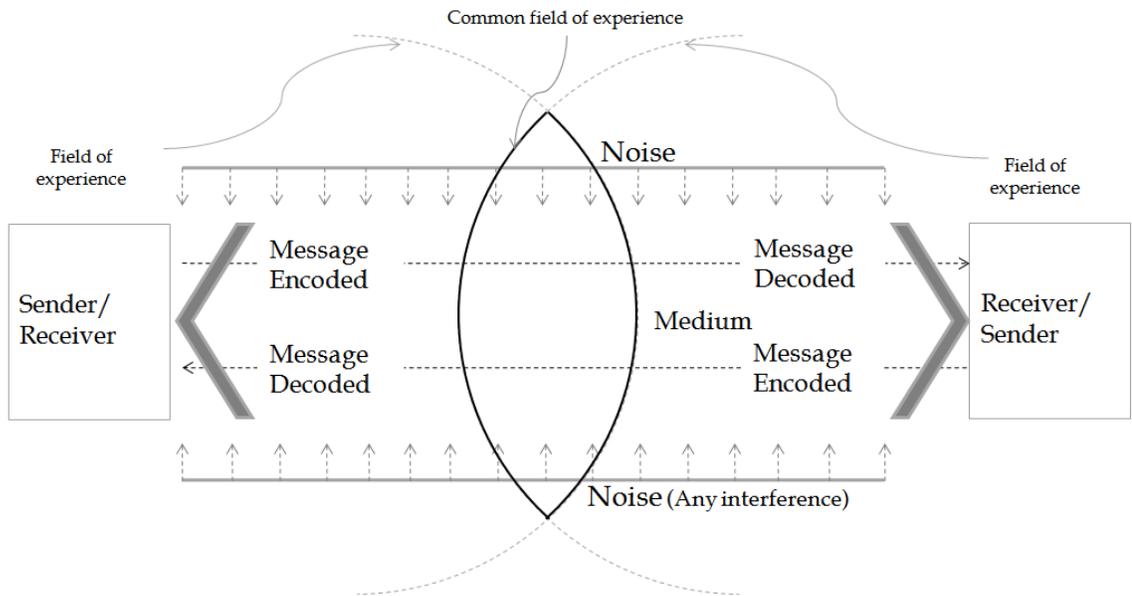


Figure 3.7 Interactive interpersonal communication model

(Source: Author; Adapted from Rapoport, 1982)., and Hargie and Dickson, 2003)

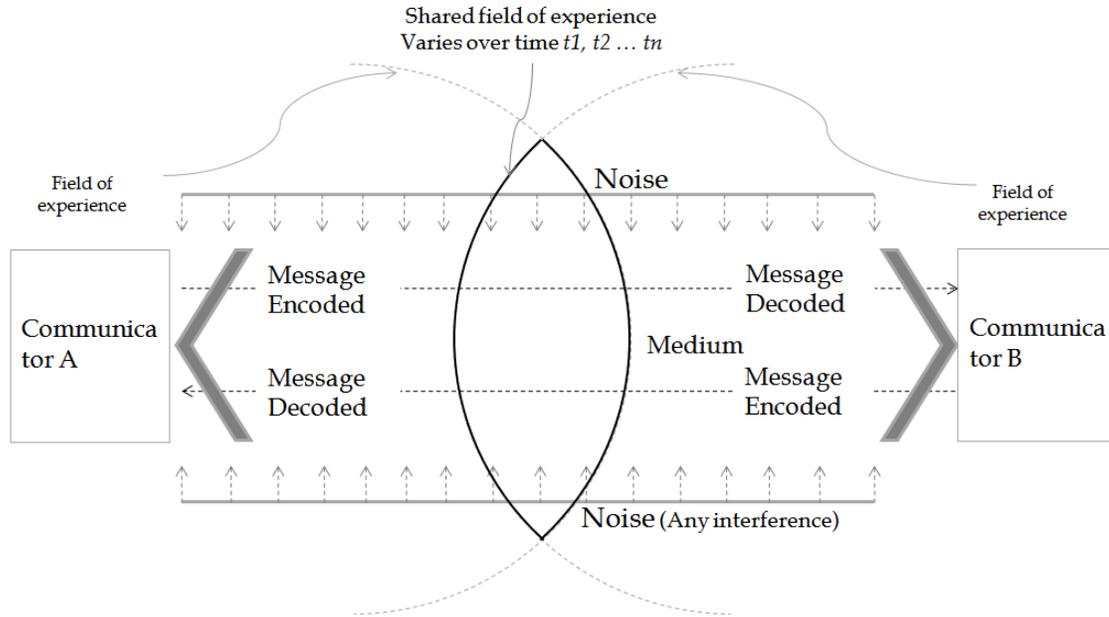


Figure 3.8 Transactional communication model

Source: Author. Adapted from Rapoport (1982), and Hargie and Dickson (2003)

Transactional model: In transaction model the shortcomings of linear and interactive models have been eliminated. The sender and receiver are both defined as 'communicators' in this model as they simultaneously send and receive messages. It focuses on the multiple roles of people in interpersonal communication and also includes a shared area of experience. This model posits that the shared field of interest is not fixed, but rather it may change over time and experience (Figure 3.8).

The knowledge of communication was applied in Chapter 4 to identify social aspects and negotiation factors of using urban spaces. The concept of this

interpersonal communication has also been applied in the qualitative investigation of the street space of the study area i.e. Old Dhaka. This qualitative data was the base from where questionnaire was made. Results from the questionnaire were also compared with the qualitative data to verify the responses by survey population.

Chapter 4: Socio-cultural Aspects and Right to Use of Urban spaces

4.1 Urban space: Socio-cultural background

Urban space generally refers to the space for public use or space that is publicly common. Childs (2006) defines 'common' as physical space where the citizens of a country/community/or certain groups have a right to use. 'Urban space' is a general term with subcategories that differentiate types of urban spaces in terms of use pattern, physical character, social relation, and control mechanism. A comprehensive categorization of urban spaces (in terms of commons) was proposed by Childs (2006, p.21)(Table 4.1). Childs organized urban spaces into two groups, i.e. a. Spaces under social point of view and b. Architectural categories- civic spaces.

Although Childs' categorized urban spaces into two broad groups, they are complementary to each other, thus; all architectural (civic) spaces can be included within the social definitions. Since every urban space is constructed socially, they have a particular position in the social definition. The social definition highlights particularly the degree of accessibility in public spaces. For example, a civic space should have complete access for all people. Neighborhood space is similar to civic but its scale is limited for a certain community. On the other hand 'membership' limits the access to any public space. Under membership conditions only a certain group or limited number of people can use any public space.

| Public space (Defined as commons) | |
|--|---|
| Social definition Civic, Neighborhood/membership | Architectural categories - Civic places Civic rooms or chambers Squares (plaza, place etc.) Civic coves Fore courts Court yards Civic lots Civic lands Civic grounds Yards Campus Urban frameworks Urban paths Public streets Public walks and promenades Malls Indoor commons Third places Public institutions |

Table 4.1 Categories of urban spaces adapted

Source: Adapted from Childs (2006,p21).

Considering accessibility to urban space a category of urban space could be justified though there are arguments among scholars in putting limits on access as criteria for analyzing urban public spaces. To Shaftoe (2008,p.75) “... *public space would cover anything that is universally accessible to citizens and could therefore include anything from national park to townhall foyers*”. Shaftoe highlighted the ‘general gathering and breathing space’ as the basic quality of urban space and simplified typology of urban space is,

- Open square,
- Enclosed and/or covered types (Public and private),
- Pocket spaces,
- Boulevard and linear spaces,
- Reclaimed street,
- Linked spaces

Krier (1979) and other researchers examined urban spaces and categorized according to shape (geometry), size, and connectivity with streets (Figure 2.4). Scholars such as Kevin Lynch, Christopher Alexander, and Jan Gehl suggested different physical dimensions to define small and large public space (Shaftoe, 2008). Shaftoe also simplified the scale for public space that is 'large' to 'small'. According to this scale, a large space would give a feeling of 'lost' and too small space might create 'claustrophobic' effect.

It is well accepted that urban space can be understood with its process and product characteristics. Process characteristic focuses basically on socio cultural factors of space. The social dimension in Childs's (2006) category covers very few social factor(s) of urban public space (Figure 4.1). In Shaftoe's (2008) typology, each type can be explained with socio-cultural background except open square, which is referred to similarly as Krier's (1979) space.

Socio cultural background or generation process of each urban space is different. An enclosed public space could be privately or publicly owned. Spaces are designed and controlled, depending on their objective, nature and ownership. For example, a museum is a publicly owned public space but the access is controlled through ownership. People have to pay to enter that space and there is also limit on time. On the other hand a privately owned shopping mall is also a public space where limit exist on time but entrance is free. If the socio-cultural background is compared, then they are different. For example, a shopping mall is designed for business (profit making) whereas a museum is a social commitment to educate people (Figure 4.1).

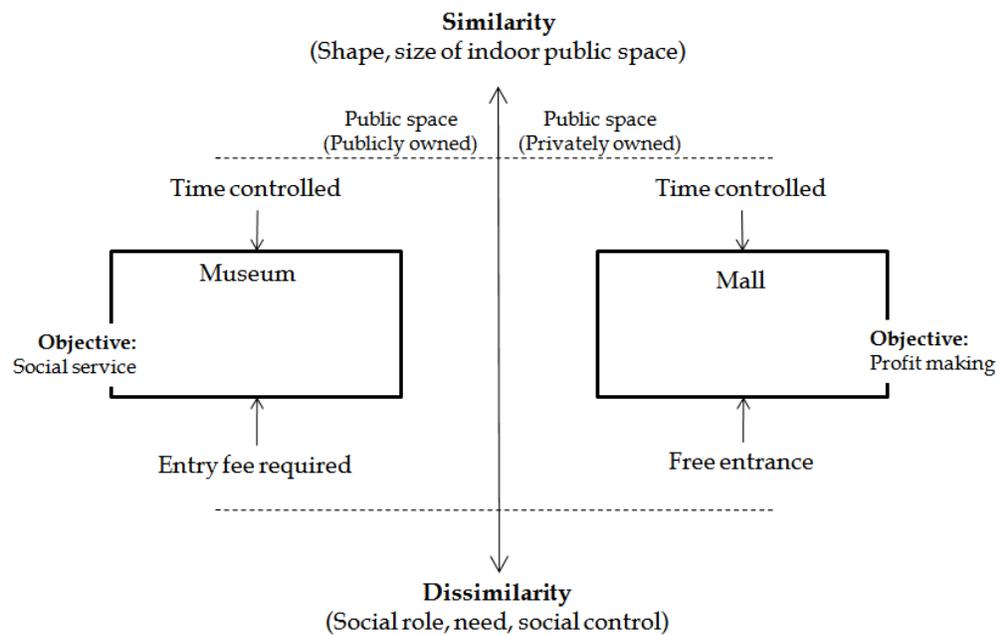


Figure 4.1 Kinds of public space in different social position

(Source: Author)

Thus, every urban space, whether big or small, square or rectangular, park or a community pocket, have all been created by socio-cultural demand. For example, the *Younge-Dundas* Square in Toronto downtown and *Piazza del Signoria*, Florence result from different social influences. Social demand and prevailing political ideologies of the time of construction guided the formation of those urban squares. In this case, if we consider Krier's (1979) classification of urban space then we might need to measure their dimensions of length and width, connectivity with streets, etc. (Figure 4.2 and Figure 4.3). These public squares are different as they originated from different socio-cultural background and have distinct physical character.



Figure 4.2 Younge -Dundas square, Toronto, Canada⁸



Figure 4.3Piazza del Signoria, Florence, Italy⁹

⁸ Source: http://en.wikipedia.org/wiki/File:Dundus_Square.jpg (Accessed on 24.10.2013)

⁹ Source: http://en.wikipedia.org/wiki/File:Piazza_della_Signoria.jpg (Accessed on 24.10.2013)

4.2 People- Environment relationships: Socio-cultural factor

Urban spaces are socially produced and each society is identifiable with their distinct culture. Culture modifies itself in a continuous process of changing by adaptation with people and environmental changes. So if there were any change occurs in a society with its political, business or geo-climatic factors then eventually it would affect culture to adapt. So new urban spaces do not only develop with the change of culture but existing spaces also change themselves with cultural transformation. The changes may come in control and use type of the space. So when urban spaces whether new or in transformation reflects the culture, societal demand and meaning then it create an acceptable positive image for the society.

People do prefer a space that is culturally embedded and has some specific meaning for that culture. Spaces need to be converted into places so that people can find meaning in them and value positively in their perception. "*... when human invests meaning in a portion of space and then become attached to it in some way (naming is one such way) it becomes a place*" (Viik, 2011, p.110). Environment changes with the flow of time may create different perception of space. Viik proposed that not only the creation of meaning is enough but also it is also necessary to stabilize that meaning to retain a specific spatial quality. By stabilizing the meaning of place we actually establish the sameness of a place

over time. If we experience the same culturally responsive meaning from a place every day, then all the values of that space can be perceived positively.

"It is difficult to conceive of 'space' as being without social content and, equally society without spatial component."(Carmona et al, 2010, p.111). When we speak about the social aspects of urban space, then its 'people' appear as the most important element. Presence of people and their level of interaction would determine how successful a public space is. People are the factor that is continuously changing the nature of space and also being changed itself by space. Carmona, et al.(2010) proposed this change as a two way process (Figure 4.5).

Rapoport (1980b, p.26) highlighted three theoretical positions regarding human-environment relationship when their effects on each other are considered. The positions are,

- *Environmental determinism*

The traditional view of professionals such that, physical environment causes changes in human behavior.

- *Possibilism*

Besides physical environment, social and economic environments are also important factors that affect human behavior.

- *Probabilism*

Some of the choices in physical setting have more/ or less constrains than others that determine the probability of becoming important for behavioral impact.

Concluding these views of human-environment relationship, Rapoport (1980b,p.27) also postulates that 'physical environment alone cannot lead people to engage in any activity' and 'Environment cannot generate motivation' to change behavior rather it's a complex and two way process (Figure 4.4).

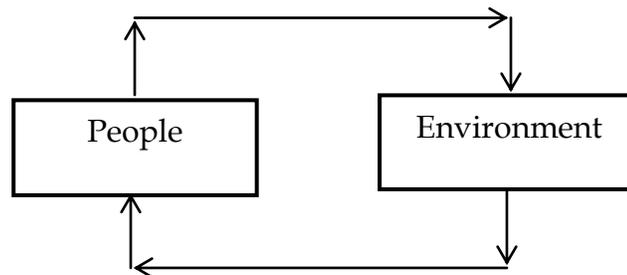


Figure 4. 4 People environment relationship

Source: Author. Adapted from Rapoport (1980b), & Carmona et al. (2010)

4.2.1 Components of culture and people in urban environment

Urban space is one of the component elements of built environment. To understand the cultural aspects of urban space it is necessary to look for relationships between culture and environment. Scholars in the fields of sociology, urban planning, and environmental psychology have defined culture, and environment according to their fields of interest. In explaining relation

between culture and environment Rapoport (1980b,p.9) summarized the general views of culture as,

- a way of life typical of a group.
- a system of symbols, meaning, and cognitive schemata transmitted through symbolic codes.
- a set of adaptive strategies for survival related to ecology and resources.

Rapoport also commented that these views are not contradictory rather complementary. If urban spaces may be considered as a social product then they should possess these aspects of culture. For example, a space should be an integrated part of a particular society's life style where the meaning and symbols are transmitted through symbolic codes. If the system of communication is clear and functional, then the people of that society can understand and decode the meanings and symbols expressed by others in urban space. If these criteria of culture match in a space then it creates a desired environment for that particular group of people (Rapoport, 1980b). Later, the desired environment initiates the grouping of similar goal oriented people that could be distinguishable from others.

4.2.2 Sharing urban space: Homogeneity and process of clustering

Grouping in a space reflects that people share common symbols and meaning in their daily life practices. It is important to observe carefully to understand how sharing happens or what are the major factors those initiate grouping and sharing in urban space. To understand how spaces are shared it would be important to explain is 'homogeneity' in the neighborhood, 'clustering' and urban space as 'shared space'.

Homogeneity occurs in a society when people have similar demand from environment and possess a common way of transmitting, receiving, and decoding symbolic codes of culture. Formation of cluster/group is place, time, and level of homogeneity dependent. In a more homogenous society the tendency of clustering or grouping is more prominent (Rapoport, 1977,p.249). Rapoport (1980b,p.37) summarized the variables that can be applied to assess a neighborhood's level of homogeneity. The variables are religion, class, race, place of origin, kinship, caste, language, stages in life cycle, education, community of interest, and occupation. In addition to these factors 'life style' is as another major variable that affects homogeneity.

Homogeneity among people in a society indicates the higher probability for prevalent common environmental perception. The perceived homogeneity tends to reduce interference by others that in turn starts the process of

clustering/grouping among people (Rapoport, 1977,p.249). Rapoport (1980b) concluded that homogeneity helps to achieve an environment supportive of specific life style. Rapoport also forwarded a set of arguments in support of homogenous neighborhood in the formation of social clusters. Homogeneity facilitates,

- Increasing predictability and reduce unpredictability.
- Providing 'back stage region' for relax and natural behavior.
- Reducing perceived density.
- Promoting more clear and effective non-verbal communication.
- Reducing conflict by agreeing about temporal organization.
- Reducing environmental stress and ability to share symbols, shops, language, food, festival, rituals and religion, family and kinship etc.
- Increasing choices of habitat at urban scale.

The evidence of clustering between homogenous people is seen in Old Dhaka, Bangladesh. Rapoport (1980b) also reported the examples of clustering in a homogenous society in the case of India, and Middle East. In Dhaka, historically, neighborhoods formed by the clustering of different interest groups such as, profession, caste, and religion(Ahmed, 2006). When such clusters/groups are formed in a neighborhood then people tend to share common social and physical elements personally and within groups.

It is claimed that in a homogenous neighborhood, shared common space facilitates better exchange of cultural codes and meaning. Examples of shared open space in urban environment are streets, plaza, yard and so on. These shared spaces are culture specific that allow social activities, institutions, and settings suitable for grouping. This cultural specificity is also reflected through cognitive styles, social relationships, and behavioral patterns (Rapoport, 1980b). At this point Rapoport wants to differentiate between social interactions and 'liking' or 'disliking' in urban space. There are arguments against initiating social interaction by space sharing. Using an example of cul-de-sacs, it is claimed that sharing space does not always ensure social interaction and social acceptance (Rapoport, 1980b). Shared common space does not always foster social interaction; rather it depends on how people accept inhibiting or facilitating quality of an urban setting.

4.3 Urban public space and social demand

A successful urban space should provide a supportive environment for people. A supportive environment can be achieved when there is a safe and familiar base for traditional and/or familiar activities (Rapoport, 1980b). More specifically supports may come through establishing the scope for fulfilling basic human needs.

Childs (2006) examined the human needs in civic place and compared with Maslow's hierarchy of needs. He simplified Maslow's need hierarchy pyramid and explained how this can be applicable in assessing whether an urban space is fulfilling the social needs (Figure 4.5). Childs generalized and squeezed down the five levels of need into three levels to apply to urban spaces. Figure 4.6 is showing the appropriateness of street space in support of fulfilling basic human needs.

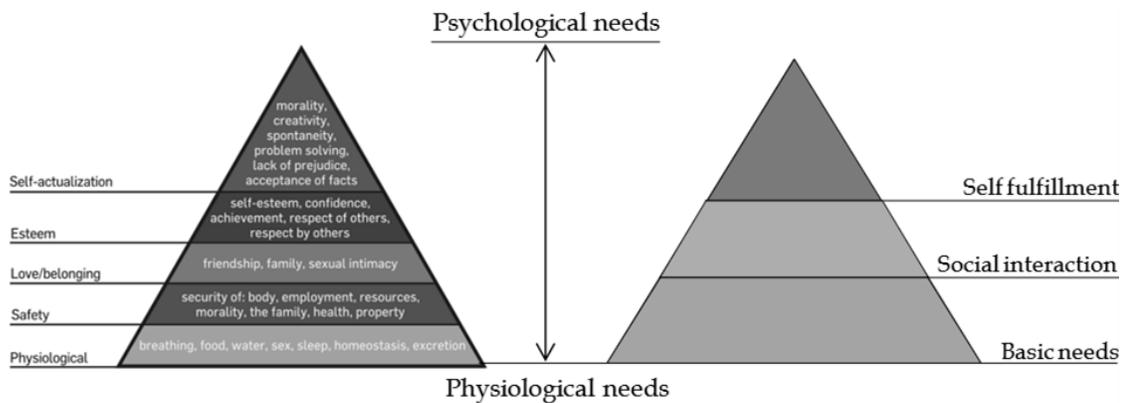


Figure 4.5 Maslow's hierarchy of basic needs¹⁰

Figure 4.6 Maslow's hierarchy of need for urban space.

(Source: Author, Adapted from Childs, 2006)

¹⁰ http://en.wikipedia.org/wiki/Maslow's_hierarchy_of_needs (accessed on 25.10.2013)



Figure 4.7 Street in Old Dhaka supports basic daily needs-a (Physiological need)

(Source: Author)



Figure 4.8 Street in Old Dhaka supports basic daily needs-b (Physiological need) (Source: Author)



Figure 4.9 Street in Old Dhaka provides the scopes for social interaction (Source: Author)



Figure 4.10 Street in Old Dhaka supports daily needs (Psychological need).

(Source: Author)

Urban public spaces in Old Dhaka were assessed within the framework of simplified Maslow's hierarchy proposed by Childs (2006). Capacity to fulfill the basic needs (food, water, breathing etc.), social interaction, and self-fulfillment (morality, self realization etc.) is found in the street spaces. Figure 4.7 and Figure 4.8 are exhibiting the potentiality of the streets of Old Dhaka to support daily necessity. Figure 4.9 illustrates how a small water collection point beside streets can be a space for social interaction. Figure 4.10 is showing the streets accommodative power to support activities of self-fulfillment. When there is no space in mosque in peak time then people use street space for prayer.

4.4 Negotiation, Access, and use of urban public spaces

The use of public space in everyday life can be seen as a result of the negotiation process between such different claims by different stakeholders. The outcome of negotiations, i.e. the access arrangements to public space, always reflects the way society is organized (Hackenbroch, 2011, P.59).

Negotiation for space use results from the conflicts between the user groups. Conflict leads to negotiation which is actually a struggle for the territorial control between person and person, person and community, or even community and institutions (Koning, 2006). When negotiation for using public space is

established, then people obtain their right to access and share common territories. But the levels of accessibility are not equal for all social groups.

Questions of accessibility and ability to use space are determined by the 'publicness' of any particular space. *"Access to public space is also a mechanism by which urban dwellers asserts their right to participate in society"* (Sideris & Ehrenfeuch, 2009, p.7). Sideris & Ehrenfeuch also claim that publicness can be assessed through observing whether permission (expressed or implied) is required to access a space. Every space is different in terms of its functionality and social image so the mechanisms for obtaining access to each of them would be different. Since activities in public space are different and also occur in different times, access to varying spaces could be different at different times. Urban public spaces should have equal access for people in a society but *"Public space is not freely accessible to everyone at any time"* (Hackenbroch, 2011). Different groups (societal or institutional) can claim the control of a space at different times and within different contexts. Control of a space by a group applies restrictions for other groups. Every space has restrictions to use in terms of physical, legal, and social conditions. Urban dwellers establish balance between the restrictions and negotiation.

As 'public space' urban streets also have restrictions to use. For example, sidewalks of streets are public spaces but owners or legal right holders on adjacent spaces usually control them (Sideris & Ehrenfeuch 2009). In Old Dhaka it is found that shop owners control their adjacent sidewalks and they even provide informal permission others to operate business (Figure 6.9)¹¹.

It has been observed historically, that higher social class people have better access to institutions and public space. This accessibility helps in creating territory for those higher, or elite, social classes that can become inaccessible for the other lower class groups in society (Figure 3.1). Class differences such as between higher and lower income group or elite and not elite in a society are also a major factor in space control and use. For example, higher and middle-income groups visualize street vendors as dirty, hampering good business environment and so on, whereas lower income group may not possess that same vision (Sideris & Ehrenfeuch, 2009., Bhoumik, 2005). Sideris & Ehrenfeuch provided example of this phenomenon from the areas of Brooklyn and, Eastside Harlem in New York City. In these examples, the authors highlighted how the upper class businessman neglected the street vendors though streets were public. A similar example is also noticed in the cities of developing countries like Bangladesh. The

¹¹ Negotiation process for street use in Old Dhaka

struggle between higher and lower classes to control and access space is prominent in Dhaka city (Hackenbroch, 2011).

“Engagement with space either alone or with others can create a connection with place and a sense of ownership regarding what should and what should not happen within this space ” (Dinnie, Brown, & Morris, 2013). The sense of ownership of space leads one to create a territory that also eventually restricts others’ access and use of that space. Legal control comes from government authorities, which clearly states the public rights to access of spaces. Sideris & Ehrenfeuch (2009) studied the sidewalk ordinances in 1880’s, 1890’s, and 1900’s for Los Angeles. They found sidewalk laws were made for the use of streets based on factors such as, accepted level of physical obstructions, type of speech, vending types (also zones and time), provision of loitering and so on. Ranges were fixed for these activities and people had to abide by those restrictions.

Hackenbroch (2011) studied the urban informality and negotiation situation in Dhaka city. The author’s study simplified the existing scheme of the negotiation process. In that scheme three concepts of spaces are identified i.e. statutory space, informal space, and negotiated space. Statutory space refers to rules and regulation by statutory body. Informal space is claimed in everyday life outside

statutory framework. Negotiated space is linked between these spaces and shows a hybrid character (Figure 4.11). The character of negotiation is different for every individual case. For example, the negotiation of space use in Old Dhaka is not the same as Hackenbroch (2011) observed. This author studied space control mechanism specially streets of Old Dhaka and found a different dimension negotiation (Figure 10.45). This process shows how formal (government) and informal (community leaders) bodies are connected and controlling street use and how negotiation is done.

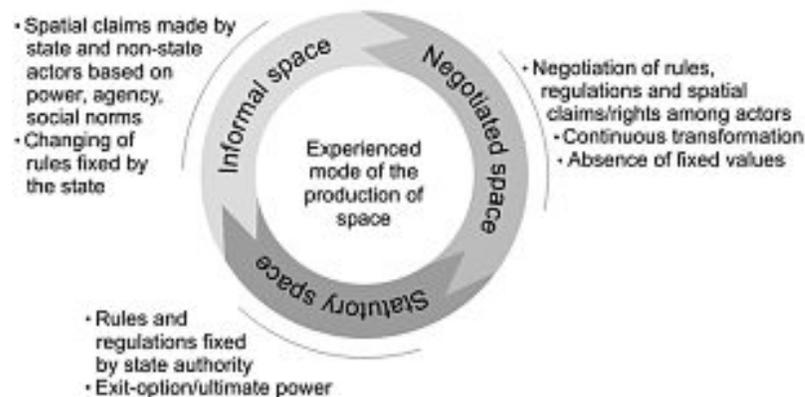


Figure 4.11 Creation of negotiated space.

Source: (Hackenbroch 2011)

The aim of studying socio-cultural aspects of urban space is to pinpoint foci to investigate. Theories discussed in this chapter helped this research at different stages i.e. in observation, questionnaire survey and data analysis. The concept of

the hierarchy of social demand and formation of urban space has been applied to assess streets of Old Dhaka. After analysis, it is found that streets are providing the major types of needs (Figure 4.6, Figure 4.7, Figure 4.8, Figure 4.9, and Figure 4.10). In order to understand culture in the survey area, a questionnaire was prepared with the questions related to ways of life. In direct observation, social codes, symbols and meanings were recorded and analyzed later. The concept of homogeneity and its variables were applied in this research to assess whether the study area is homogenous or heterogeneous. Theories of territory control and negotiation of space have been applied in this research. Compilation and analysis of major theories of socio cultural factors and relation to urban spaces helped through out of this research.

Chapter 5: The Morphology of Street and neighborhood in Old

Dhaka

5.1 Urban morphology and street hierarchy

There are several key elements that are required to understand urban morphology. The elements are land use, building structure, lot and street patterns, and street types (Jones and Wienckowski, 2009). Streets are the major elements that change least within the elements of urban morphology. The importance and functions of streets are highlighted into two major ways, 'link function' and 'place function' (Ribeiro, 2012, Figure 5.1). Ribeiro (2012) highlighted that link function of streets works for connecting different places of urban activities. Place function deals with location (historical identities of place), types of existing uses in buildings and on space and character of built forms including vegetation and appearance. Existing functions of streets determines spatial qualities and indicates the liveliness qualities. Appleyard (1980) summarized the place functions that are necessary for a street to become a livable street. A livable street should be a sanctuary, a healthy environment, a community, a neighborly territory, a place for play and learning, a green and pleasant land, and a unique historic place (Appleyard, 1980). Link functions and place functions are not contradictory rather they are complementary (Figure 5.1).

Link function describes how streets are connected to streets and other spaces and provide accessibility for movement. *"Most journeys involve movement through a network of roads. It becomes necessary to determine how this travel can be channelized*

within the network in a logical and efficient manner” (Ribeiro, 2012, p.271). Efficiency of street networks is primarily determined by the hierarchical connections between them. Ribeiro classified functionalities of street hierarchy in broad groups i.e. accessibility (to land services) and circulation (traffic movements). The typology of roads is not constant and it varies from place to place (Ribeiro, 2012., Forbes, 1999., Jones and Wienckowski, 2009).

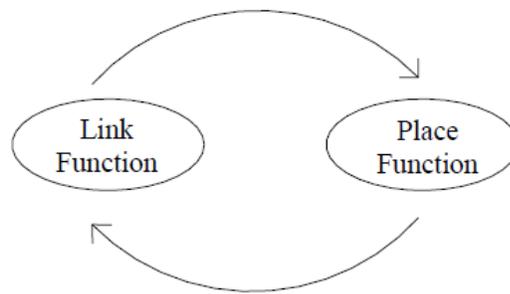


Figure 5.1 Interlinked functions of streets

Source: (Ribeiro, 2012, p.275)

5.2 Classification and hierarchical organization of street network

Jones and Wienckowski (2009) generalized street pattern as local, collector, and arterial to identify streets' relative positions in the hierarchy. According to Jones and Wienckowski (2009), local streets are mostly residential and narrower than collector and arterial. Collector runs perpendicular to local streets that collects traffic and distributes to arterial streets. Arterial streets can be major or minor. The general street classifications that are adopted by different countries have been presented in Table 5.1.

| Source ¹² | Road/ Street categories | | | |
|---|-------------------------|-----------------------|-------------------|----------------------|
| IHT (4) | Primary distributor | District distributor | Local distributor | Access roads |
| AUSTROADS (3) FHWA (1) AASHTO (5) | Arterial roads | Distributor/Collector | | Local streets |
| Portugal(2) | Arterial streets | Main distributor | Local Distributor | Local access streets |

Table 5.1 General street classification for different countries.

(Source: Ribeiro, 2012)

Greater similarities between the category and hierarchy can be observed in Table 5.1. Ribeiro (2012) also classified and analyzed street's functions in terms of accessibility and mobility. The author found that arterial streets prominently function as mobility corridors whereas local access streets are primarily used for getting access to land or other spaces (Figure 5.2). This figure also highlights that distributor streets serve for both of the functions (mobility and access) similarly.

¹² (1) Federal Highway Administration, (2) Portugal, (3) AUSTROADS - Australia, (4) Institute of Highways and Transportation, (5) American Association of State Highway and Transportation Officials.

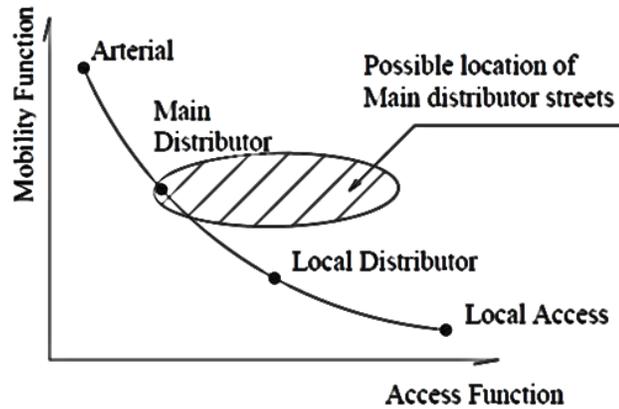


Figure 5.2 Possible functions offered by different types of streets.

Source: (Rebairo, 2012, p.274)

Unlike the functions of 'access' and 'mobility' in conventional classification, 'connection and division' and 'capacity and character' have been considered in another street classification by AIA (American Institute of Architects). AIA's alternative classification states that streets or corridors in urban area either connect communities or serve to separate them (Forbes, 1999). In this classification there are ten categories of streets where variation on traffic movement, pedestrian activities, and building types are considered (Table 5.2).

| Classification | | Description |
|-------------------------|-----------|---|
| Local to Regional | Highway | A long-distance, medium speed vehicular corridor that traverses open country. A highway should be relatively free of intersections, driveways and adjacent buildings; otherwise it becomes a strip, which interferes with traffic flow. |
| | Boulevard | A long-distance, medium speed vehicular corridor that traverses an urbanized area. It is usually lined by parallel parking, wide sidewalks, or side medians planted with trees. Buildings uniformly line the edges. |
| | Avenue | A short-distance, medium speed connector that traverses an urban area. Unlike a boulevard, a civic building or monument terminates its axis. An avenue may be conceived as an extremely elongated square. |
| | Drive | An edge between an urban and a natural corridor, usually along a waterfront, park or promontory. One side of the drive has the urban character of a boulevard, with sidewalk and buildings, while the other has the qualities of a parkway, with naturalistic planting and rural detailing. |
| | Street | A small-scale, low speed connector. Streets provide frontage for higher density buildings such as offices, shops, apartment buildings, and row houses. A street is urban in character, with raised curbs, closed drainage, wide sidewalks, parallel parking, trees in individual planting areas, and buildings aligned on short setbacks. |
| | Road | A small-scale, low speed connector. Roads provide frontage for low-density buildings such as houses. A road tends to be rural in character with open curbs, optional parking, continuous planting, narrow sidewalks, and buildings well set back. The rural road has no curbs and is lined with pathways, irregular tree planting and uncoordinated building setbacks |
| | Alley | A narrow access route servicing the rear of buildings on a street. Alleys have no sidewalks, landscaping, or building setbacks. Alleys are used by trucks and must accommodate dumpsters. Alleys are usually paved to their edges, with center drainage via an inverted crown. |

| | |
|---------|---|
| Lane | A narrow access route behind houses on a road. Lanes are rural in character, with a narrow strip of paving at the center or no paving. While lanes may not be necessary with front-loading garages, they are still useful for accommodating utility runs, enhancing the privacy of rear yards, and providing play areas for children. |
| Passage | A very narrow, pedestrian-only connector cutting between buildings. Passages provide shortcuts through long blocks or connect rear parking areas with street frontages. Passages may be roofed over and lined by shop Fronts. |
| Path | A very narrow pedestrian and bicycle connector traversing a park or the open country. Paths should emerge from the sidewalk network. Bicycle paths are necessary along highways but are not required to supplement boulevards, streets, and roads, where slower traffic allows sharing of the vehicular lanes. |

Table 5.2 AIA Street classification system

Source: (Forbes, 1999, p.4)

5.2.1 Administrative and Experiential hierarchy of street network

The widely discussed general hierarchy of street network can be called as 'administrative hierarchy' as it primarily serves the functions of urban traffic for transport planner's decision making. The levels in this hierarchy are based on designer's and administrator's decisions (Table 5.1, Table 5.2). This classification is grounded in design characteristics, not by experiential salience (Tomko, Winter and Claramunt 2008). From this understanding Tomko et al. proposed the concept of 'experiential hierarchy' and has explained how experience of streets has been applied in understanding hierarchy of street network.

By visiting a street space for several times people learn about its spatial layouts. People hierarchically organize the mental representations from their spatial knowledge that is known as 'experiential hierarchy' (Tomko et al., 2008). In this hierarchy people refer to only the named streets that they have experienced instead of referring to local, distributor, or arterial streets. Tomko et al. provided an example of experiential hierarchy as one person is navigating the A'beckett Street with the help of Elizabeth Street and intersection (Figure 5.3). It was considered that knowledge of Elizabeth Street was more prominent than A'Beckett Street. For this reason Elizabeth Street had been referred to locate A'Beckett.

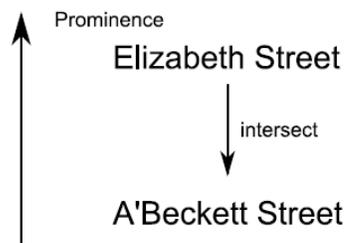


Figure 5.3 Schema for route direction in experiential hierarchy

Source: (Tomko et al., 2008, p.42)

The following part of this chapter is going to explore the morphology of streets and neighborhoods in Old Dhaka. Since the objective of this research was to find out spatial behavior in urban streets so understanding street space and the morphology was important. Historical development of settlements in Old Dhaka

has been described in the following discussion that is followed by the study of social spaces and neighborhood morphology.

5.3 Rationale for selecting Old Dhaka as study area

Dhaka had been the target for millions of people to migrate during last centuries in Bangladesh. Researches have shown that the population of Dhaka is increasing too fast and within the next decade it will hold one of the higher positions in the list of world's mega cities. It is claimed that the city is suffering from the lack of open space and urban infrastructure. In some areas population density has reached to even 678 persons/acre (Islam et al. 2009). The problem exists at higher levels in the older part of Dhaka. The prominent images of socio-cultural life in Old Dhaka can be observed through its street life¹³. Streets in Old Dhaka are now the only urban public spaces where people perform their socio-cultural activities. Historically spontaneous growth of Old Dhaka left no space for community purpose. Increase of population and lack of designated land, either directly or indirectly forced people to use streets as community space that has become a usual part of daily life.

¹³ Please see chapter 6

Several researchers found that though there are the problems of high population density and lack of public space, the neighborhoods in Old Dhaka have held a strong sense of neighborhood during the last four hundred years. This uniqueness of street life made Old Dhaka a potential area for environmental behavior research. These areas become interesting for research as the neighborhoods display hundreds of year old culture, which is still unique. For this research two settlements have been selected that are claimed as two of the oldest neighborhoods in Old Dhaka (Ahmed 2007, Khan 1982). It is expected that studying these two oldest settlements would help revealing the behavioral pattern in street space in Old Dhaka.

The following discussion will cover the street and neighborhood morphology, social spaces of Old Dhaka. A fundamental discussion on morphology, especially the hierarchy of streets, has been added before studying the street morphology of Old Dhaka. A brief historical background of the city's development has been added for introducing the city's development stages and hierarchy of streets.

5.4 Need for studying street morphology for analyzing spatial behavior

Morphology of streets deals with street width and alignment, connectivity, visibility, walkability, hierarchy in community, enclosure ratio and so on (Jones & Wienckowski, 2009). There are debates on whether these factors of physical environments have impact on human behavior or not. Scholars have discussed this issue in terms of social, psychological, or physical environmental factors¹⁴. It is claimed that morphology impacts built environment and environment can also mould behavior. Several research works highlighted that there are direct and indirect influences of physical environment on human behavior (Shaftoe. 2006, Carmona et al., 2010, Rapoport, 1980b). Environment is one of the major factors that guide spatial behavior (Baldassare, 1978). Rapoport (1982) suggested that environment provides 'cues' for behavior in non-verbal ways. Depending on socio-cultural background people communicate with the environment, receive and read the cues in their own ways. These 'cues' come from elements of environment such as, fixed feature elements, semi-fixed feature elements, and fixed feature elements. A significant part of the environmental impact depends on how people receive and decode the message from the environment. Scholars concluded that 'the message' helps to perceive environment and that perception eventually changes the human psychological state.

¹⁴ The factors of environment and their effect on behavior have been discussed in Chapter 3

Zaki, Zekri¹, Servières, Moreau, & Hégron, (2010) applied spatial-temporal data in studying pedestrian walkways. In situ observations were made on shape of street, number and duration of pedestrian stops, and changes of directions. The research came with the result that pedestrians tend to slow down in high shade and in weak wind speed. This result supports the idea that the morphology of streets affects human behavior. Larman & Omer (2013) studied the impact of spatial configuration and functions on pedestrian movement. Hierarchy of street network, degree of connectivity and accessibility were the major centers in their study. The study concluded that there are higher correlations between pedestrian movement and spatial configuration and functions. Mohareb (2009) conducted his study on street morphology and effects on pedestrian movement in Cairo. His study concluded that pedestrian movement correlates with the ratio of average height to street width by 60%.

These studies confirm that components of morphology such as hierarchy and connectivity of streets do have impact on pedestrian behavior. Human experience from socio cultural background, the ability to decode environmental cue, affects the perception of space. Degree and nature of space perception would impact spatial behavior. This research included observation of pedestrian behavior in traditional streets. Based on the previous research results, a focus has been given on morphology i.e. taxonomy of streets, hierarchy of street space in

Old Dhaka in assuming street it would affect pedestrian behavior. The following discussion will provide a brief description of Dhaka's physical growth along with street and neighborhood morphology.

5.5 The physical growth of Dhaka city

Bangladesh celebrated 400 years of history of Dhaka in 2008 (Khan & Nilufar 2009). Founded as a small medieval trade city and expanding to be the nation's capital; Dhaka experienced several phases of developments under different rulers. Historically, Dhaka had been the most important place for administrative and business purposes in the greater Bengal region. Local emperors to European colonists all chose Dhaka as the capital for this region. Central location and easy communication via the river ways determined Dhaka's role as the focus for administration and business. Dhaka is now the capital of Bangladesh, and is considered the 5th largest agglomeration in the world with an estimated population of 19.5 million by 2015 (Islam, 2008).

Geographical location of the city is 23^o 43'N latitude and 90^o 24' E longitude beside the river Buriganga (Chowdhury, 2012). Figure 5.4 and Figure 5.5 show the physical growth of Dhaka city and the historical development phases.

Scholars identified and described the growth of Dhaka city within certain time

frames. Historical evidence concluded that there are six major phases for the development of Dhaka city (Mowla, 1997). However, Chowdhury (2012) simplifies the phases into two basic groups such as, before 1800 AD and after 1800 AD. The six phases for the physical development of Dhaka city are,

- Pre-Mughal period (1205-1610)
- Mughal period (1620-1757)
- East-India period (1757-1858)
- British colonial period (1858-1947)
- Pakistan period (1947-1971)
- Bangladesh period (1971- present)

The precise history of Dhaka during *Pre-Mughal* phase is not available in written sources. The indications of human settlement in this region can be traced back to the 12th century AD (Kabir and Paroil, 2012). Around the 13th century AD a nearby city *Bikrampura* was prominent. Another nearby city *Sonargaon* also flourished around the 13th -14th century AD after Muslim occupation in Bengal region. It is claimed that there were very good communication between Dhaka and these cities through river ways (Chowdhury, 2012).

Written descriptions of western travellers who visited Dhaka are some of the important sources of information. Travellers such as *Sebastien Marique*, *Manucci*, and *Tavernier* visited Dhaka around 1640-1670 AD (Chowdhury, 2012). Their description indicated that Dhaka was a populous city and had been expanding along the river *Buriganga* when they travelled. The growth of Dhaka in different phases was calculated as Mughal period (10km²), British period (22 km²), Pakistan period (85km²), and Bangladesh DMDP¹⁵ (1528 km²) (SENES, 2007).

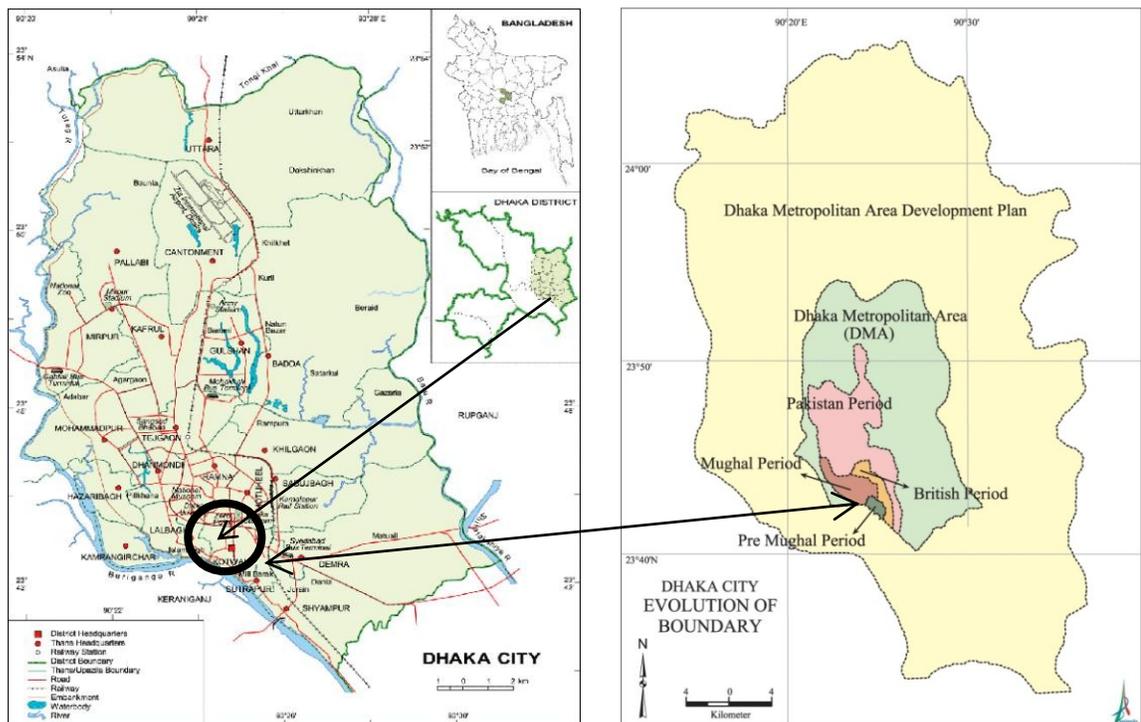


Figure 5.4 Map of Dhaka city and Physical development phases

(Source: Chowdhury, 2012)

¹⁵ DMDP: Dhaka Metropolitan Development Plan

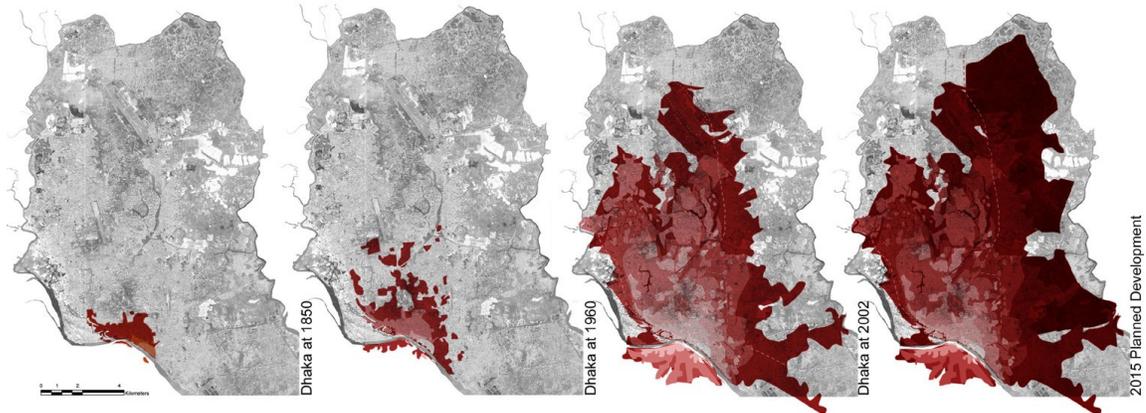


Figure 5.5 Historical development of Dhaka city

(Source: Habib, 2010)

In Mughal period, Dhaka became the capital for the administrative and business functions of Bengal province in 1610 AD and it retained its capital status for 100 years (Chowdhury, 2012). During the *Mughal* period Dhaka was a city of 7-10 miles long and 2.5 miles wide. The capital was shifted to *Rajmahal* (now in India) around 1639-59 C AD. Major building types were administrative headquarters, palaces and residences for government officials. The city center was around Pukurtala (now Babubazar). The current central jail was the city's fort at that time. From this point, the city expanded towards east and west where the expansion basically followed the riverbank (Figure 5.4). European traders, such as the Portuguese, the Dutch, the English, the French, and Armenians came and established trade houses in Dhaka around 17th C AD. Current Tejgaon Industrial area was the area where they set up their industries.

There was no formal urban development authority for Dhaka until 1823 when the first ‘city committee of improvement’ was formed. Before 1823 urban development was done informally either by *Panchayet*¹⁶, local informal administrators, or wealthy people within any particular society (Mowla, 1997). Creation of new roads or civic spaces also followed the same way.

| Year | Population x (000) |
|------|--------------------|
| 1801 | 200 |
| 1830 | 75 |
| 1838 | 68 |
| 1840 | 51.6 |
| 1858 | 51 |
| 1868 | 60 |
| 1872 | 69.2 |
| 1878 | 75 |
| 1881 | 79 |
| 1891 | 83 |
| 1901 | 90 |
| 1911 | 125 |
| 1941 | 239 |
| 1947 | 336 |
| 1961 | 556 |
| 1974 | 1680 |
| 1981 | 3340 |
| 1991 | 6150 |
| 2008 | 9000 |
| 2015 | 19500 |

Table 5.3 Population growth of Dhaka city with the projection in 2015.

(Source: Ahmed, 2006., Chowdhury, 2006., & Islam, 2008)

After 1800 AD with the rise of The East India Company by Britain, Dhaka experienced a major change in its business, political system, and population. Businessmen, craftsmen and officials of the Mughal emperor lost their businesses and jobs during that period. People migrated from Dhaka to other places and as a result, the city saw shrinkage of its population to 200,000 in 1801. The situation became worse when the population sank to 51,636 in 1840 (Table 5.3)

¹⁶ Panchayet: During the Mughal period there was social organization called *Panchayet* (Committee of five). They controlled socio-political life and physical development aspects of Old Dhaka. Each smallest neighborhood called *Mahallah* had a Panchayet. These Mahallahs were semi-autonomous socio-spatial units that had very little control from higher level of administration (Mowla, 1997).

(Chowdhury, 2006). During these times several highly populated areas, such as Narinda, Faridabad, Fulbaria, and Alamganj, were completely abandoned. It was reported that these large areas became completely jungle around 1840s (Ahmed, 2006). Unhygienic environment and spread of diseases like cholera, measles, and malaria caused the deaths of people and prompted migration to other places. From a topographical map done in 1850s, the shrinkage of physical boundary of the city was estimated and it was 3.25 mile long and 1.25 mile wide only at that time (Chowdhury 2006, p.149).

The 1850's are called the start of a new era for the development of Dhaka city, with the establishment of a formal Municipal Committee. Jungles were cleaned, new roads, parks, piped water supply, and street lights were established. Healthy environment and the demand for workers for new industry attracted people to Dhaka at that time (Chowdhury 2006, p.144). After that period the population and the area of Dhaka city again started increasing (Table 5.3).

Until 1947, Dhaka was the next important city to Calcutta¹⁷ in the British colonial period. In 1947, greater India was subdivided into India and Pakistan (in two regions named East Pakistan and West Pakistan). Dhaka retained its importance

¹⁷ Now capital of West Bengal state in India.

as the capital of East Pakistan. In 1971 East Pakistan won its independence and took its name Bangladesh and since then, Dhaka is the capital of Bangladesh. In 2011 Dhaka city Corporation divided into Dhaka South City Corporation¹⁸ and Dhaka North City Corporation¹⁹.

| Year | Name of formal city development authority | Administrative units of the city (Union, Ward) ²⁰ |
|------|---|--|
| 1823 | The City Committee of Improvement | |
| 1840 | Dhaka Committee | |
| 1864 | Dhaka Municipal committee | |
| 1960 | Dhaka Municipal committee | 25 Unions |
| 1964 | Dhaka Municipal committee | 30 Unions |
| 1977 | Dhaka Municipality | 50 Wards |
| 1978 | Dhaka Municipal Corporation | |
| 1982 | Dhaka Municipal Corporation | 56 Wards |
| 1990 | Dhaka City Corporation | 75 Wards |
| 1993 | Dhaka City Corporation | 90 Wards |
| 2011 | Dhaka North City Corporation | 36 Wards |
| | Dhaka South City Corporation | 56 Wards |

Table 5.4 The chronology of the formation Dhaka city Corporation.

(Source: Ahmed, 2006), and

http://www.dhakacity.org/Page/About_us/About/Category/2/About_us_info (Accessed on 31 March 2013)

¹⁸ Dhaka South official website: <http://www.dhakacity.org/>

¹⁹ Dhaka North official website: <http://www.dncc.gov.bd/>

²⁰ 'Union' and 'Ward' represent the units of administrative areas in the city.

The historic and older part of Dhaka city grew unplanned and spontaneously without systematic planning. The contemporary planned part of the city is known as new Dhaka. The newer part is characterized by wide main streets and larger urban blocks that were incorporated into a broad initial master plan in 1959 (Ahmed et al., 2009, Khan & Nilufar, 2009).

5.6 Social space, street and Neighborhood morphology of Old Dhaka

Old Dhaka had mixed composition of social classes. Small groups/social classes were formed either based on profession, religion, or social status (i.e. high officials, military) (Ahmed, 2006). In most of the cases the names of the neighborhoods or streets carry the names of the dominant social classes. For example, the neighborhood *Mughal Tuli* was named from the people who were the high officials of Mughal king. The name of neighborhood *Shakhari Bazaar* came from the craftsmen who worked with *Shankha* (Ahmed, 2007). There was good connectivity between *Dhaka* and *Sonargaon* (a developed city at that time) through river ways. It may be assumed there was a flow of craftsmen from Sonargaon to Dhaka who settled and formed craft based neighborhoods.

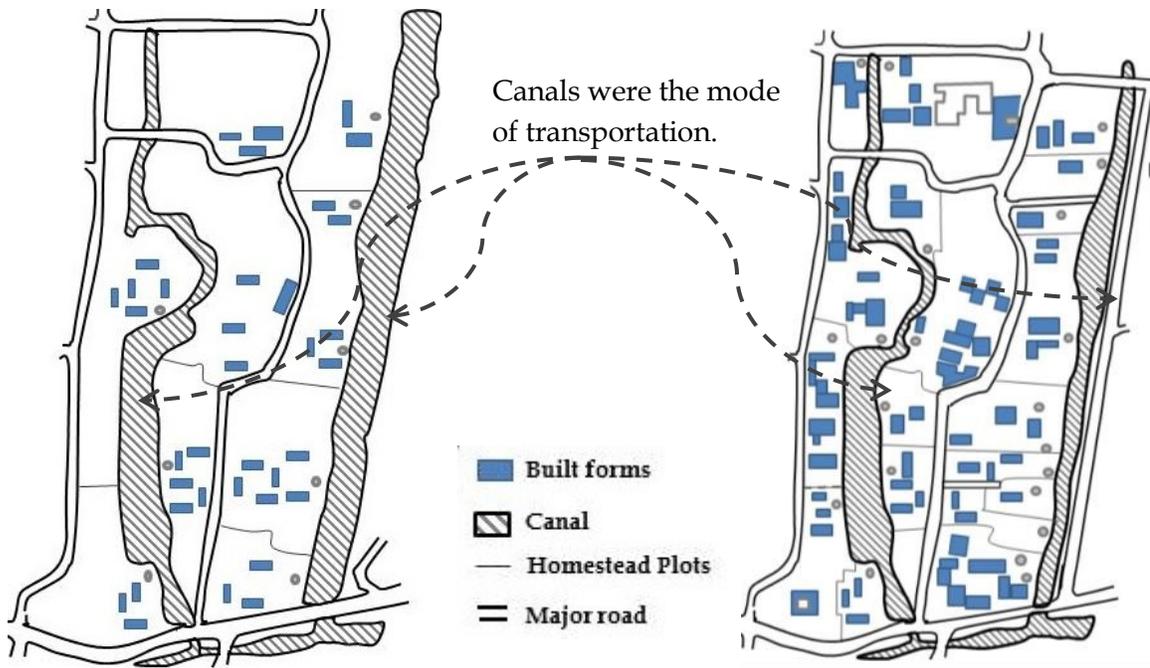
5.6.1 Street morphology of Old Dhaka

Old Dhaka was characterized with a network of canals throughout the whole area that were connected with the river. People started building their houses by following the routes of canals. Canals were the important mode of communication in Old Dhaka and settlement followed the linear course of the canals. Settlement grew informally and there were no formal street layouts before the people settled down. People chose locations to build houses according to their own preference. For example, people of same profession and ethnic background grouped in different locations. Gradually streets were developed following the course of canals. In some cases the canals were filled up and new roads were constructed. The landowners besides the canals extended their properties by occupying land from canals (Figure 5.5). Different forms of street evolved with the unplanned expansion of the settlement. The streets were the mix of lanes, by-lanes and cul-de-sacs. The maximum widths of the streets were kept to such a level that they can accommodate horse driven carts (Kabir and Parolin, 2012). The major road types are straight linear and irregular. These streets characterized the neighborhood pattern in Old Dhaka. Linear settlements followed by straight roads were appropriate for constructing 'craft shop house'. Mixed irregular is other pattern of street for rest part of the settlement. As the result two major types of streets were evolved from the development of the neighborhood through hundreds of years.

The planar configuration, width, and connection with other streets are found differently throughout the study area. The following discussion illustrated the street morphology of a selected part of Old Dhaka. Taxonomic structures, planar configuration, types of intersection, and the sense of enclosure of streets are the major points of discussion.

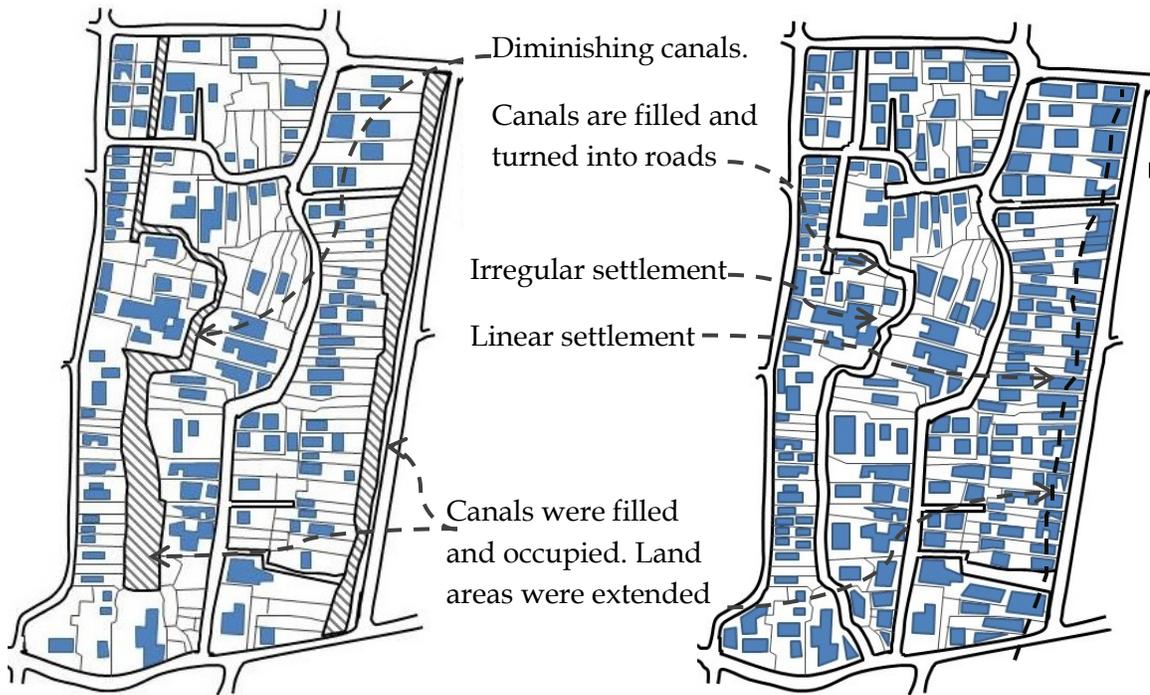
5.6.2 Taxonomic structure of streets

In Old Dhaka the variation of street forms ranges from pure to mixed hybrid types (Figure 5.7 and Figure 5.8). Street's modes of continuation i.e., open and close end streets were studied along with the taxonomy and types of connectivity. Linear streets as straight form are the dominant in commercial areas. Straight alignment provides the pedestrians a clear view inside the street environment. Shop owners on a straight street are also getting priority to attract pedestrian's attention by displaying products. Straight alignment is also supportive for vehicular movement that is useful for transporting the supplies of local shops. Width of the street varies across its length with the variation of building setbacks (Table 5.6, Figure 5.7).



a. Map around 1810-1845

b. Map around 1858-1899



c. Map around 1962

d. Map around 1995

Figure 5.6 Settlement and street development pattern of Old Dhaka.

Source: Reconstructed from (Mowla, 1997)

The major wide roads are North-South, English, Nayabazar, and Bongshal. The enclosure and spatial distribution of these streets are different than other narrower community streets (Figure 5.10 and Figure 5.11). Two other forms of linear streets such as, Curvilinear and Zigzag pattern are the other major forms of streets and these streets also vary with their width across their length. For zigzag and curvilinear streets, the points of interests are those where the street axis is shifted and at intersection. These points are preferable for business and for smaller community activity such as water collection, or friend's gathering. Other forms such as tree, radial, cellular, and hybrid are also present in the study area but not dominant like linear (Figure 5.7).

| Type of intersection | 2 intersecting streets | 3 intersecting streets | 4 intersecting streets | More than 4 intersecting streets |
|--------------------------------------|------------------------|------------------------|------------------------|----------------------------------|
| Perpendicular (Open & close ends) | | | | |
| | | | | |
| Oblique (Open & close ends) | | | | |
| | | | | |

Table 5.5 Typology of street connectivity in Old Dhaka

(Source: Author)

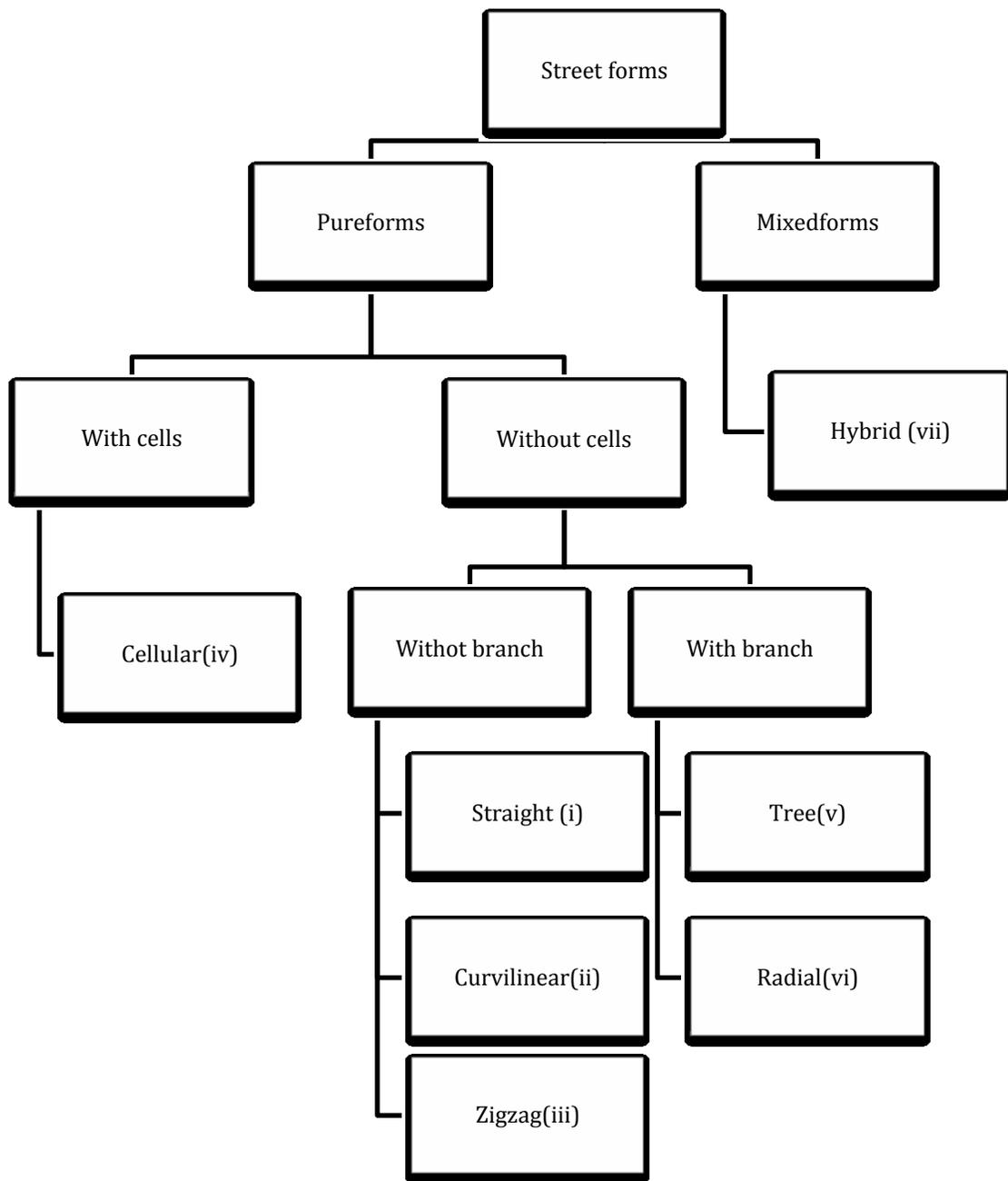
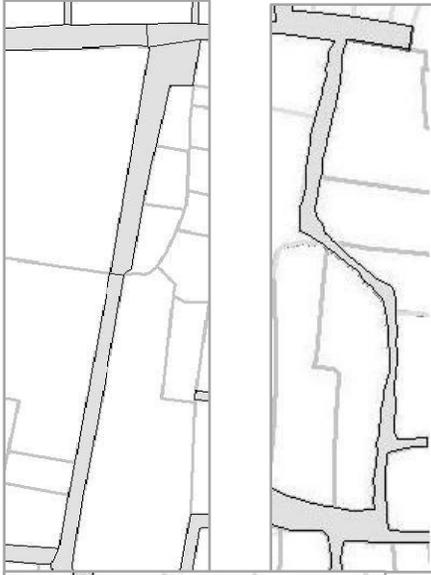
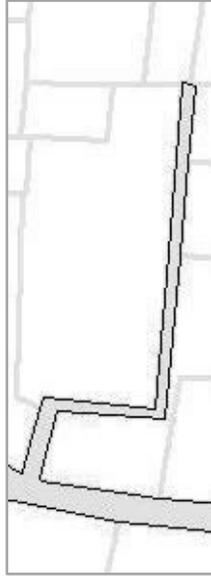


Figure 5.6 Taxonomic structure of streets in Old Dhaka

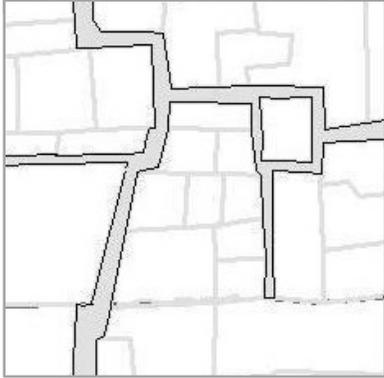


i.

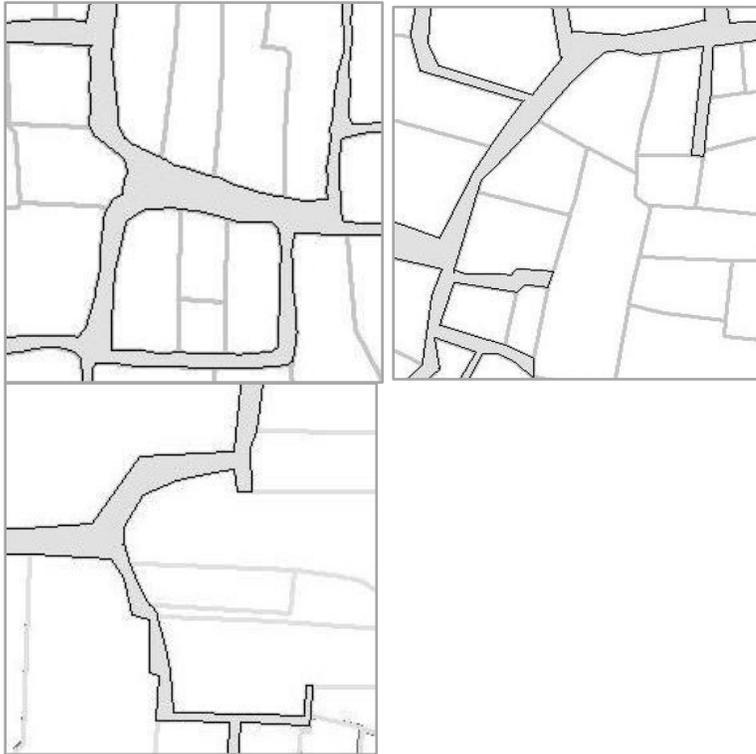
ii.



iii.



vii.



iv.

v.

vi.

i. Straight, ii. Curvilinear, iii. Zigzag, iv. Cellular v. Tree, vi. Radial, iv. Hybrid

Figure 5.7 Street forms in Old Dhaka

(Source: Author)

5.6.3 Street enclosure and walkability

Walkability of street refers to “walking with leisure”. It also refers to certain physical characteristics that contribute in achieving walking environment (Spooner, 2007). Sense of enclosure in street space is different than other urban space since the street is open at two ends and the sky is visible. Presence of

openness reduces the sense of enclosure in a street. Additionally the ratio between street width and building height also has the stronger effect on enclosure feeling. Enclosure ratio and nature of enclosure planes i.e. architectural walls and ground planes are the two most important factors for assessing walkability of streets.

The enclosure ratio is determined as the relation between horizontal and vertical dimensions of street's ground plane and adjacent vertical surfaces. The suggested acceptable enclosure ratios are 1:1, 2:1, and 3:1 (Spooner, 2007). The ratio 1:1 refers as the better for an enclosure of walking street. In Old Dhaka the enclosure ratios vary between 0.25:1 and 4:1 (Figure 5.9).

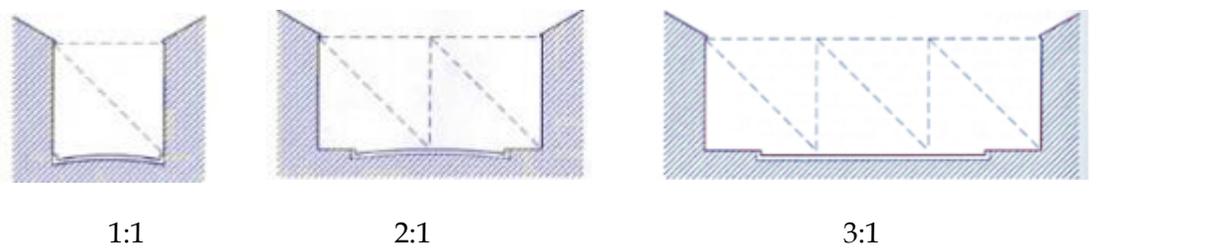
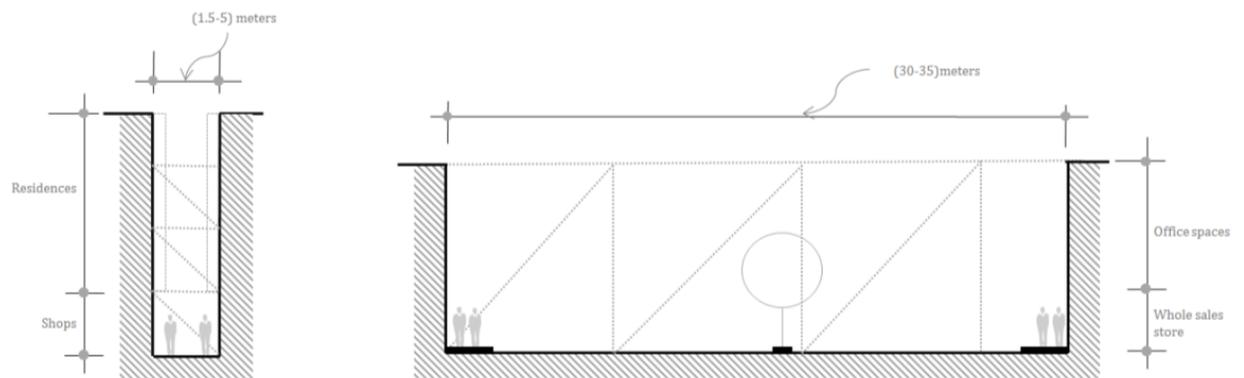


Figure 5.8 Accepted enclosure ratios.

(Source: Spooner, 2007)



0.25 : 1

3.5 : 1

Figure 5.9 Enclosure ratios for the streets of Old Dhaka.

(Source: Author)

In narrower streets, pedestrians have the scope for a closer look at the products that are displayed in the stores. Environmental comfort is an additional benefit of this type of narrower streets. These streets remain shaded during the major part of the day, which is comfortable for pedestrians in a hot-humid climate. Spooner (2007) claims that complex building facades with variety of attention help making a better walking environment than a straight one. More specifically, homogenous façade with glass surface of a modern building could create adverse effect for walking environment. Referring to this argument, neighborhood streets of Old Dhaka are rich with the variations on building facades.

In Old Dhaka the most preferred and active pedestrian streets are Shakhribazar, Panitola, Tatibazar and Malitola. These streets remain lively from early morning till midnight. Different events like shopping, eating, religious activities are basically keeping these streets active. Building heights are 2 to 4 storied and street width varies from 1.5 meter to 5 meters except the wider streets. Roads are paved and sloped to the drains at both sides. Narrower alleys connect households those are behind the shops facing the primary streets (Figure 6.23, 6.24). These alleys are generally privately owned public streets and in most of cases they are not included in City corporation's official maps. Slow and non-

motorized vehicles offer safe walking environment in the community streets of Old Dhaka. Mutual respect between vehicles such as rickshaw, bicycles, motorcycles, vendors and pedestrians resulted in the easy movement in the streets (Figure 6.24). Sides of the street spaces are used by vendors and shop owners. People in static mode such as, vendors and customers generally use this informally occupied space. The middle part of the street is used by all other vehicles and pedestrians (Figure 6.24).

5.8 Street as Social Space in Old Dhaka

Social spaces of Old Dhaka were limited to Mahallah (Neighborhood), Chowk (market square) and intimate street spaces (Khan, 1982, Nilufar 2000, Khan and Nilufar 2009, Mowla 1997, Rahman, 2003). Khan (1982) found two major types of neighborhood pattern in old Dhaka: i. linear and ii. Irregular. Nilufar (2004) also studied the neighborhood morphologies for Dhaka and found six types (Figure 5.18). However Nilufar concluded with two dominant types as *linear* and *fat irregular* spaces in general. Nilufar's (2004) broad classification supports Khan's (1982) categories of neighborhood in Old Dhaka.

5.8.1 Hierarchy of community spaces in Old Dhaka

In Old Dhaka community spaces are classified in five levels (Khan, 1982, Mowla, 1997, Figure 6.8). *Uthan* (private court) is the family court at individual house and *Bazaar streets* are the public spaces at community level. Each level of streets accommodates different user groups that are based on hierarchy and social functions. Since all of the street spaces are actually community spaces at public domain (except the *Uthans* - 1st order) so by excluding the family level space, the hierarchy of public street space can be made in four orders. Such as, 1st order: Gali (lanes); 2nd order: Mohallah (Neighborhood) street; 3rd order: Chawk (Intersection of Mohallah streets); and 4th order: Bazaar streets (city scale streets) (Mowla, 1997), (Figure 5.17).

These local names of street groups can be compared with the general hierarchy discussed by Ribeiro (2012). The Gali, Mohallah, Chawk, and Bazar of Old Dhaka can be represented by Local access streets, Local distributor, Main distributor, and Arterial Street respectively (Table 5.1).

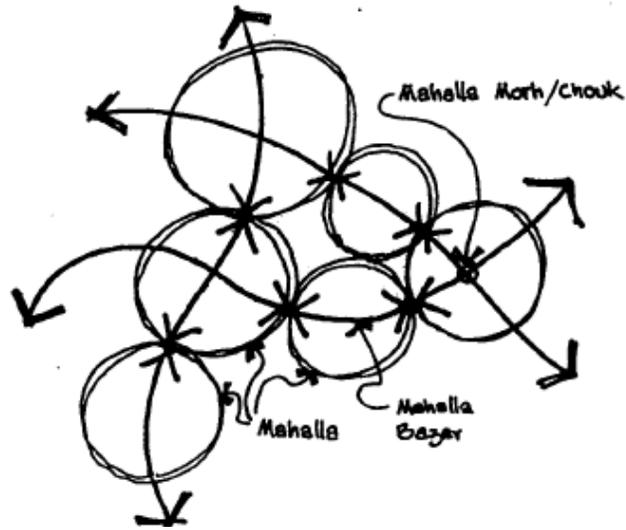


Figure 5.10 Evolution of settlement morphology in Old Dhaka Dhaka
 Fundamental order in the neighborhood (*Mahalla*) morphology.
 (Source: Mowla, 1997)

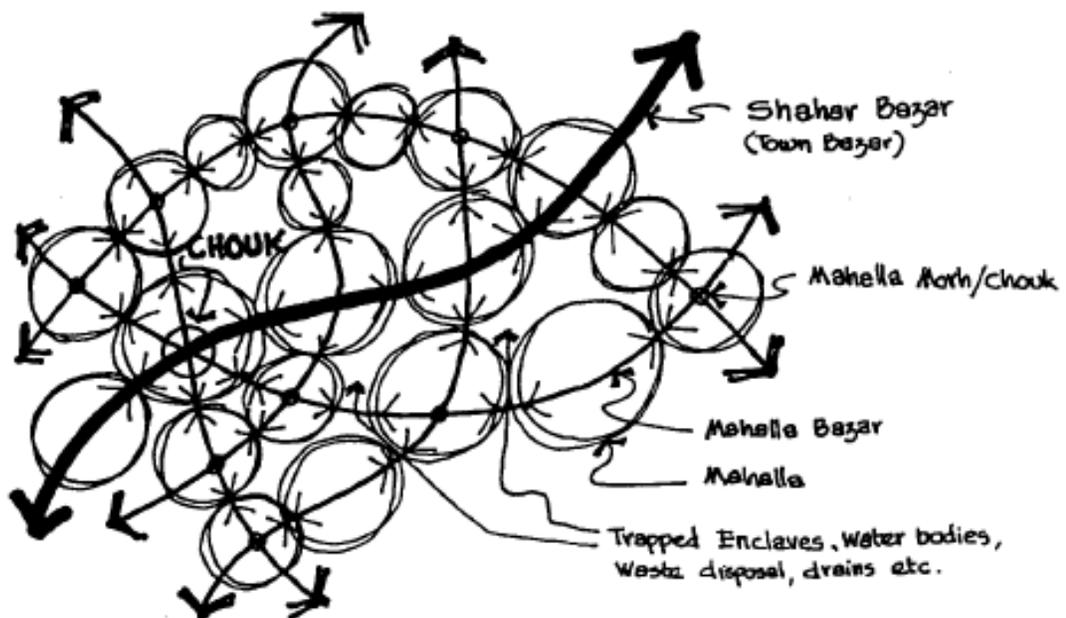


Figure 5.11 Extension of Mahalla morphology creates shahar/town morphology.
 (Source: Mowla, 1997)

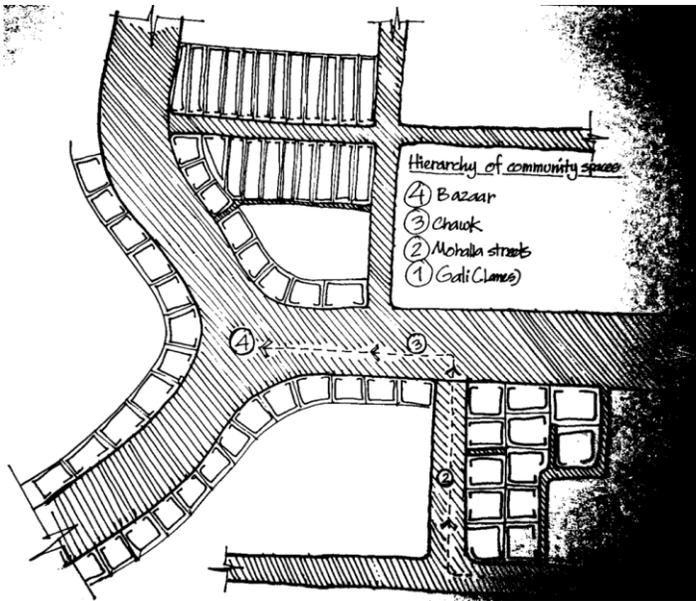


Figure 5.12 Major Street and neighborhood patterns in Old Dhaka.

(Source: Author)



Figure 5.13 Morphological Types of Neighborhood in Dhaka.

(Source: Nilufar, 2004)

This chapter provided street and neighborhood morphology, development phases of streets in Old Dhaka. The next chapter highlights the qualitative environment of street space in Old Dhaka from empirical studies. The following chapters highlighted space-sharing mechanism, temporal changes of space use, land ownership and control of street space. The knowledge of hierarchy (both administrative and experiential) has been applied in preparing questionnaires and data collection. This morphological information helped understanding the street space preference in Old Dhaka.

**Chapter 6: Qualitative investigation and Behavior Mapping in the
streets environment of Old Dhaka**

6.1 Need for a qualitative investigation of street environment

Street environments can be investigated through their physical parameters and associated activities. Research results show that both morphological factors and available functions affect behavior in streets. Streets configuration, width, connectivity (links with other streets, functions) are the major factors for physical attributes of streets. Functions like presence of necessary business, schools, and offices act as the puller for streets. Street environment can be understood by quantitative and qualitative analysis. A quantitative investigation relies more on numeric data of environmental factors. An analysis of socio cultural factor on behavior requires in depth investigation of culture and lifestyle. It is often claimed that a quantitative method lacks in strength for analyzing environment and society. An ideal qualitative analysis method has the potential to produce 'thick data'. Thick data refers to rich, detailed information about a group's culture or people's experience (Bryman, Teevan, & Bell, 2009, p.133). This also ensures transferability of research data. Rich data can be helpful to assist researchers to understand a research setting in detail. On the other hand a quantitative analysis does not require such detailed data. In quantitative analysis there might be the chance to overlook any significant social factor in research. Since this research requires in-depth investigation of environment, behavior and socio-cultural factors, so a qualitative analysis method would be appropriate.

This research focused on the streets of Old Dhaka that are not only important as the corridors for movement but also serve as social space for the community. Empirical data were collected from physical survey before and during questionnaire survey. Non-verbal communication (silent observation, photographs), and verbal communication (informal discussion) were the sources of information for the qualitative investigation. In non-verbal communication 'cues' from fixed feature elements, semi fixed feature elements; non-fixed feature elements were assessed for study in understanding environment. It is expected that understanding the messages from these three elements (fixed, semi-fixed, and non-fixed) would be appropriate get a comprehensive image of environment (Rapoport, 1982). This chapter presents the findings after qualitative investigation of streets in Old Dhaka. The findings from the investigation have been discussed in the following broad categories;

- Temporal changes of street uses and activities
- Behavior mapping of street space
- Street's physical character analysis

6.2 Temporal changes of street uses and activities

Spatial quality of street is modified by the temporal changes of activities.

Changes of activities bring out more/or new user groups of people in street.

After observation, Street activities and their frequencies were grouped into a. daily (week day and week end), b. yearly, and c. occasional time periods. The day time divisions has presented in Table 6.1.

| Day of the week | Time zone | | | | |
|-----------------|------------------------------|--------------------------|--------------------------|------------------------------|-----------------------------|
| Week day | 5 a.m. to 8a.m. (Morning) | 8a.m. to 7p.m. (Day) | | 7p.m. to 11p.m. (Evening) | 11p.m. to 5a.m. (Night) |
| Week end | 5 a.m. to 9a.m. (Morning) | 9 a.m. to 1p.m. (Day) | 1 p.m. to 7p.m. (Day) | 7p.m. to 11p.m. (Evening) | 11.p.m. to 5a.m. (Night) |

Table 6.1 Time division according to the activities in street

6.2.1. Week days: Temporal changes of users and activities

Mosque goers, school children, morning walkers, office goers, tea stall/breakfast seekers, vendors, and service delivery people dominate these streets in the morning. Muslim people, generally the seniors, start their days with going to mosque for Morning Prayer. At this time of the day all streets remain almost free from all kinds of motorized vehicles. With the sunrise, new groups of people come and occupy the streets. These include: morning walkers, service delivery persons, and street side businessmen (Figure 6.1, Figure 6.2). Business operators

in the morning mostly choose a mobile van to settle at a suitable place. The favorite places for this kind of business are the street area in front of an existing store or a space at the intersection of streets (Figure 6.3, Figure 6.4, Figure 6.5, and Figure 6.6).

The food vendors, for example the *Ghol*²¹sellers, target the businessman (local shop owners), office going people, and people returning home from morning walk. This drink (*ghol*) is considered healthy and local people want to start their day with a glass of *ghol* (Figure 6.9). These businessmen leave their occupied place as the shop owner comes in and start business. After that point of time the environment changes as the new set of business and client groups come in the street space.



Figure 6.1 Morning street: delivery persons busy with van.

(Source: Author)



Figure 6.2 Busy street in front of restaurant for breakfast.

(Source: Author)

²¹ Ghol: A kind of drink made from milk.



Figure 6.3 Street corner business in morning.

(Source: Author)



Figure 6.4 Moveable business available for morning pedestrians.

(Source: Author)

Legend

- | | | |
|---|---|---|
|  Vehicle: Rickshaw (Non-motorized three wheeler) |  Vendors display |  Pedestrian: Stationary |
|  Bicycle |  Vendor: Cigarette, drinks, etc. |  Pedestrian: On the go |
|  Motorcycle |  Store owners occupation |  Three wheeler (motorized) |

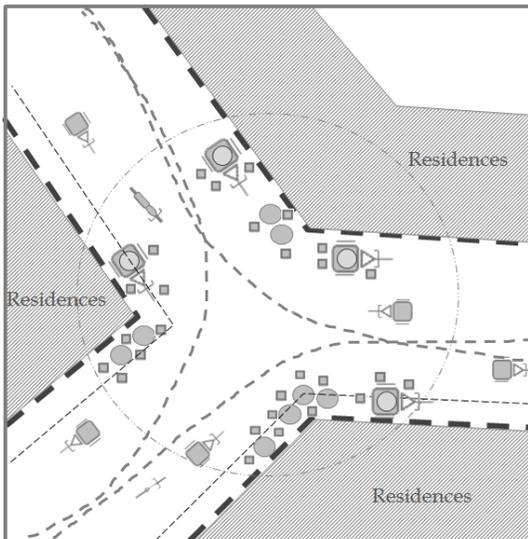


Figure 6.5 Street intersection at morning.

(Source: Author)

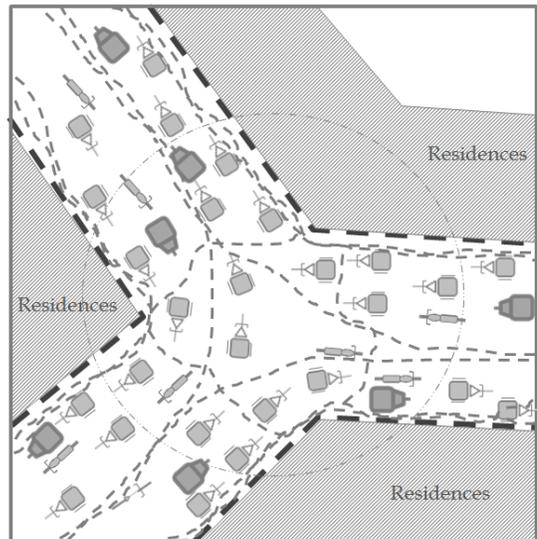


Figure 6.6 Street intersection at daytime.

(Source: Author)



Figure 6.7 Temporary business in morning.
(Source: Author)



Figure 6.8 Temporary business in Friday. (Source: Author)



Figure 6.9 Street vendor in morning
A vendor occupies a part of street in front of a permanent store with the storeowner's verbal permission.
(Source: Author)

Around 9 a.m. streets activities attain full impact. Street vendors, who have occupied spaces in front of established stores during the morning, either close

their business or become mobile to look for another suitable place. Vendors play a vital role in business operation and indirectly influence pedestrian movement. Vendors can be classified according to the space occupation as, a. floating business space, b. business space under another's control, c. business space that is not formally controlled.

The businessman who moves with his unit from place to place for a shorter time creates a floating business space. He sets up his station at any part of the street at a convenient time for him (Figure 6.7, Figure 6.14). Sometimes an informal right to use of a space is given for business by a formal business operator. This space is generally the part of the street in front of the permanent store and the business operated on that space that is not formally controlled (Figure 6.9). The business time is either daily morning or Friday afternoon when the main store remains closed. In this case, no permission is required to occupy that part of street space for business (Figure 6.8). Sometime people want to avoid seeking formal permission and look for a space that is less controlled. For example, in front of a solid wall (assuming nothing is happening behind) or the spaces between two stores, are favorite places for temporary businesses (Figure 6.12, Figure 6.13). The boundary walls of government buildings are the favorite place to operate this kind of business (Figure 6.16). Securing a space that is not absolutely controlled by others, except government authority, constitutes a third kind of street space occupation and use. Generally that space has no direct access for

pedestrian or vehicular movement such street corners, space between electrical poles (Figure 6.15, Figure 6.16).



Figure 6.10 Vendor free street.
Vendors are moved away after morning time.
(Source: Author)



Figure 6.11 Street occupancy in day time.
Dominance of pedestrians and non-motorized vehicles on streets.
(Source: Author)



Figure 6.12 Business between stores.
The business man holds a space in between the space of stores and against solid wall.
(Source: Author)



Figure 6.13 Business extension on the street.
The vendor and the storeowners both are occupying street space.
(Source: Author)



Figure 6.14 Multiple business places on street.

The businessman is sharpening a knife with his portable unit and frequently changes stations.

(Source: Author)



Figure 6.15 Business on government land.

A businessman occupies a place between two electrical poles and against a wall.

(Source: Author)



Figure 6.16 Street side bazaar in community street.

(Source: Author)



Figure 6.17 Street space use for construction work.

(Source: Author)

Evening is one of the busiest times of the day when a larger volume of pedestrians is seen on the street. This is the time when people return from their job, people (especially Muslims) go to mosque for prayer, and youngsters return

home. It is common practice for office workers to do grocery shopping on the way to return home. To facilitate that, some street markets open in the evening, which continue till 9-10 p.m. approximately. It is also a common social practice that all children would return home at the evening or at the time of evening prayer 'Maghrib'²². Because parents make sure that their kids are at home after evening, and doing their school works. Parents also don't feel safe to keep their children after evening.

There are no or very few activities noticed in the street in night time. A few people who are returning from other areas and from local cinemas can be seen till mid night. At night some of the community streets are kept closed and maintained by a local security guard (Figure 6.18 and Figure 6.19).



Figure 6.18 Gated community street-a.

(Source: Author)



Figure 6.19 Gated community street-b.

(Source: Author)

²² Maghrib (in Arabic); The name of evening prayer for Muslims.

6.2.2. Weekend: Temporal changes of users and activities

In Bangladesh, Friday is the weekend and also Muslim's weekly prayer day.

Muslims dominate street activities on Friday, as attending the Friday prayer at mosques is a dominant religious practice. The social practice is to go to mosque at noon with all family members (male and children). For this reason, since most of the mosques become full at the time of Friday prayer, religious observance sometimes extends onto streets (Figure 6.22, Figure 6.24).



Figure 6.20 Weekly and temporary street business-a.

At Friday noon the temporary businessman is targeting the prayers coming from mosque as potential clients.

(Source: Author)



Figure 6.21 Weekly and temporary street business-b.

The crowd after Friday prayer. Businessmen are running their business for a short period of time (2-3 hours).

(Source: Author)

6.3. Behavior mapping in the streets of Old Dhaka

Pattern of space use in street vary with width, connectivity, and activity types. These factors affect and guide behavior of all users groups of streets. The behavior of pedestrians, businessman and vehicle operators in different types of streets have been mapped in the following discussion. The behavior has been identified and recorded by filed notes during the field investigation. Samples of the filed notes are Figures 6.22 and 6.23. The field notes on pedestrian behavior have been presented schematically for different types of streets. If the street has footpath then a part of that is occupied²³ for business use (Figure 6.30). If there is no footpath then a part of street would be occupied for business either by owners or vendors (Figures 6.26 - 6.29). Though the space occupation by storeowners and vendors is illegal but it has been socially tolerated and accepted because it is a now a social practice and neighborhood people became dependent on these informal businesses through time social practice (Figure 6.14, Figure 6.16).

Street width is a major factor that determines numbers and types of activities, and vehicles they can accommodate. Due to space limitation secondary and tertiary roads don't have fixed space occupation (Figure 6.24, Figure 6.25).

²³ The nature of space occupation, control and negotiation process is described in chapter 10

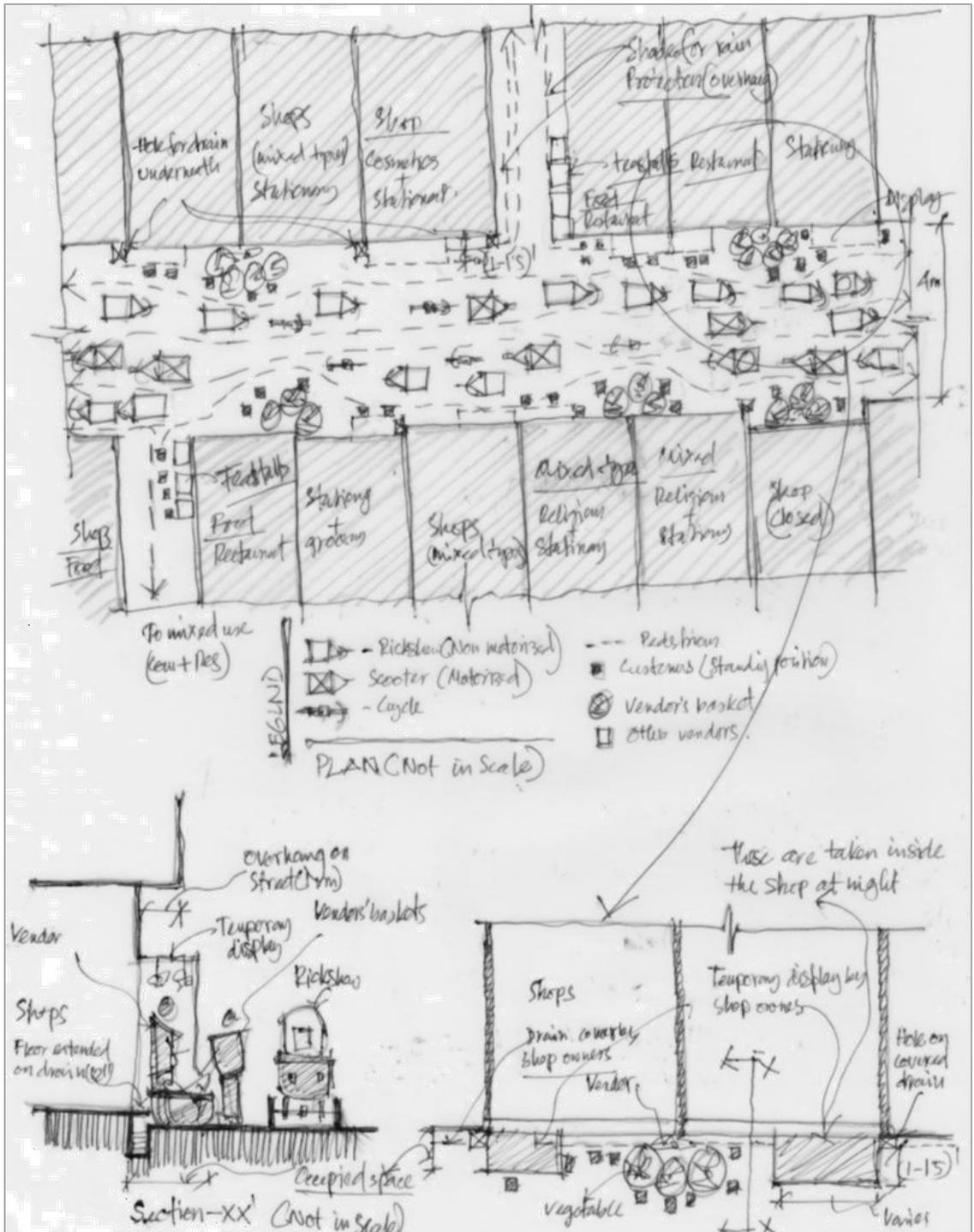


Figure 6.22 Field note -1 (Behavior Map), Shakhari Bazar street (Source: Author)

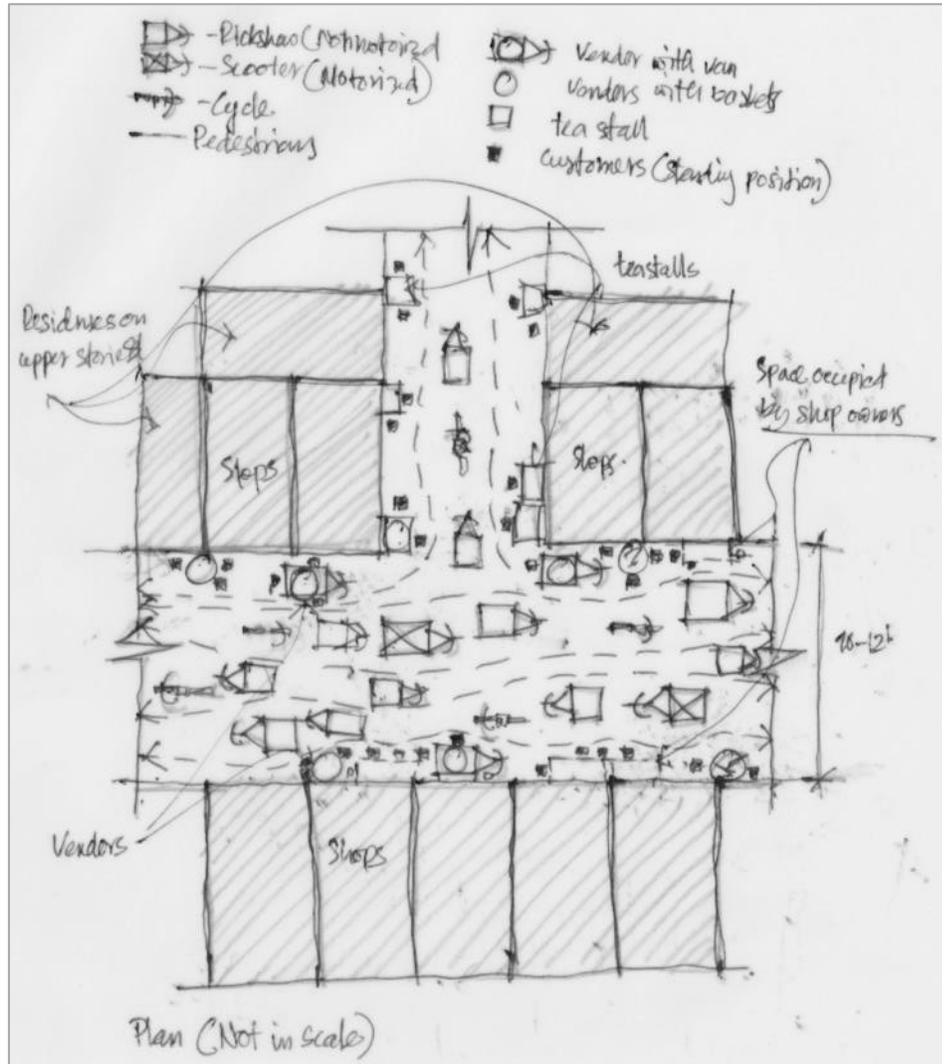


Figure 6.23 Field note -2 (Behavior Map) Malitola
(Source: Author)

Widths of primary streets are divided into three basic zones i.e. effective road and two occupied zones on its both sides (Figures 6.26 - 6.30). The occupied area of the street is mainly used for commercial use and there are additional spaces for religious purposes (Figures 6.30, Figure 6.31, Figures (6.35 - 6.38)). The use of streets space for Hindu and Muslims are different; for example Muslims go to

mosque five fixed times a day but Hindus don't visit temples on strict times. Muslims follow north-south elongated lines when they pray which not required for Hindus (Figure 6.37 and Figure 6.36). Muslims pray in lines because it is a strict guideline for prayer. On Friday (also weekend) the number of people comes to mosque more than the regular times. In case of space shortage for the additional people prayers extend into adjacent streets (Figure 6.38). Other than pray times the street spaces in front of mosque is used by the vendors and shop owners (Figure 6.33, Figure 6.35).

In typical primary streets vendors usually hold a space until eviction. In night or in morning the holdings of spaces are maintained by keeping their baskets at the same places (Figure 6.27). No one would remove those tied up baskets because the holding of those spaces by baskets are socially accepted and negotiated. In the streets where one side is not used by shops and closed by walls of storage or factory vendors hold the whole length of the street. The controlled areas are determined by the number of baskets and the number varies depending on the vendors' negotiating capacity (Figure 6.28, Figure 6.29).

Rickshaw and three wheelers make stopovers for passengers at the intersections of primary and secondary streets. The intersections are chosen because

pedestrians and rickshaw pullers can see each other from all directions of streets (Figure 6.28). Vendors with moveable van also prefer to operate business at the intersections of streets for the same reasons as the rickshaw pullers (Figure 6.24, Figure 6.25). The use pattern at the intersections in residential area is different than a commercial street. Vendors with their moveable vans temporarily hold roadside space in the morning time. Around 8 am vendors leave that space because most of the residence owners would not allow business attached to their gate (Figure 6.5, Figure 6.6).

Pedestrians also share the streets even when streets are fully occupied by vehicles. There are no physical division of space in shared streets rather mixed up because the flow of pedestrian and vehicles are not controlled by any authority rather it's a mutual understanding.

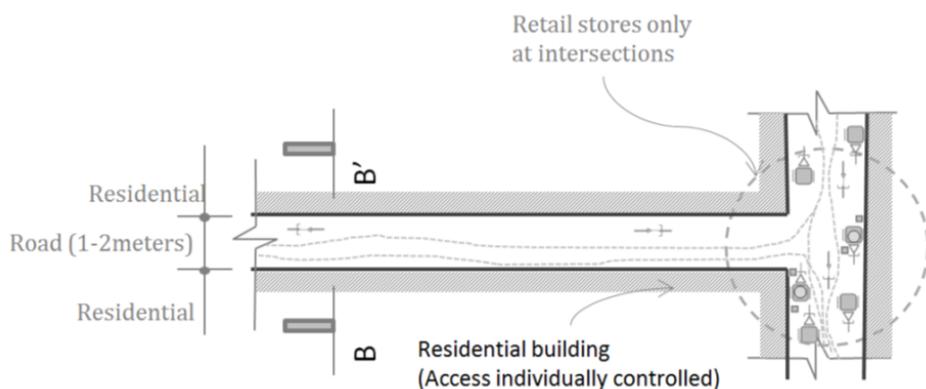


Figure 6.24 Behavior map: Typical tertiary street
(Not in scale, Source: Author)

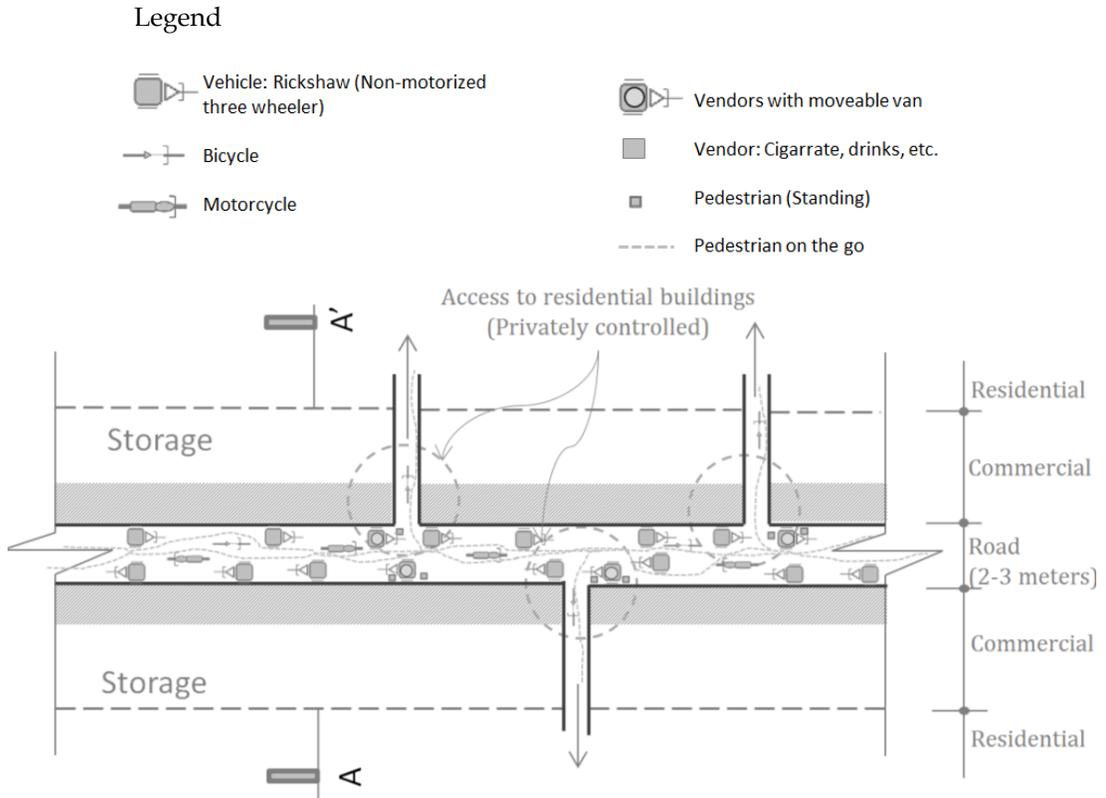


Figure 6.25 Behavior map: Typical secondary street

(Not in scale, Source: Author)

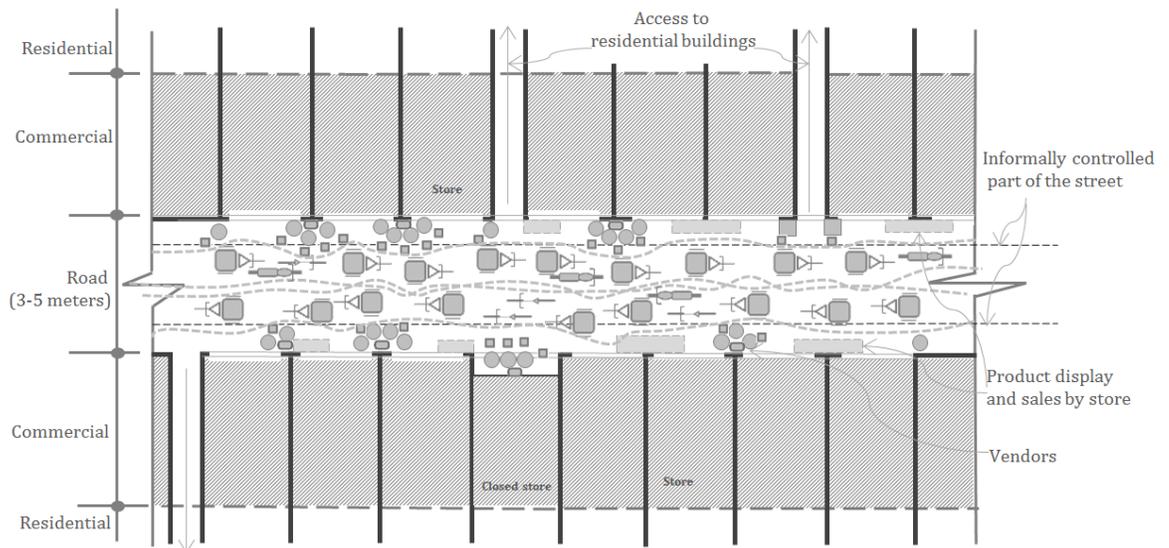


Figure 6.26 Behavior map: Typical primary street (narrow) in busy daytime.

(Not in scale, Source: Author)

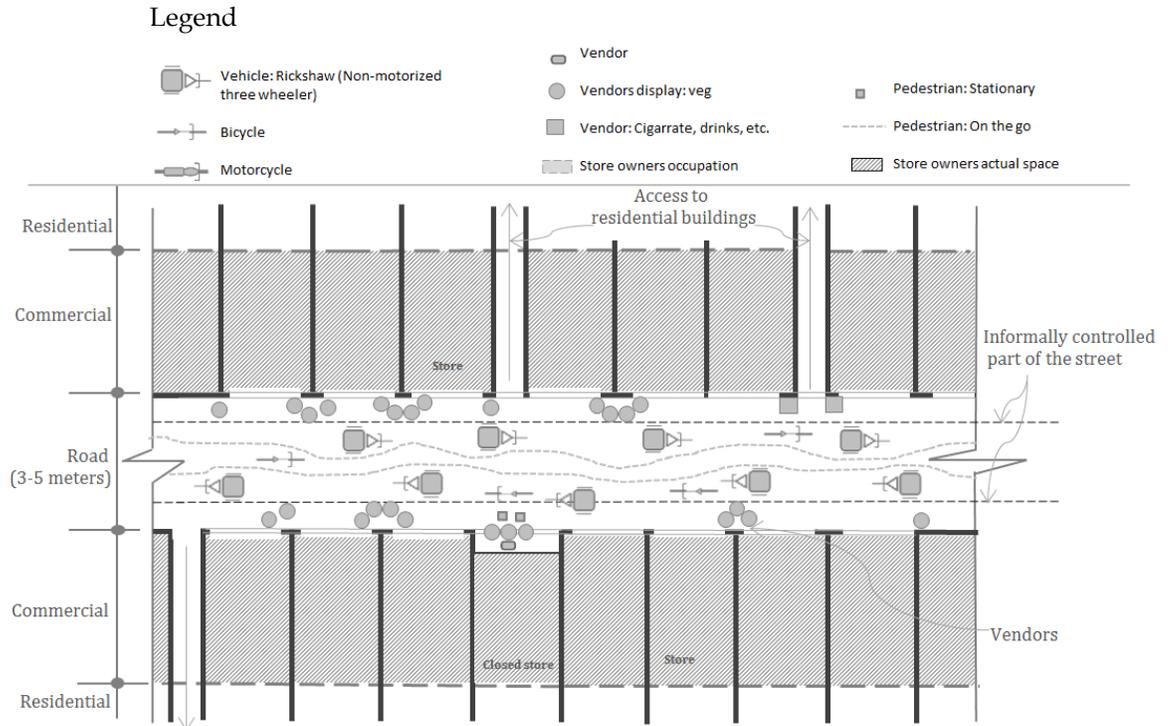


Figure 6.27 Behavior map: Typical Primary Street (narrow) in early morning. (Not in scale, Source: Author)

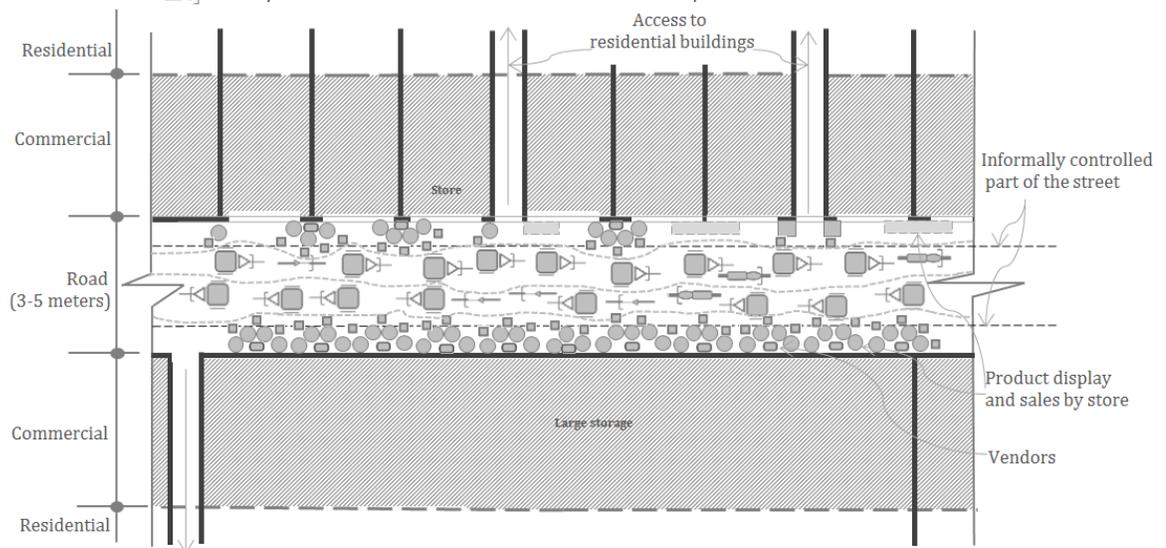


Figure 6.28 Behavior map: One side open typical primary street (narrow) in busy daytime.

(Not in scale, Source: Author).

Legend

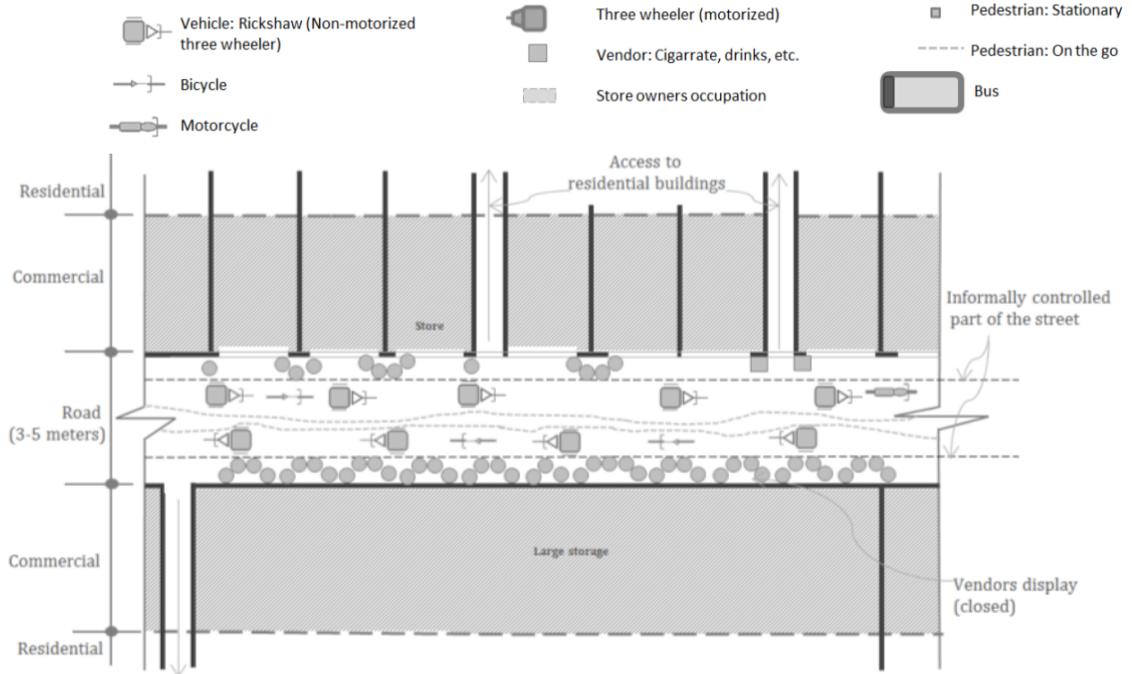


Figure 6.29 Behavior map: Typical primary street (narrow) in early morning, One side of the street open

(Not in scale, Source: Author).

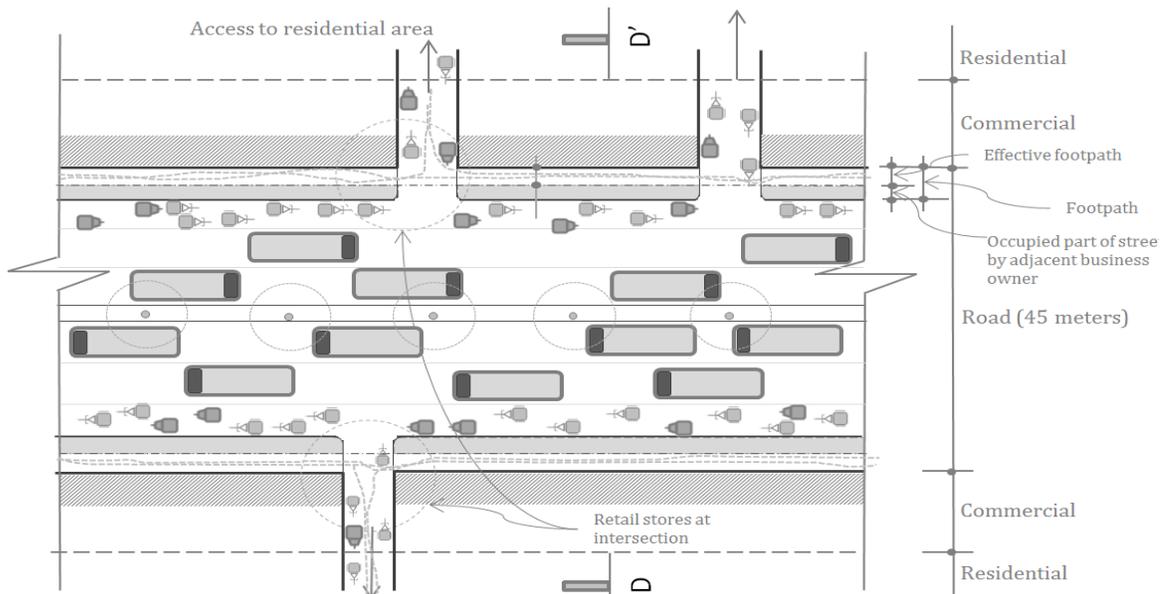


Figure 6.30 Behavior map: Typical primary street (Wide) in day time,

(Not in scale, Source: Author).

6.4. Socio-cultural activities and street use

Religion is one of the major factors that guide social activities. Muslim and Hindu are two religious groups dominant in the study area (Appendix C and Appendix D). Religious institutes for Muslims and Hindus are mosques and temples, respectively. Most of the religious activities occur in these mosques and temple that often extended into adjacent street spaces (Figure 6.24, Figure 6.25). Other than prayer times streets in front of mosques or temples used for local business (Figure 6.28, Figure 6.29).



Figure 6.31 Religious events (Muslim) on street.

The Friday prayer is extended on street from the mosque.

(Source: Author)



Figure 6.32 Religious events (Hindu) on street.

Street is being used as the space for prayer for Hindu temple.

(Source: Author)



Figure 6.33 Street use in front of mosque other than prayer.

(Source: Author)



Figure 6.34 Street in front of temple other than prayer.

(Source: Author)

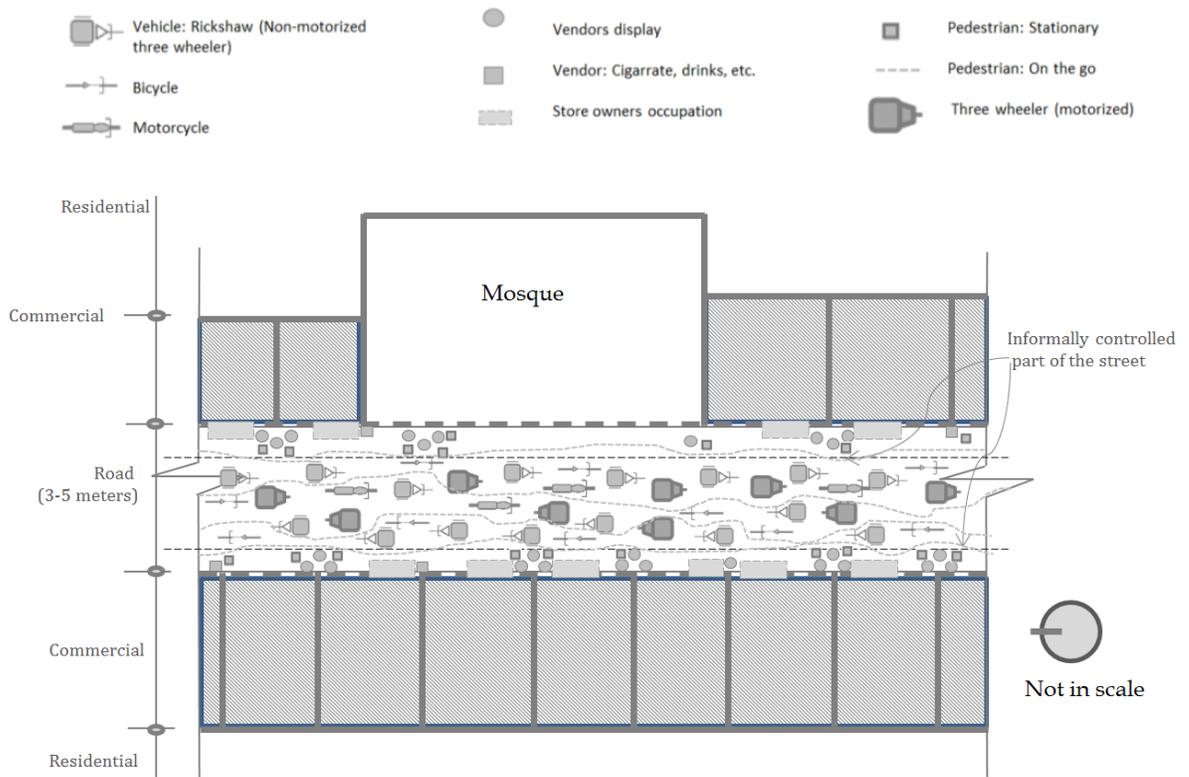


Figure 6.35 Behavior map: Religious activities (Mosque), Daytime-regular (Not in scale, Source: Author).

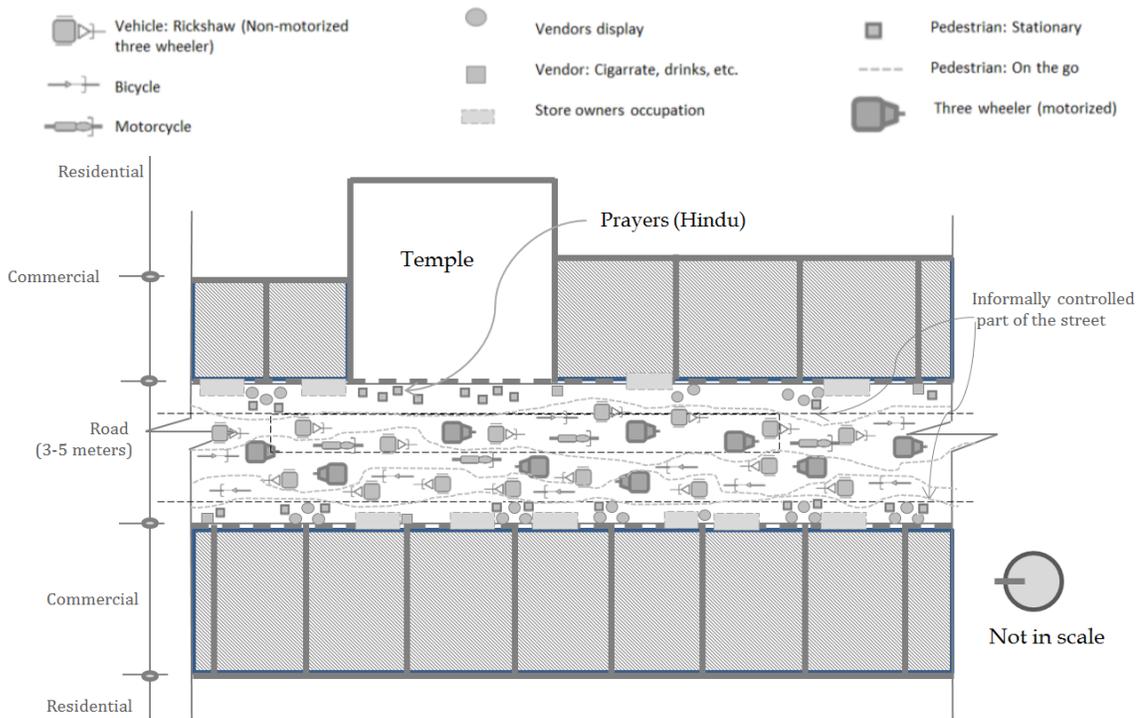


Figure 6.36 Behavior map: Religious activities (temple), Daytime-regular (Not in scale, Source: Author).

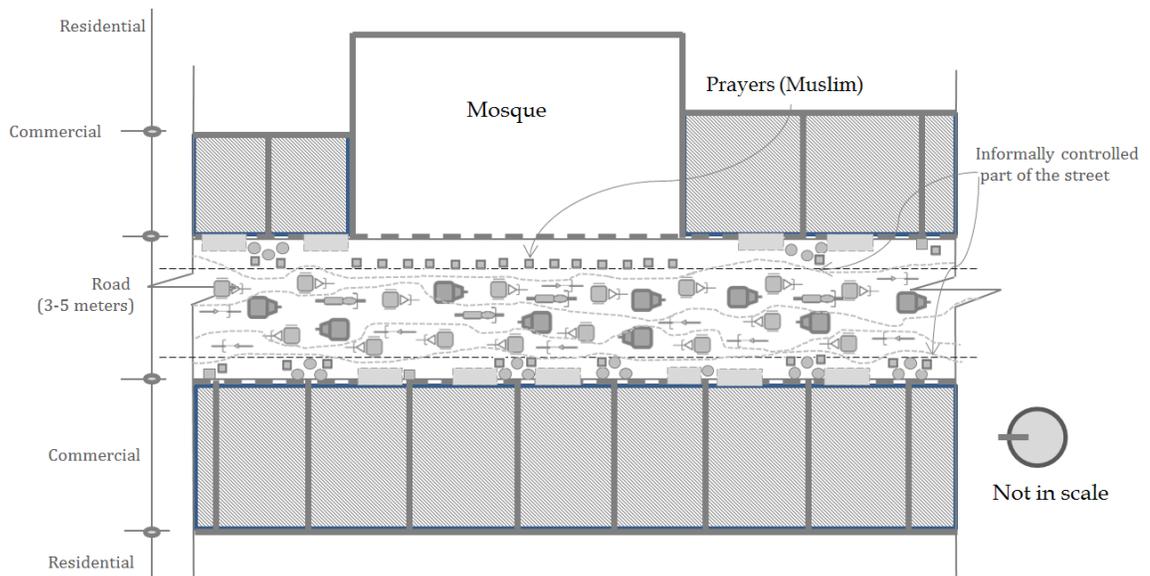


Figure 6.37 Behavior map: Religious activities (Mosque), Daily Pray time (Not in scale, Source: Author).

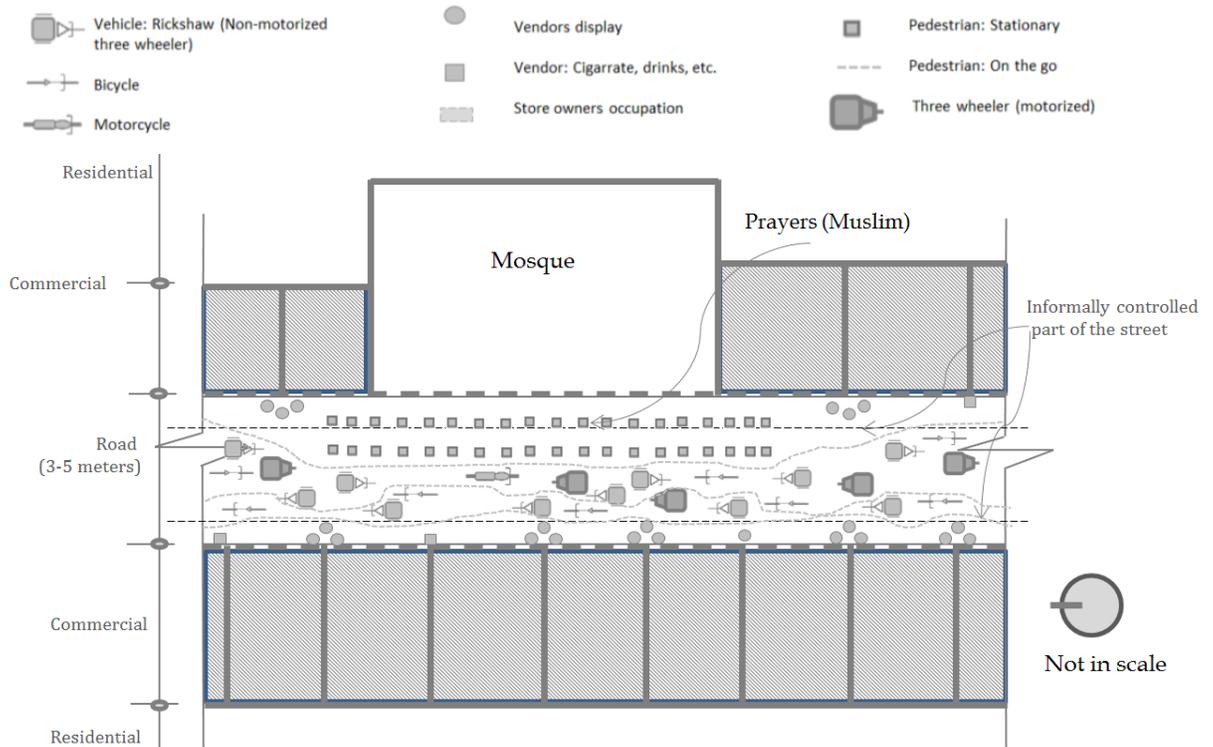


Figure 6.38 Behavior map: Religious activities (Mosque), Pray time-Friday
(Not in Scale, Source: Author)

Two of the major religious activities for Muslims and Hindus are Ramadan and Durga Puja. These are yearly religious events where Ramadan lasts for one month and Durga Puja for 3-4 days (Appendix C and Appendix D). In Ramadan, streets of the Old Dhaka can be seen almost fully occupied by vendors who sell Iftar²⁴ and eventually streets became bazaars (Figure 6.39, Figure 6.40). The places of Iftar bazaars create an image of festival, which is unique for not only Old Dhaka but also for whole Dhaka city. People come to buy food in these street

²⁴ The food what is taken at evening after a day long fasting.

markets from all over the Dhaka city. These Iftar bazaars generally start at noon and continue till evening.



Figure 6.39 Iftar bazaar in Old Dhaka²⁵



Figure 6.40 Iftar bazaar in Old Dhaka



Figure 6.41 'Durga Puja' stage in Old Dhaka street²⁶



Figure 6.42 Street decoration for Durga Puja in Old Dhaka at night²⁷.

²⁵ Source: thewritersclub.wordpress.com/2008/09/

²⁶ Source: <http://jishankhan.wordpress.com/2009/03/05/durga-puja-in-shakhari-bazar/>

²⁷ Source: <http://banglaphoto.wordpress.com/2009/04/30/a-death-in-chakari-bazar/>

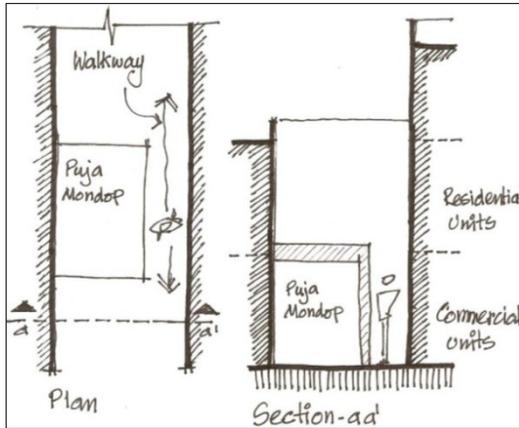


Figure 6.43 Partial occupation of street for Puja stage.

(Not in Scale, Source: Author)

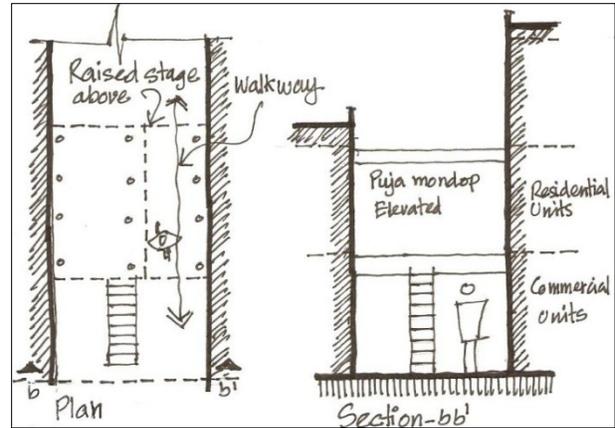


Figure 6.44 Fully occupation of street with raised platform for Puja.

(Not in scale, Source: Author)

For Durga puja, the festival continues for 3-4 days from morning till midnight. During this time the part of the street becomes a place for social gathering (Figure 6.41 and Figure 6.42). Sometimes the Puja stage is built on a raised platform, allowing a route for pedestrians under it (Figure 6.43, Figure 6.44). In other cases the Puja stage is not built on a raised platform but a passage is kept for pedestrian movement (Figure 7.32). Various other activities keep the street life vibrant all the year round such as from social festival to religious rituals, family program to community's procession are usual pictures of Old Dhaka (Figure 6.38).



Figure 6.45 A procession for Hindu marriage ceremony in the street of Old Dhaka²⁸.



Figure 6.46 Holi festival for Hindu in the street of Old Dhaka.



Figure 6.47 Procession in Shakhari Bazaar Street Old Dhaka²⁹.

²⁸ Source: http://www.piebaldo.com/?filter=tags_s_mv:old%20dhaka

²⁹ Source: www.eprothomalo.com (Accessed on 02.09.2013)

This research investigated behavior and spatial qualities using both qualitative and quantitative methods. The result of qualitative investigation from this chapter served as complementary data for the final survey data analysis in Chapter 10. The qualitative investigation came up with the some important findings. The findings are,

- a. *The vibrancy and intensity of the activities are important features of street life.*

Vibrancy and intensity of activities offers diversified kinds of activities to community people. By observing and understanding socio-cultural activities people become familiar with them. People gradually become able to extract and understand the meanings of what others transmit in verbal and non-verbal communication. For example, all people know the meanings of colors in dress and the items they are carrying for a part of marriage ceremony in Hindu religion (Figure 6.43, Figure 6.44). Not only are the dress and the items meaningful but also there is also specific meaning of this pedestrian movement. By observing these events for several years all community's people were able to extract meaning from these specific socio-cultural activities.

- b. *Shared space for commercial activities in urban street are not static.*

The streets are shared for commercial activities that also move from place to place to find particular suitable locations. Suitability of place depends on

informal permission from the adjacent shop owners and local leaders. Selection of business space and time also depend on potentiality of attracting more people during different times of the days. This specific 'time' and 'space' selection are done according to the needs of the community people. For example, a business usually operated in the morning, targets the people who are going for their job in office or business place (Figures 6.3, 6.4, 6.5, 6.6, 6.7, 6.8).

c. Street has defined zones for specific religious activities.

There is the use of same streets by different religious groups but some parts of the street are dedicated to specific religious activities. Streets are open for activities of all religious groups (Figures 6.29, 6.30, 6.33, 6.34, 6.35,6.36). It is socially accepted that some parts of the streets can have dedicated use for specific religious activities. This qualitative investigation of street space was conducted fundamentally by direct observation, and informal discussions with local people. Application of this observation method was a part of recording behavior data in urban space that has been applied in this research. A complete description of behavior recording method has been illustrated in Chapter 7. It was expected that the proper record of behavior data would help identifying relation between environment and culture. In Chapter 7 analysis of different methods for recording behavior data is analyzed. After the analysis a working method for recording behavior data has been developed and presented.

Chapter 7.0 Conceptual model for recording spatial behavior

7.1 Introduction

Human perception of space is complex. It is hard to develop a common system that is applicable for analyzing everyone's perception. Perception of space guides the character of an individual's spatial behavior. Behavior varies according to the experience of individuals in different types of environment. Several methods have been developed but most of them are mainly descriptive in nature and less emphasis has been given in presenting results graphically that are not communicable to all. It is necessary to understand the complex relation between environment and behavior in order to identify perception of space. This research was initiated with a goal to identify behavioral patterns in urban street environments. This goal necessitated identifying a comprehensive method to study spatial perception. To fulfill the target this research was conducted in three major steps. The steps are i. Analysis of existing theories of observation and recording behavior in environment-behavior studies. ii. Develop a method to record behavior data. iii. Application of that method in studying and recording behavior in a public space. This chapter highlights the first two major steps.

7.2 Theories of Observation in Environment-Behavior studies

'Environment-behavior' is a self-explanatory word which combines two words of different meanings, but in combination they represent a broad field of study in

environmental psychology. Since behavior cannot be explained without its surrounding environment so it is necessary to have a clear knowledge on behavioral components and their relation with environment.

What one watches other people do is referred to as behavior. "...behavior is that what an organism is doing at any moment. Behavior is always attached with environment and thus behavior and environment should be studied together" (Bechtel and Zeichel, 1987). So if there is a regularity of our activities in certain environments over time then it is our behavior. Behavior is the combined expression of different actions, which we perform in our daily life. The modes of our activities vary from personal to public levels, which make behavior dynamic in time and space. The span of behavior ranges from molar (or global) to molecular scale. 'Molar' focuses on studying behavior in a broader scale, for example children are going to school, or playing in the field. On the other hand 'Molecular' deals with smaller scale (Bechtel and Zeichel, 1987). These scales are not fixed but vary among different researchers. A molar unit of behavior for one researcher may be seen as a molecular unit for another researcher. Bechtel and Zeichel differ with the works of Barker and Birdwhistell where they identified Birdwhishell's factors of observation as too small for Barker.

Another important factor in behavioral research is the determination of units of environment, which are necessary for counting behavioral occurrences in that

particular setting (Bechel and Zeichel, 1987). Proper definition and identification of 'unit' are necessary to establish the validity of research. Since behavior should be perceived as inseparable from environment so to study their relationship one must jump deep into the 'behavior setting'. Schoggen (1989.p.48) postulated that "A behavior setting has found its greatest usefulness in studies of public areas of whole small towns as environment for behavior...". Wicker (1976) referred to the environmental psychologist Roger Barker in giving the examples of 'units' in behavioral settings as public places and activities such as bank and church. "These behavior units are common phenomenal entities and they are natural units in no way imposed or created by investigator" (Schoggen, 1989.p.14). The essential nature of behavior units are summarized as,

| | |
|----|---|
| 1. | "They occur without feedback from the investigator, they are self generated; |
| 2. | Each units has a time-space locus; and |
| 3. | An unbroken boundary separates an internal pattern from a different external pattern" |

Table 7.1 List of essential nature of behavior units

Source: (Schoggen, 1989.p.14)

Rapoport's process of understanding environment-behavior is different from others. The analysis of behavioral setting, time, organization are found as

common factors in most of the research processes (Rapoport, 2000). Rapoport proposes several filters to perceive environment as whole. These filters can be cultural, personal, group or one can add specific filter(s) to orient their research in its specific direction (Figure 7.1). According to Rapoport's (2000) model, perception of environment should pass through evaluations against different factors like images, norms, standards, meanings and so on.

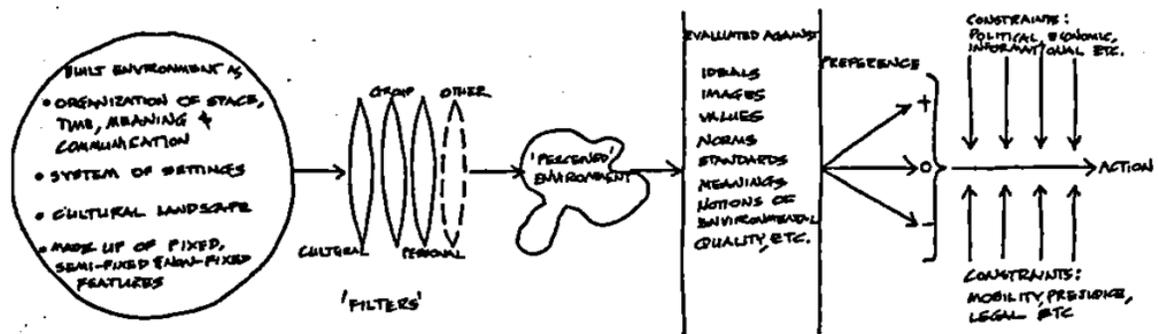


Figure 7.1 Model of Environment evaluation process.

Source: (Rapoport, 2000)

Conventional theories of environment-behavior studies are different in nature but possess some parameters, which are common i.e. analyzing the type of settings, units, scale, and time. So, if one wants to measure behavior in a given setting, the person must consider those common parameters where humans should be treated as elements in the behavior unit³⁰.

³⁰ The 'setting' and 'unit' for this research have been discussed in Chapter 9

7.3 Theories of Measuring and Recording Behavior Data

To understand the nature of behavior in a given setting, it is important to know how data are recorded and presented. The detection and recording of environment-behavior may vary with changes of observers and observation methods. Before measuring and recording the behavior data one should first analyze and measure/count the behavior settings and units. Without proper understanding the setting it is difficult to run a model for recording behavior data. Bechtel (1987a) proposes a common format to understand and measure behavior settings. This method primarily highlights counting all behavior settings and units in a community. The general process of behavior setting survey should have the following steps (Bechtel, 1987a),

- i. Preliminary list (from yellow pages to newspaper archives etc., to get information about range of activities in the community).
- ii. Research on the list and potential behavior settings (identifying missing data in the list and filling the technical data on all the behavior).
- iii. Final list.
- iv. Analyze data.

The common major methods of recording behavior are a. Behavior specimen record, b. Behavior Mapping, c. Proxemics, d. Kinesics, e. Photographic technique, f. Measuring by the Global Scales of behavior, g. Self-report/direct observation data collection technique, h. Behavioral focal points assessments, i.

Time-Budget method, j. Time-geography method (Betchel and Zeichel, 1987; Bechtel, 1987b; Zimring, 1987; and Michelson, 1987).

These available methods were analyzed to develop a suitable method to record behavior data for this research. Brief descriptions of each of the methods are presented here.

Behavior specimen record

Developed in late forties (Barker & Wright, 1951) and the basic steps of this method are,

- Observer will write down everything in most common-sense language.
- Generally observations last for a full day.
- Hand written on lined 11x 8 ½ inch clipboard attached with stop watch.
- Some times continuous recording of description of events are done.

Behavior Mapping

Behavior Mapping is an observation tool where an environment is drawn to scale and notes of behavior are placed in actual positions in that map (Figure 8.2 and Figure 8.3). Behavioral mapping was developed to record behavior in any

designed space where five essential elements are identified (Bechtel and Zeichel, 1987). The elements are,

1. A graphic rendering of the area(s) observed
2. A clear definition of the human behavior observed, counted, described or diagrammed.
3. A schedule of repeated times during which the observation and recording take place.
4. A systematic procedure followed in observation
5. A coding and counting system, which minimizes the effort required in recording observation.

The simplified procedure can be described as, obtain accurate map ----- > decide the behaviors to be observed ---- > schedule specific times for observation ---- > agree on the system for recording and -----> analyze the data.

1. *Professional duty without patient*—any actions necessary for the completion of a staff member's professional duty, including: charting, punching in, medication preparation, deliveries, preparations for parties that do not involve food, adjusting equipment, cleaning, clerical, Xeroxing.
2. *Professional duty with patient*—caring for and assisting patient, except in feeding, including: bathing, applying equipment, sitting with patient so patient can smoke, giving medicine, wheeling patient in wheelchair, physical therapy, hygiene.
3. *Meeting*—formal, more than two individuals, congregating in same location for a specific purpose, exclusive of special activities; examples: report, family conferences, administrative/staff meetings.
4. *Smoking*—a sole personal activity, all other categories take precedence except postural categories.
5. *Talking*—more than one person necessary, speaking with another, no particular location is necessary, talking takes precedence over smoking, sitting, standing, pacing, T.V., radio, traffic, lying in bed.
6. *Eating and drinking*—sole activity, consumption, personal activity, does not include food preparation that involves other person helping the patient eat, no certain location necessary.
7. *Food preparation*—includes anything to do with food, except personal eating and drinking; examples: storage, distribution, clean up, encouragement, cooking, setting up for parties (displaying food).
8. *Hygiene*—personal body care; examples: makeup, hair, teeth, fingernails, shaving, grooming, toileting, done by or to oneself.
9. *Telephone*—using the telephone.
10. *Lying in bed*—patient activity, all other categories take precedence.
11. *Sitting*—independent of location, postural category, all other categories take precedence except lying in bed and standing.
12. *Standing*—postural category, all other categories take precedence except for sitting and lying in bed.
13. *Pacing*—undirected walking, back and forth, takes precedence over no other category.
14. *T.V./radio*—the act of viewing or listening, takes precedence over postural categories, talking, and smoking.
15. *Reading and writing*—if an individual is being read to, the reader is performing a professional duty; if person is reading or writing and listening to radio, the observable behavior (reading or writing) is chosen.
16. *Recreation*—play activities, arts and crafts, group or individual, not T.V./radio, reading or writing, or special events.
17. *Traffic*—movement from one place to another, all other categories take precedence; includes: moving of equipment without patient being involved.
18. *Interaction*—communication between two individuals.

Figure 7.2 Sample of categories for behavioral mapping

Source: (Bechtel and Zeichel, 1987)

constitute the norm for a culture in a specific type of situation. Figure 8.4 is and an example of this method which is showing peoples movements and activities with some proxemics codes.

| INSTRUCTIONS | | CODE | |
|---|------------|--------------------------------|-------------|
| | Column No. | Variable | Description |
| 62 Posture See Coding Scale opposite. | 62 | Posture | 0 |
| | | | 1 |
| | | | 2 standing |
| | | | 3 leaning |
| | | | 4 sitting |
| | | | 5 squatting |
| | | | 6 prone |
| | | | 7 |
| | | | 8 |
| | | | 9 |
| 63 Body orientation This scale describes the orientation of the subjects' bodies to each other, beginning with back-to-back orientation (0) and opening out through side-by-side (5) and right-angle (7) to face-to-face orientation (9). The shoulders are the reference points to observe in deciding orientation. The most common positions for interacting are 5 through 9, although two persons standing "in line" (4) or backed up to each other (0) in crowds will also be aware of and interact with each other to some extent. Be sure that both subjects in an interaction are rated the same on this scale. (See Coding Scale opposite.) | 63 | Body orientation | 0 |
| | | | 1 |
| | | | 2 |
| | | | 3 |
| | | | 4 |
| | | | 5 |
| | | | 6 |
| | | | 7 |
| | | | 8 |
| | | | 9 |
| 64 Lateral displacement of bodies Refers to the amount of displacement on the body orientation scale (63). Records the degree to which the subjects are removed from the base positions. The displacement spectrum is amplified by adding increments of space to the basic displacement of the subjects; this space is indicated by the "plus" in the coding scale opposite. | 64 | Lateral displacement of bodies | 0 |
| | | | 1 |
| | | | 2 |
| | | | 3 |
| | | | 4 |

Figure 7.4 Examples of Proxemics codes

Source: (Bechtel and Zeichel, 1987).

Kinesics

Kinesics is the tool to observe and record behavior, which are dependent on non-verbal activities such as motions of the body as language. Symbols are known as *Kinograph* (Bechtel and Zeichel, 1987). Figure 8.5 is an example of applying Kinestics method of recording non-verbal motions of different parts of body such as, smiling, lip biting, whistle and so on.

| FACE | | | |
|---|--------------------------------------|---|----------------------|
|  | Out of the side of the mouth (right) |  | Whistle |
|  | Set jaw |  | Pursed lips |
|  | Smile tight—loose o |  | Retreating lips |
|  | Mouth in repose lax, o; tense — |  | Peck |
|  | Droopy mouth |  | Smack |
|  | Tongue in cheek |  | Lax mouth |
|  | Pout |  | Chin protruding |
|  | Clenched teeth |  | "Dropped" jaw |
|  | Toothy smile |  | Chewing |
|  | Square smile |  | Temples tightened |
|  | Open mouth |  | Ear "wiggle" |
|  | Slow lick—lips |  | Total scalp movement |
|  | Quick lick—lips | | |
|  | Moistening lips | | |
|  | Lip biting | | |

Figure 7.5 An example of Kinograph

Source: (Bechtel and Zeichel, 1987).

Measuring behavior by the global scales

Barker proposed three global scales as a tool for analyzing and recording behavior data. The scales are, a. action pattern, b. behavior mechanism, and c. general richness index (Bechtel, 1987b).

- a. Barker's thirteen action patterns are aesthetics, education, government, personal appearance, physical health, professionalism, recreation, religion, and social contacts. These patterns are scored in percentage (1 to 100)% and coded as 1 to 10 for analysis.

| | | | | |
|------------|------------|------------|------------|--------------|
| 1-10% : 1 | 21-30% : 3 | 41-50% : 5 | 61-70% : 7 | 81-90% : 9 |
| 11-20% : 2 | 31-40% : 4 | 51-60% : 6 | 71-80% : 8 | 91-100% : 10 |

Table 7.2 Barker's global scale for measuring action patterns

Source: (Bechtel, 1987b)

- b. Behavior mechanisms are a second global behavioral scale that may be used in special cases and for using general richness index. Five behavior mechanisms are proposed for this measurement (Bechtel, 1987b). The mechanisms are,

1. *Affective behavior* (assessing emotional expressions, i.e. laughing, crying, yelling and so on).

2. *Gross motor activities* (assessing large muscle activities i.e. walking, swimming).
 3. *Manipulations* (any activity with hand i.e. turning a page).
 4. *Talking*.
 5. *Thinking* (measured from decision making or solving a problem).
- c. General Richness Index is the sum of action patterns, behavior mechanism, and penetration levels.

Self reported/ direct observation data collection technique

In self-report technique the researcher provides guidelines/questionnaire to respondents. Zimring's (1987) self report has two parts i.e. a. an actual map of space with broad divisions and b. a chart to report activities for each of the divisions. In the map all the furniture layout is provided for understanding the space. Respondents will assess their activities over time and record by following instructions (Figure 7.6). This method was proposed specifically for data collection at micro level i.e. in interior spaces.

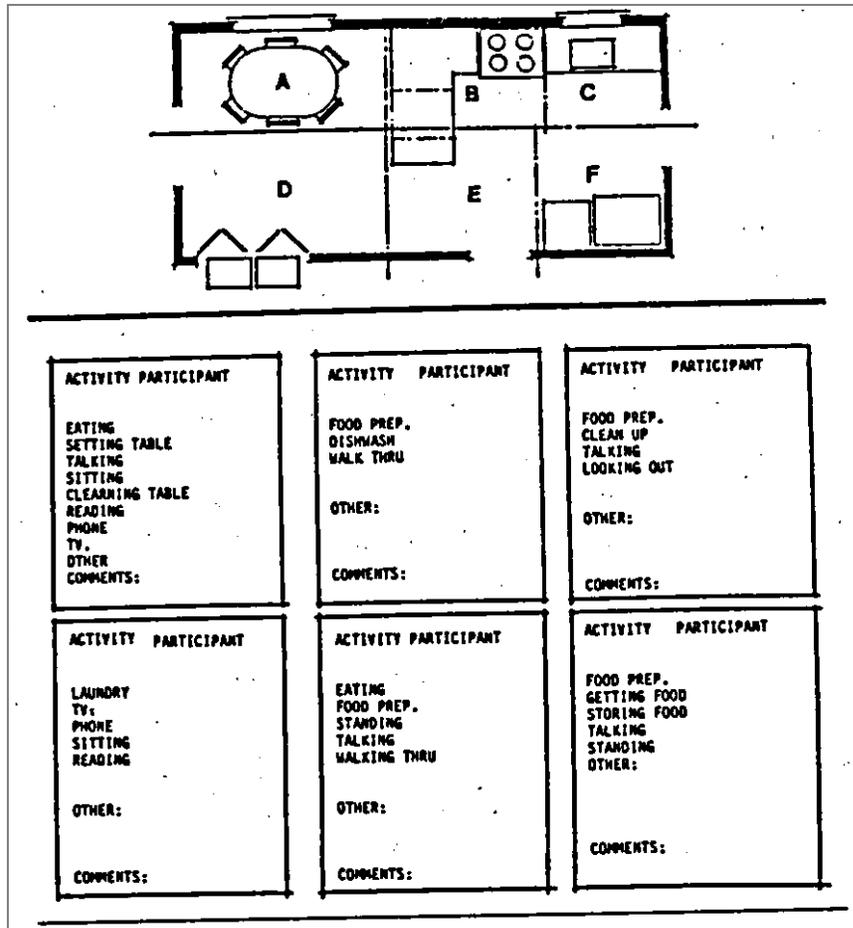


Figure 7.6 Sample of Self report data collection technique

Source: (Zimring, 1987)

Behavioral focal points assessments

These focal points are the behavioral settings, which are accessible for largest numbers and various types of people. Focal points are self-explanatory and capable enough to reflect community's natural development process as it understood as the product of spontaneous activities (Bechtel, 1987b). This is the tool by which a researcher can diagnose the social working of a community. A fragmented community can be identified by segregated focal points (Figure 7.7).

On the other hand a socially integrated community will have rich focal points and that are well integrated with other behavior settings (Figure 7.8).

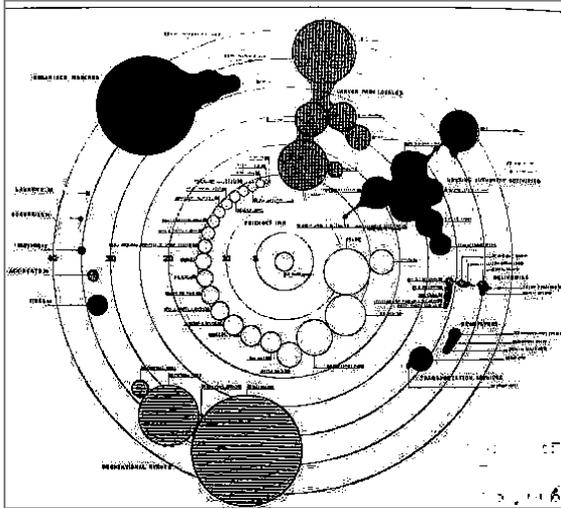


Figure 7.7 Fragmented Behavioral focal points

Focal points are indicating a fragmented community. (Source: Bechtel, 1987b).

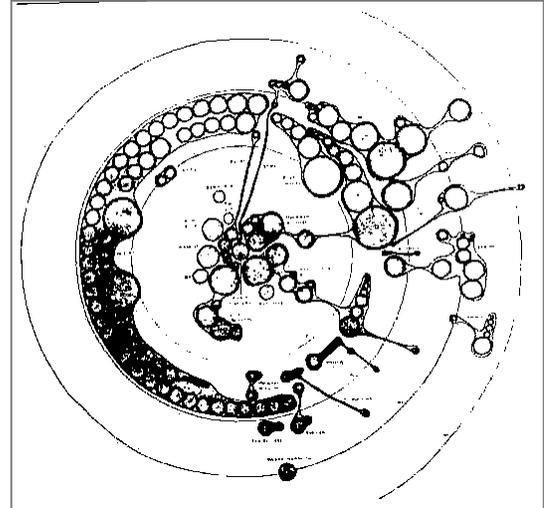


Figure 7.8 Integrated Behavioral focal points

Focal points are indicating an integrated community. (Source: Bechtel, 1987b).

The Time Budget method

This is simply the record of the activities of a person for a specific period of time, i.e. the time can be twenty-four hours or even any number of days (Michelson, 1987). The main idea is to track time and activities, which provides a real sense of preference for activities of a person in a particular setting. It can be done by either self-administered diary or questionnaire by the interviewer.

A descriptive method records all the observations in the form of description such as Behavior-specimen record method. On the other hand, some methods use figures and graphics with description to record behavior data. Use of graphics in text is found to be easier to understand by all levels of readers. The application of graphics in recording varies from actual to abstract (symbols and codes). For example, in Time geography method Hagerstrand illustrated the way of recording movement behavior in lines with the reference of X-Y axes (Figure 7.9, Figure 7.10). Bechtel's (1987b) Focal point assessment method considers the whole community in some concentric circles where settings are also represented by circles of different sizes and filled with shades (Figure 7.7, Figure 7.8).

Orientation of observation can be considered as another factor of classifying behavior-recording methods. Such as,

- a. Researcher's point of view.
- b. Respondent's/people's point of view.

In the researcher's points of view the researcher (or representative) observes the activities in a given setting and records behavior data in their preferred format.

'Kinesics' is an example of this type of method where the researcher/observer records physical expressions of human subjects. In this approach there is no scope to record the motivation behind those observed physical expressions (Figure 7.5).

The method of respondent's points of view utilizes direct responses from the sample population. Researcher only provides a structured guideline to record behavior. Zimring's (1987) Self Report Data Collection Technique is an example of this kind of method. In this method, the researcher provides a detail plan of a setting and peoples are requested to record their activities in that setting. These two broad methods of recording behavior have some advantages and disadvantages. These available methods either suffer from the lack of representativeness of actual behavior or lack of visual clarity to be understandable for everyone. Sometimes the outputs from these methods are too rich in description but weak in visual representation. Absence of visual aids sometimes fails to draw the interest of the readers. Considering these advantages and disadvantages a working method for this research was formulated that is called as 'Combined method' for this research. This Combined method was applied in a study of space identification to observe it's applicability and potentiality for further research.

7.5 Development of the 'Combined method'

There was a need for developing a method that would include the potential features of different methods. The new method should be rich in description as well as equipped with visual aids to enhance self-reporting. The combined method is proposed here which is actually the hybrid of Direct Observation

(Bechtel and Zeichel, 1987), Self Report (Zimring, 1987), and Time Budget methods (Michelson, 1987).

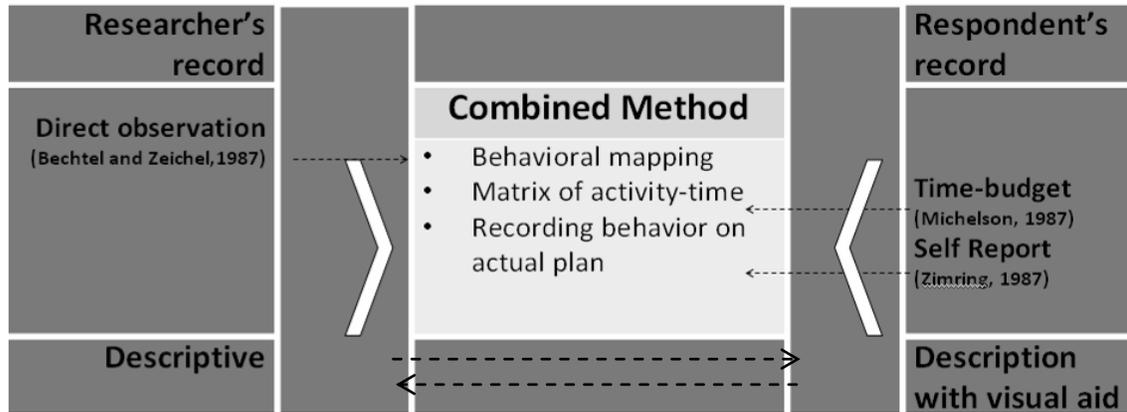


Figure 7 11 The structure of Combined method.

The figure shows its position in relation to other broad categories.

(Source: Author)

The proposed method aims to make bridge between Respondents record and Researchers record methods. Additionally it also provides a platform for the methods of description and visual aids. The contribution of direct observation in this combined method is to produce the categories of activities in behavioral mapping. In this mapping all possible activities were listed. Since a list made by a researcher cannot assure inclusion of all activities; to eliminate this confusion, a procedure to verify the list by the study group in the space identification study has been proposed. Application of actual plan/ map and chart of time-activity are combined from Zimring's Self report and Michelson's Time budget methods correspondingly.

Zimring's (1987) Self report method uses actual plan/map with divisions as major zones (Figure 8.6). Users would be requested to record their behavior for each division on that plan. In Zimring's Self report method, it was not clear whether these divisions were based on people's opinion or researcher's own. Since the way of making these divisions was unclear so in the combined method the plan was proposed without divisions.

Aims of applying the 'combined method' in space identification study was to see how far it is suitable to record behavior properly and obtained data is potential for analysis. To test this model the space identification a study was designed specifically to look for people's way/level of space perception and identification. It was expected that if this combined method could exhibit its potentiality to record behavior then further development of this method can be done to apply in this research. The next chapter is showing the applicability of combined method in a space identification research.

Chapter 8.0 The Space identification study in public area

8.1 Introduction

The 'combined method' was applied in a research for studying and recording spatial behavior and space identification. One of the major objectives of this study was to assess the method's applicability in observing and recording behavior data in public space. The Mezzanine level of Hall building at Concordia University, Montreal is designed for multi-purpose uses, generally for students (Figure 9.15). This space was designed for different student activities such as study, gossip, relax, and so on. It was expected that this public nature of Mezzanine level would serve the purpose of this research. The major steps of this study were,

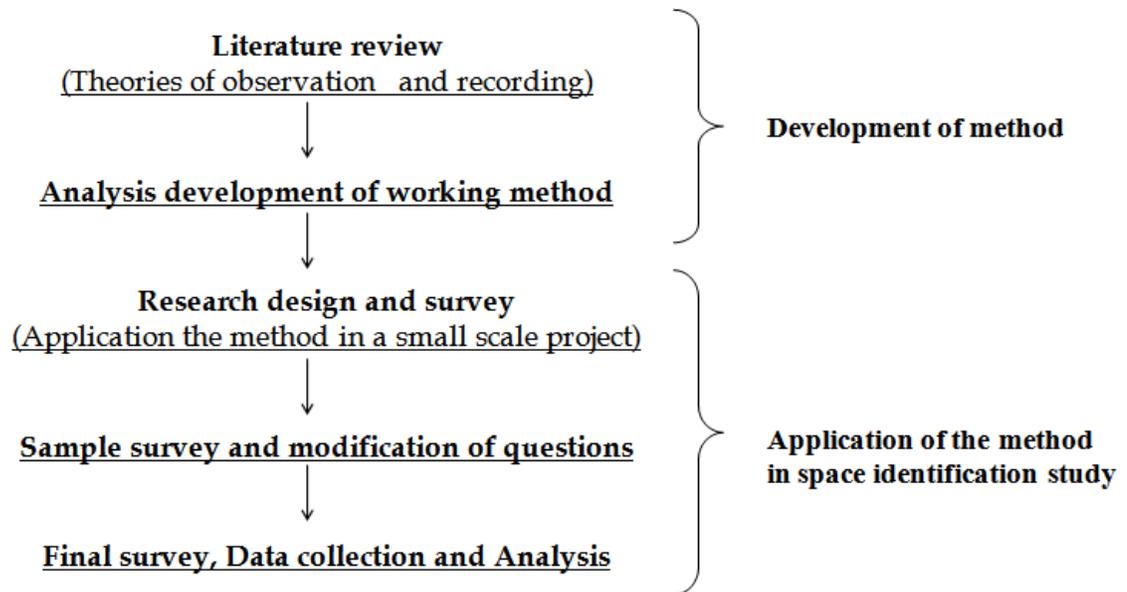


Figure 8. 1 Flow chart for space identification study

(Source: Author)

A theoretical investigation was done in environment-behavior studies to look for available theories and methods for observation and recording behavior data. A comparative analysis was made between available theories to assess the potentialities of major theories and their applications. The advantages and disadvantages of available theories were identified and the directions were developed for an appropriate theory to apply in the research. These directions guided this research to develop a method for environment study especially for recording behavior. Since this proposed method uses components of three different methods, it was then termed as a 'combined method' instead of a new method.

This combined method includes two ways of data collection which was incorporated into the design of a questionnaire. Two parts of the questionnaire were a. Activity summary b. Structured questions along with a map of the Mezzanine level. In the survey the targeted study population was the students of Concordia University and the sampling frame was that part of the population who were the users of Hall building. A simple random sampling method was applied in selecting survey respondents at the Mezzanine level in Hall building. Total 30 surveys were completed to make the data set for analysis.

In this research a preliminary questionnaire survey was conducted to assess the applicability of questionnaire. Responses and comments from the samples were analyzed and the final questionnaire was developed (Appendix A).



Figure 8.2 Student's common area, Mezzanine level

(Source: Author)



Figure 8.3 Visual barrier by Escalator , Mezzanine level

(Source: Author)



Figure 8. 4 Space naming by visual aids

Posters under escalator give cue to name a space. (Source: Author)



Figure 8.5 Space naming by function.

Travel agent office provides the name of a space. (Source: Author)



Figure 8.6 Barrier between two reading spaces

Planter boxes are acting as barrier.
(Source: Author)



Figure 8.7 Barrier between circulation and reading space

Student support stalls are acting as barrier. (Source: Author)

8.2 Pre-data collection measures

This research employed undergraduate students (as surveyors) from Concordia University's Urban Planning department on a volunteer basis. Before sending the surveyors into the field a common instruction session was conducted to clarify the objectives of the research and to train them for survey. This common session was arranged in order to confirm that everyone gets the same information for conducting the survey in a consistent manner. The surveyors were informed that no instruction (as answer clue) can be given to the respondents related to that study area i.e. Mezzanine level, Hall building. It was allowed to provide explanation from other similar spaces to avoid bias in the responses.

A map/plan was provided with the questionnaire to make respondents familiar with the study area (Appendix A). It was assumed that people have different levels of understanding a map and if the interview was taken in other place then less valid responses might be obtained. To overcome this problem it was instructed that interviews must be taken on the spot-i.e. Mezzanine level in order to make sure that every respondent can identify him or herself in that particular space and answer accurately.

8.3 Analysis

The analysis of this space identification study was conducted in three stages.

- a. Assessment and analysis of activity list.
- b. Analysis of space identification.
- c. Validating the space identification process.

8.3.1 Analysis of un-coded information

The questionnaire was designed partially in an open-end format. Responses were coded after interview for analysis, but some respondents gave more information than required in the questionnaire, which was not possible to code. However,

this information found valuable and analyzed qualitatively. The information from the un-coded responses was compared with the results of the coded information. This comparison in some cases identified new information which was not considered during the design of questionnaire. For example, the comparison came up with a new approach of naming space that developed from un-coded information (Table 8.1).

8.3.2 Assessment and analysis of activity list

This research applied primarily, fifteen activities were identified as very common and were presented to the respondents in questionnaire. After summarizing the responses, it was found that no new activity was mentioned in the chart by the respondents, which indicated the list of activities was sufficiently comprehensive. The most frequent occurring activities in the study area were seating, talking, reading, writing, and telephony.

The general occupancy of spaces based on different activities is 10 to 30 minutes, but there are also some students who use the space for more than an hour. The presence of students is either single or in-group and purposes were mixed in nature.

8.3.3 Analysis of the level of space identification

Space perception and identity

The responses to all of the questions were calculated and the ratio is almost (50:50) for positive and negative answers. People can identify spaces in two different scales (broad and sub-spaces) but the interpretations of spaces were different. The two scales of space perceptions are,

- a. Broad space (in questions it was termed as 'space').
- b. Sub-space (same was used in questions).

In identifying broad space, most of the respondents used geometric shapes and primarily a circle (sometimes oval shape). The other shapes are rectangles and sometimes a mix of them. Line and arrow marks were also seen as marking space but not frequently. In identifying sub-spaces, geometry (circle, rectangle, and mix of them) and alphabets (with legends) are found in analysis (Table 8.2).

| Questions (Identification of categories) | Level of ability to identify space | Responses | |
|--|--------------------------------------|--|--------------|
| 6. Is there any specific space for an/group activity(ies) | Y = 55% N = 45% | | |
| 7. Is there any indication/direction for specific activities here? | Y = 50% N = 50% | Display area Furniture Atmosphere Wifi zone | |
| 8. Do you see any overlap in these specific space | Y = 45% N = 50% No answer = 5% | | |
| 9. Can you identify any barrier in between these activity spaces | Y = 45% N = 50% No answer = 5% | Stairs Group tables/club table Large display board Plants Angle of chairs | Object based |
| | | The escalator when they don't work Just to eat | Event based |
| 10. Can you give a name for different (sub) spaces? | Y = 50% N = 50% | Seating, Meeting Walking, Group TV watch, Photocopy Movement, Interaction Technology Lounge (Horrible chairs) Hall(open space) Mixed(talk, study) | Event based |

| | | | |
|--|--|---|------------|
| | | JavaU, Java coffee, Computer store, Corporate booth, Food, Travel, Expo | Name based |
| | | Wait for friend Club table | |

Table 8.1 Space identification summary

(Source: Author)

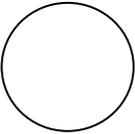
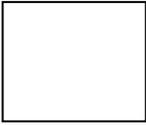
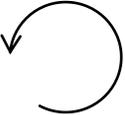
| | | | | |
|---------------------------|---|---|---|---|
| Typology |  |  |  |  |
| | Circle or oval | Square or rectangle | Mixed | Arrow |
| Occurrence level (Approx) | √√√√√√√√ | √√√ | √√ | √ |

Table 8.2 Broader zone identification typology

(Source: Author)

| | | | | | |
|---------------------------|---|----------|--|---|---|
| Typology | Symbol | Text | Symbol and text | Hatch | Arrow |
| |  | A B, C |  B, C |  |  |
| Occurrence level (Approx) | √√√√ | √√√√√√√√ | √√√√ | √√√ | √√ |

Table 8.3 Sub-space identification typology

(Source: Author)

Indication of space

A 'space' (for this study 'interior space') is perceived by the colors and textures of surrounding surfaces, relative arrangements of furniture, presence of any physical elements like columns, temporary displays and so on. These factors can be considered as tangible parameters of space. It was expected that the way of identifying spaces by people will match with any of the parameters mentioned above. Responses came not only for the tangible parameters but some intangibles were also identified. For example, atmosphere of a space has been mentioned to indicate a specific space i.e. a 'calm and quiet' reading space. These factors can be mentioned as intangibles. There were two interpretation of intangibles found in this study such as,

- a. Direct interpretation (Visible activity based)
- b. Indirect interpretation (Invisible facility based)

An example of direct intangible of space identification was; if all students study in a space then it can be perceived that an atmosphere of study has been created. This atmosphere has less relation with the physical elements (enclosures, objects within) of space. On the other hand, indirect intangibles are invisible but acting in the background, which attracts and holds people's interest to come and stay. Wifi facility was identified by the respondents as an indirect intangible

parameter of space. The students who are only using wifi facilities; for them the Mezzanine level was a space for using wireless network for Internet.

Barriers in space

The escalators, student's booths, columns, small plants were primarily identified as probable physical barriers at the Mezzanine level (Figure 8.6, Figure 8.7). For neutral judgment, names of these barriers were not mentioned in the questionnaire. The objective was to determine whether people can identify these elements as barriers or not. Additionally the levels of identifying space barriers were also identified. By analyzing the responses this research came up with a new category of barrier as 'event based barrier' along with the physical barriers. An event based barrier can be explained as; if there is unexpected presence of people driven by some specific events then that group of people would be perceived as a barrier. For example, if the operation of elevators ceases then there will be more people on Mezzanine level and that presence would be perceived as barrier.

Naming a space

To identify the ability of naming a space was another important focus of this research. The analysis came with categorizing the ways of naming a space in two ways i.e.,

a. Subjectively (the common way of naming a space based on activities): a study space.

b. Objectively (the way of naming a space by its business name): *JavaU* (The name of a coffee shop which was located in the mezzanine level).

The objective way of naming a space is very uncommon for professionals but it is a common practice.

8.3.4 Validating the space identification process

This research also attempted to validate the applicability of the combined behavior record method. To validate the output from this research, two factors of identifying space have been considered i.e. identification of broad spaces and barriers in the study space. Responses for these factors were overlapped on actual plan to compare the level of space identification (Figure 8.14, Figure 8.15). Both of the overlapped responses show a pattern of identifying space. Since most identified spaces concentrated in common zone, this indicates that the validity of the combined method is confirmed for understanding space identification.

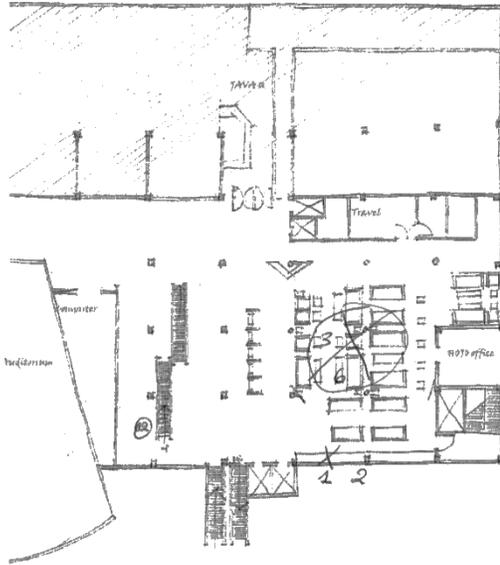


Figure 8.8 Space identification by circle and number.

(Source: Author)

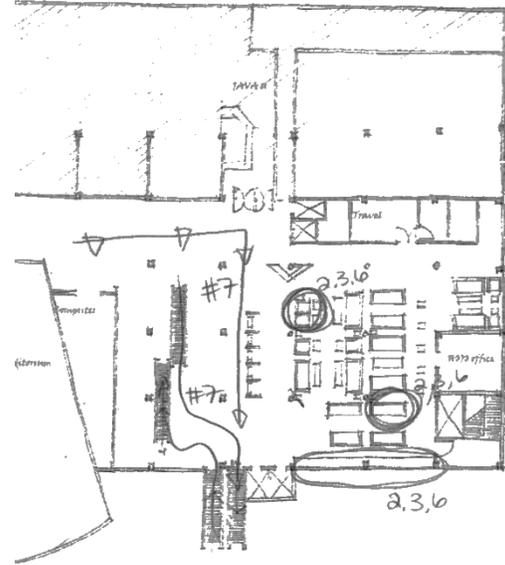


Figure 8.9 Space identity by circle and arrow.

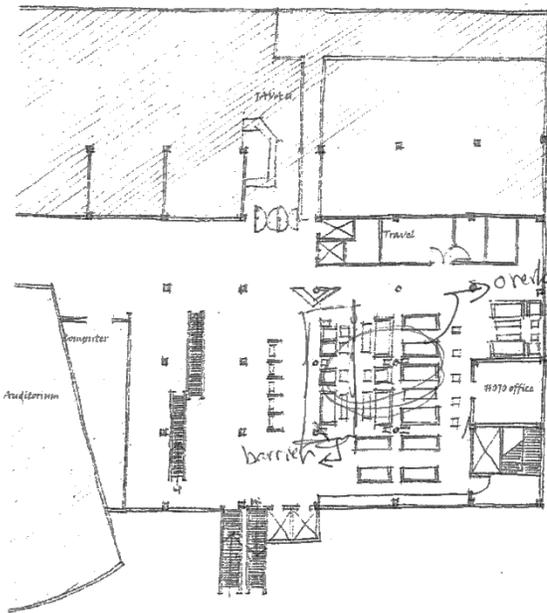


Figure 8.10 Space identity by circle and arrow

(Source: Author)

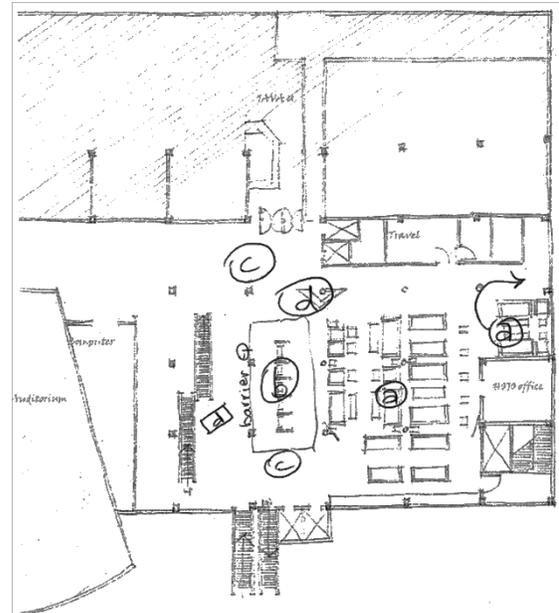


Figure 8.11 Sub-Space identity by alphabet

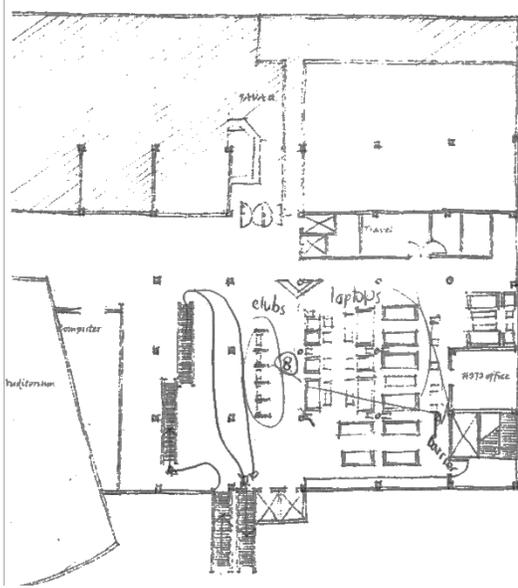


Figure 8.12 Space identity by numbers, text, and arrow

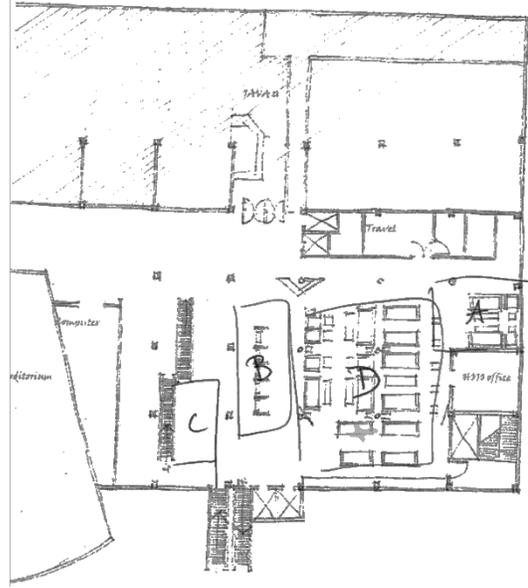


Figure 8.13 Space identity by rectangle and alphabet

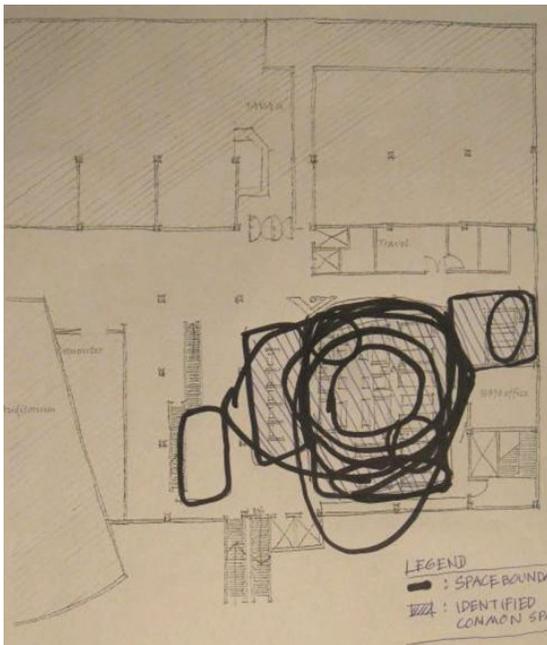


Figure 8.14 Plan of Mezzanine level. Showing the overlaps of identified broad zone boundary

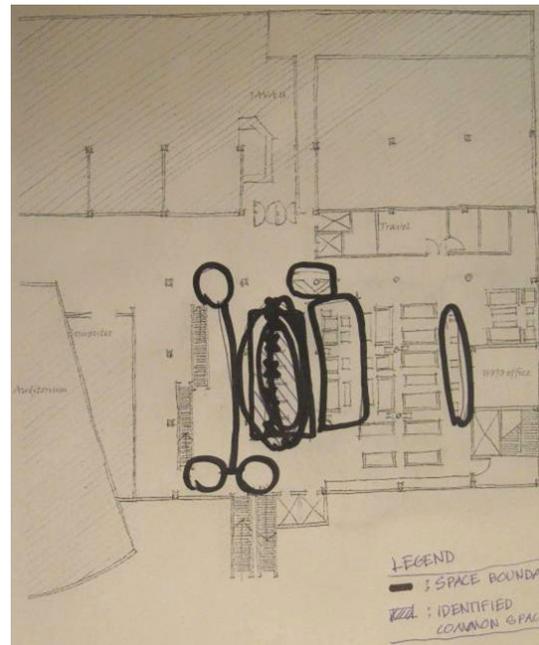


Figure 8.15 Plan of Mezzanine level. Showing the overlaps of identified barrier boundary

8.4 Recommendation and modification of questionnaire

A modification was done after the preliminary questionnaire survey. In that modification the number of questions was reduced and ranking of activities was eliminated in order to make responses easier for the respondents. After the final survey it seemed the questionnaire still needed simplification. Further modifications were proposed not only for this research but also to help other similar researches.

From the survey result it was found that people possess different capacity for identifying spaces. The keywords for this research mentioned in the questionnaire were 'space', 'identification of space', 'overlap of space', 'barrier in space' and 'sub-space'. Outdoor spaces were mentioned as 'spaces' by a large number of people. The identification of sub-spaces was found more difficult for the respondents. Respondent also felt difficulty in answering questions regarding 'barrier' and 'overlap'.

If a similar research intends to employ words like space, sub-space, overlap of spaces, barrier in space; then it is suggested to not use them specifically in the questions. These words were found either non-familiar or they do not carry the same meaning as professionals use. Questions should be formulated in such a

way that all the terms and words are at the same level of understanding for most people. For example, questions can be asked about parameters of space instead of space itself. Characters of surrounding surfaces, their relative positions can be included in making questions related to space.

The recommendations from this study were,

- Identify and include different types of environmental setting in the given study area.
- Design the questionnaire as simple as possible.
- Provide an easily readable map.
- Use only common and known words in the questions and interviews.
- Do not use technical terms.
- Include large number of respondents and maximum user groups.

8.4.1 Conclusion

Although this study had some limitations due to time and resource constraints it demonstrated how the combined method can be applied to examine spatial behavior and explore the level of space identification. Since this research was conducted among university students, its result may not be valid for other groups of people. To apply this combined method, it is suggested that surveys should include different types of environment and different groups of people. Further development of this method should

consider more simplified questions to avoid unfamiliar/ambiguous terms. It is expected that a more reliable result would come from increasing the number of survey responses.

Chapter 9.0 Research Design and Methodology

9.1 Research design

The research was designed in two stages (Figure 9.1). The basic steps of these stages are,

Stage 1: Behavior settings and units were identified (Figure 9.3). This stage also includes the 'list of social, cultural, and religious activities' (Appendix B, C, D). After the preliminary list, a further investigation was conducted to check whether any major activity is missing in the list. The socio-cultural activities in the list were divided into four groups i.e., cultural, religious, business, and political. A structured questionnaire was developed following that groups of activities (Figure 10.1, Appendix A) . These groups were created in order to differentiate between people's preferences for different types of activities. These groups of activities are synonymous to 'filters' in a simple framework environment evaluation process (Rapoport, 2000) (Figure 7.1). This process shows how grouped activities can help researchers to understand socio-cultural activities from different perspectives.

Stage 2: Behavior data was collected and analyzed. In order to collect and record behavior data a theoretical investigation was conducted and a 'combined method' was developed by following the steps (Figure 7.11),

- Development of working method for recoding behaviour data.

- Application of the method in space identification study.
- Modify the method for survey in Dhaka context.

Results from the space identification study at Concordia University demonstrated the applicability and potentiality of the 'combined method' for recording behavior data in public space. After refinement a final version of the combined method was developed for Dhaka survey.

Justification of the 'Combined method' to apply in Old Dhaka survey

Behavior study can be done in either molecular or molar scales (Bechtel and Zeichel, 1987). According to these authors, definition of scales of behavior studies may vary among researchers. For this study molecular behavior is defined as; the behavior deals at personal level in shorter time spans and smaller settings. For an example, a study in mezzanine level, Hall building, Concordia University was a study in molecular scale. Individual behavior was studied and time span was shorter i.e. morning to evening only on hour basis. Compared to this space identification study the present study can be defined as 'molar scale' as it dealt with people behavior in public space. The time span was longer i.e., weekly, monthly etc. The framework for the 'Combined method' remained unchanged but some modifications were done for individual methods. The final method for the survey also combined three methods i.e. Direct Observation (Bechel and

Zeichel, 1987), Self reporting (Zimring, 1987), and Time budget methods (Michelson, 1987) (Figure 8.11). Considering the recommendations from the space identification study the extents of the methods and modifications applied in this research are as follows,

Time budget: Time budget method can be done either by self-administered diary or questionnaire. In the space identification survey, numbers of hours spent by the respondents for each activity were asked verbally. Questionnaire survey was conducted in this research but no direct question was asked to know the numbers of hours spent for specific activities. Instead, respondents were questioned about the name of the events in which they participate. The times of those events were identified from the list of activities (Appendix B, C, D).

Direct observation: Direct observation would include observation of socio-cultural activities and physical environment of streets. Additionally photographs, local key persons' interview and field notes were included as the output from direct observation.

Self-reporting: Self reporting was proposed to collect respondents' preference patterns. Structured questionnaires with open-ended questions were provided to allow respondents to give new information outside the given answers.

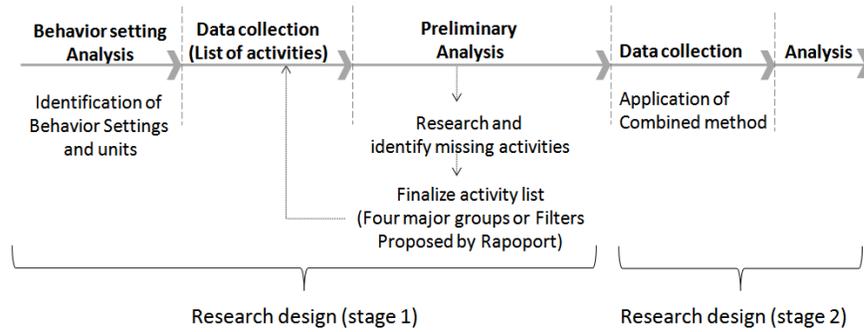


Figure 9.1 The basic stages of research design.

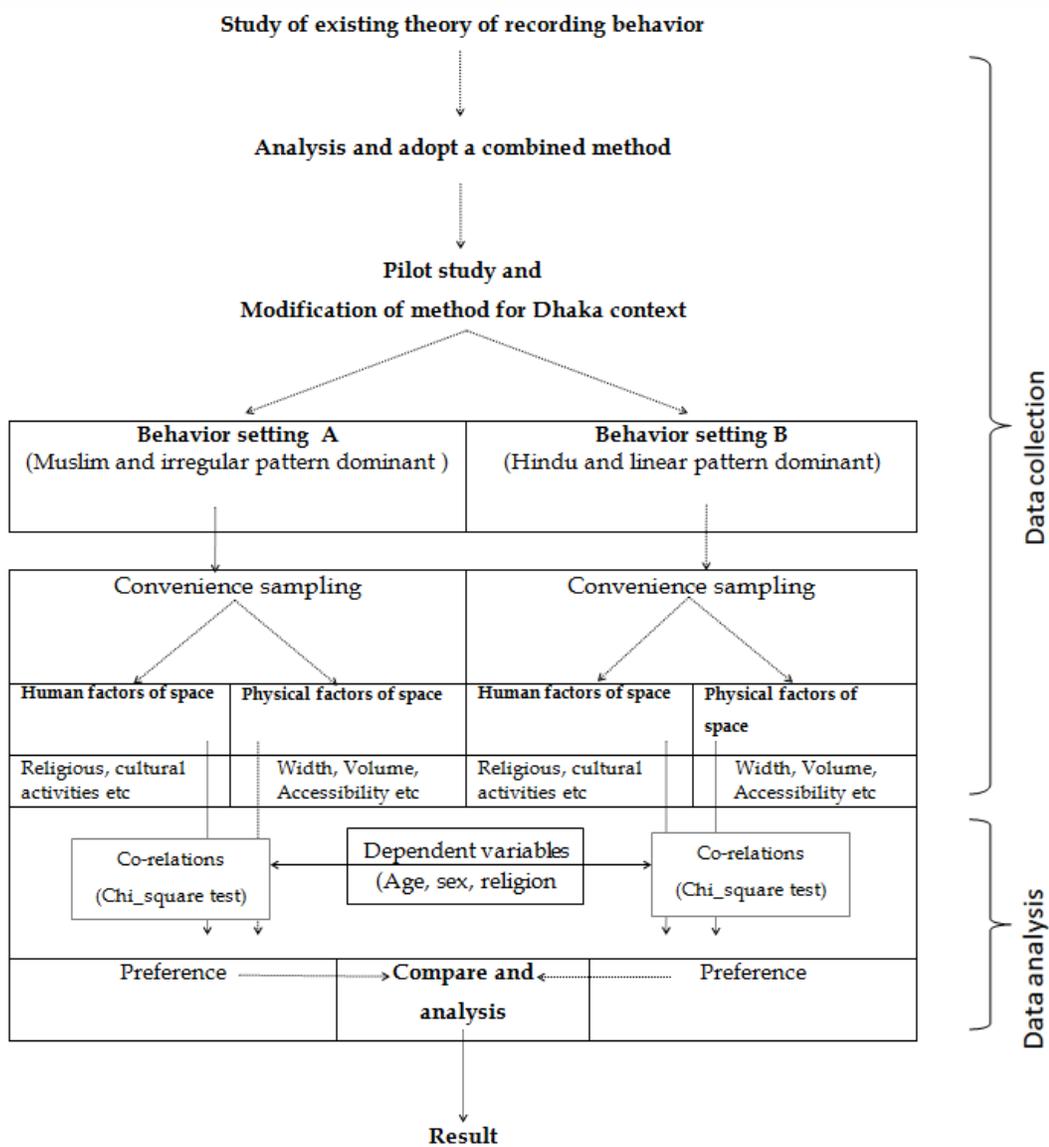


Figure 9.2 Details of stage 2 in Research design

At this stage ‘behavior settings’ and ‘units’ were identified as they are necessary before measuring and recording behavioral data (Bechel,1987a). ‘Behavior setting’ is defined as domain where a researcher is particularly interested about its significance. In simple words, behavior setting is the collection of unit(s)/ public space(s), if the study focuses on behavior in public space. Since in the study area streets are the only public spaces, they were justified as ‘units’ of behavior settings (Figure 9.3). In this research behavior setting is divided into ‘setting A’ and ‘setting B’. The units (streets) have their own identity and they were analyzed with ‘physical nature’ and ‘activity nature’ such as-

- | | |
|---|---|
| <p>Physical nature³¹ (Physical factors)</p> | <ul style="list-style-type: none"> a. Alignment (Straight, curvilinear, and zigzag) b. Connectivity (Closed end and thoroughfare) c. Street space volume d. Street order in the community (1st, 2nd, and 3rd orders)³² |
| <p>Nature of activity (Human factors)</p> | <ul style="list-style-type: none"> a. Socio-cultural b. Religious c. Business d. Political |

³¹ Please see Table 10.12 – Tables 10.17 for complete list of Socio cultural activities with their Physical and Human factors.

³²Please see Figure 10.1 for street order in the settings

9.2 Field method and conduct of survey

9.2.1 Pre-survey measures

Members selected to form the survey team were the students of Architecture Discipline, Khulna University. Surveyors were at 4th year level and experienced in conducting urban socio-cultural surveys for their urban design studio projects. Questionnaires and a preliminary list of activities were provided to the survey team at the beginning. Surveyors collected information on activities from local people which was used for modification and finalizing the list of activities. Common instruction was provided to team members that helped the members to conduct survey in a uniform way.

9.2.2 Defining survey area, 'behavior settings', and 'units'

The survey area is in the older part of Dhaka metropolitan city which includes two administrative zones i.e. Ward 71 and Ward 72 (Figures 10.1, 10.2, 10.3). A reconnaissance visit was done in order to become familiar with survey area and for locating survey points. This preliminary investigation by silent observation revealed that Ward 71 and 72 can be marked as religiously Muslim and Hindu dominant zones. With this strong difference in religion these two wards were considered as 'settings' and were coded as 'Setting A' and 'Setting B' (Figure 9.3). Linear and irregular patterns of building alignments are the most common in

the study area. The major types of street alignments are straight, curvilinear, and zigzag (Table 5.5, Figure 5.6, Figure 5.7). Since this research focuses on street environment, they were considered as ‘units’ of behavior settings (Figure 9.3). The streets as ‘units’ for the behavior setting were justified for the data collection and analysis. Nature of these units were compared with the Schoggen’s (1989) list of essential nature of a ‘unit’ in a setting (Table 7.1). The nature of the selected units were satisfied the basic criteria i.e., activities in the settings are self-generated and there was no feedback from the investigator. Units have their own activities that are exclusively time dependent. Units are unbroken i.e. they have continuous flow within the community.

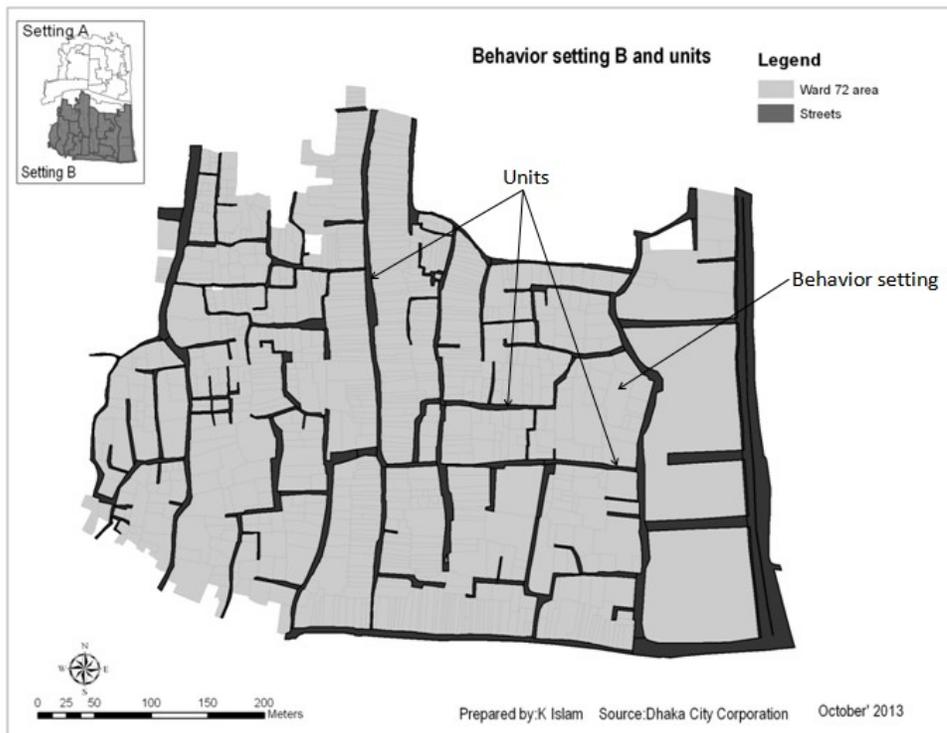


Figure 9.3 ‘Behavior setting B’ and ‘Units’ in the study area. (Source: Dhaka City Corporation)

9.3.2 Sampling method

Samples were selected from the busiest streets (as behavior units) within the two wards (as behavior settings). After conducting a visual survey in both of the settings these potential streets for questionnaire were identified as they had been using for multipurpose activities in the community. The streets are Shakhari Bazar, Tati Bazar, Johnson, English, French, Malitola, North South, Panitola, Bazar Deuri, and Radhika Mohan Basak. Within the primarily selected streets, six of them (three from each setting) were randomly selected for questionnaire survey.

Surveyors³³ were stationed at approximately 10-15 meters apart from street intersections to approach pedestrians for participating in the questionnaire. 40 questionnaires from each of the settings were completed that made up the total sample size 80. In analysis two questionnaires were rejected as they were found to be incomplete and inconsistent.

Male and female samples were approached alternatively. In each session, the first sample³³ was selected randomly. For the selection of other samples, a non-probabilistic sampling i.e. convenience sampling was used. After completion of one questionnaire, the person who reached the surveyor first was requested to become sample. Each sample had to satisfy the following conditions,

³³ Four surveyors were selected from the students of Architecture, Khulna University. An interview was conducted to select them. Students were at 4th year level and experienced in such socio-cultural surveys for their urban design projects. Instruction on research project, pre-survey preparation, survey method, and method of recording data was provided for conducting survey.

- Should be a pedestrian in the time of survey
- Should be minimum 18 years old
- Should be resident of the survey area
- Has willingness to participate in the questionnaire voluntarily.

Only after satisfying the conditions, the questionnaire was handed over to write down responses. These conditions define the 'sampling frame' from the population of the survey area i.e. defined by specific age, residency, mode of movement in street, and willingness to participate. Questionnaire surveys were conducted during January to March' 2013 in weekdays and weekends. This dry winter season was chosen in order to avoid rain and hot weather. The weather was supportive to ensure maximum pedestrian presence in streets. An additional survey for behavior mapping was done in June 2014 by the researcher.

9.4 Framework for the data analysis

Organization of the questionnaire: The first part of the questionnaire is for socio-demographic information. Age, sex, years of residence/occupancy, ownership status, average monthly income, level of education, religion, ownership of business in the community were the foci in this part of the questionnaire and were considered as independent variables. It was assumed that diversification in these variables would cause changes of independent

variables. The changes in independent variable would eventually be reflected in preferences from where we expect to know behavior pattern. Questions were grouped to identify different preferences such as,

- a. Street space preference (Preference were obtained from pattern of using streets).
 - Types of streets (pedestrian only streets, motorized only streets, pedestrian and non-motorized streets, mix of pedestrian, non-motorized and motorized streets).
 - Movement pattern in streets (Walk, Rickshaw, Car or other motorized vehicles, and Others).
- b. Activities and level of participation (Activities were grouped into four major types).
 - Cultural activities followed by levels and frequency of participation.
 - Religious activities followed by levels and frequency of participation.
 - Business activities followed by levels and frequency of participation.
 - Political activities followed by levels and frequency of participation.
- c. Most Favorite and least favorite streets in the community.
 - Respondents were requested to identification of most favourite and least favorite streets on map based on cultural, religious, business, and political

factors. Reasons behind choosing these streets were asked in separate questions.

Different categories of questions were designed in order to get information as needed for the research. Within every category of the questions, respondents expressed their preferences for street spaces that actually represent their spatial behavior. The major types of questions were,

- **Dichotomous:** These questions were used to screen people in order to reach the target group from where valid information could be obtained. Some of these questions were followed by multiple-choice questions for more specific information on the answer from the screened groups.

- **Multiple-choice questions:** Probable answers were provided and respondents had to choose from those answers.

- **Rank and scaling:** This type of question requires respondents to rank (highest to lowest preference) a group of similar objects according to their own perception and preference. For example, in a question, streets were grouped according to mode of transportation such as, pedestrian only streets, motorized only streets, pedestrian and non-motorized streets, mix of pedestrian, non-motorized and motorized streets. Respondent ranked these

options from highest to lowest which reflected their preference for a community street.

- **Open-ended questions:** Questions were asked with the option to provide multiple answers; for example, respondents provided the names of the streets that host cultural programs. Respondents had to provide four answers. Each of these questions was then followed by multiple choice questions.
- **Self-drawing/opinion:** In some questions respondents were asked to draw on maps in addition to answer the questions. For example, respondents were asked to draw lines on a map marking the streets that are most favorite and least favorite. Along with these preferences, physical parameters of those streets were identified from the list of activities. These answers were also used to verify the answers provided in the other questions.

Figure 9.4 shows the framework for data analysis. For example street preferences were obtained as ranks (4 through 1), highest to lowest. Preferences for Setting A and Setting B were calculated and correlated with age, religion, etc. The overall preference patterns were also calculated and compared with the preference from the individual settings.

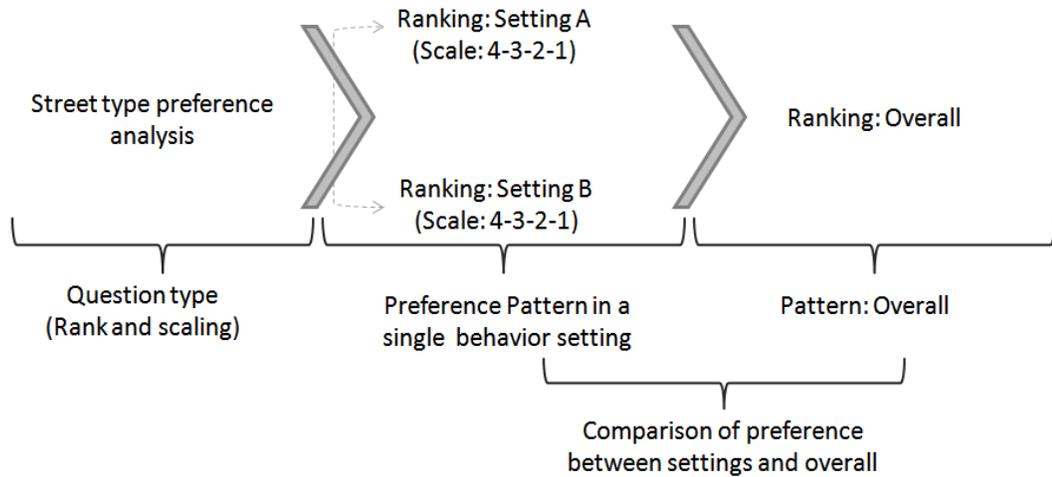


Figure 9.4 The analytical framework

After collecting data from questionnaire data process and correlation significance were identified by MS Excel and SPSS. Chi-square tests were conducted to calculate level of significance and effect sizes. These values were used to identify behavior pattern and space preference in Chapter 10.

Chapter 10: Analysis and result

10.1 Introduction

Street spaces in Old Dhaka have been investigated to identify pedestrian behavior patterns and the causes. By analyzing socio-demographic data community's nature for homogeneity and heterogeneity was identified. The verbal and non-verbal practices for inter-personal communication were analyzed to understand the causes behind the spatial behavior. Analysis was also done to identify the relation between preference, perception, and spatial practices in streets. Some important findings from this analysis are,

- Communication (both verbal and non-verbal) is well-transmitted, coded, decoded, and perceived in Old Dhaka.
- Public spaces are socially constructed through collective decision-making.
- Society is homogeneous and on the way to becoming heterogeneous.
- Homogeneity helped in taking collective decision-making.
- Territorialities are strongly protected and maintained by using specific dialect and behavior.
- Acceptance of space as public space depends primarily on the nature of decision-making and secondarily on the physical character of street.

Street activities were grouped into four categories i.e., cultural, religious, business, and political. Each of these street activities was analyzed with the levels of participation, frequency of participation, event details, and the physical

environment of the preferred streets (Figure 10.1). It was anticipated that respondent's religion, gender, age, would have impact on spatial behavior and participation in cultural, religious, business, and political events in streets.

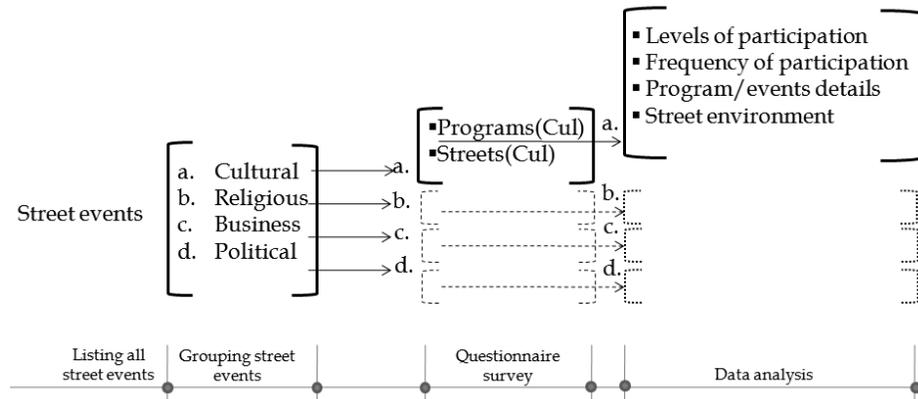


Figure 10.1 Flow diagram for analyzing relations between street events and street environment

In this chapter the analysis is presented into the following sections. The sections are;

- Socio-demographic character analysis
- Communication and spatial behavior
- Decision making and construction of social spaces
- Space perception, stated preference, and spatial behavior



Landuse map (Ward71 and 72), Dhaka

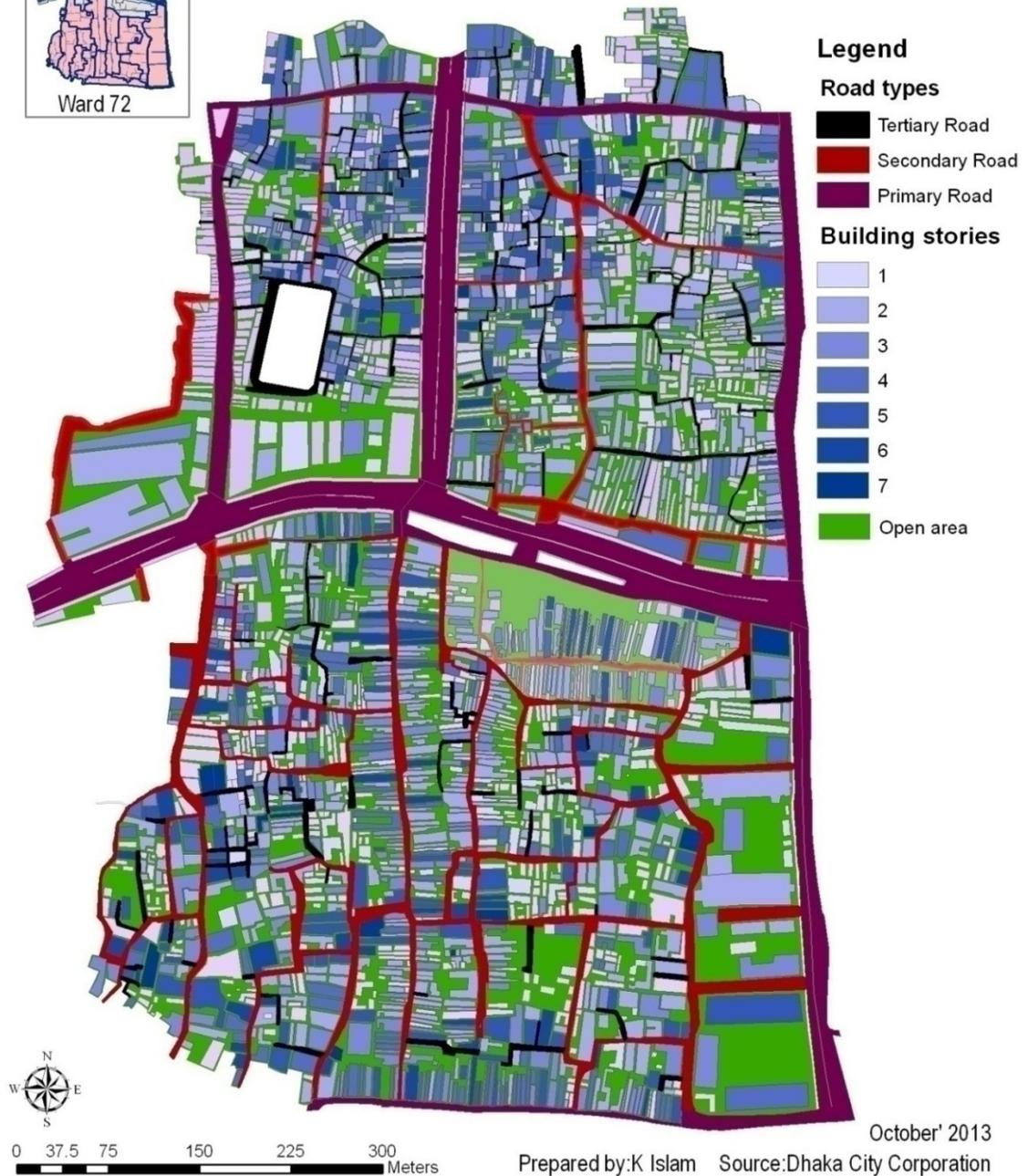


Figure 10.2 The land use (Building height and road types) map of the survey
(Source: Dhaka City Corporation)

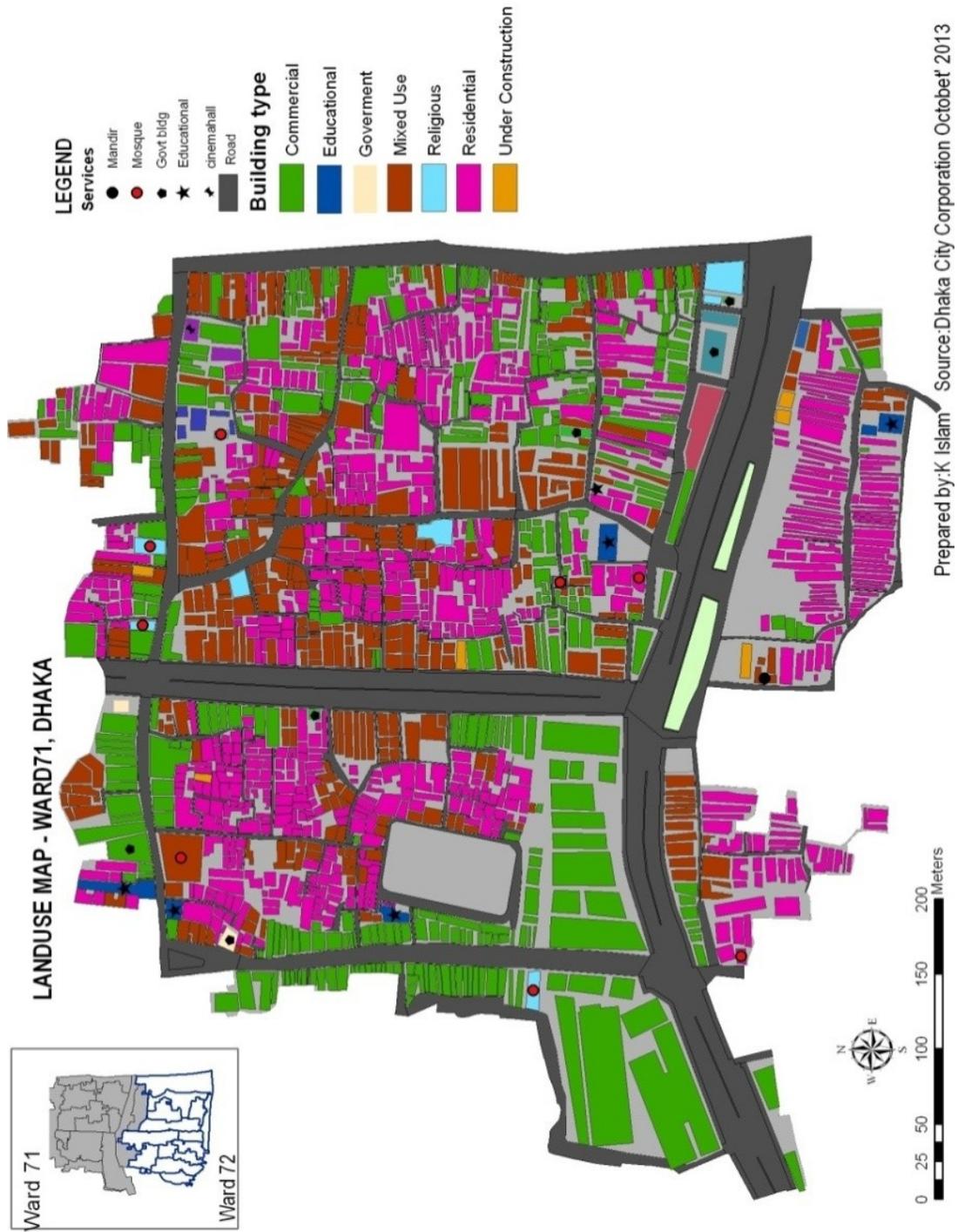


Figure 10.3 Land use map of Ward 71, Dhaka City Corporation
(Source: Dhaka City Corporation)

LANDUSE MAP - WARD72, DHAKA

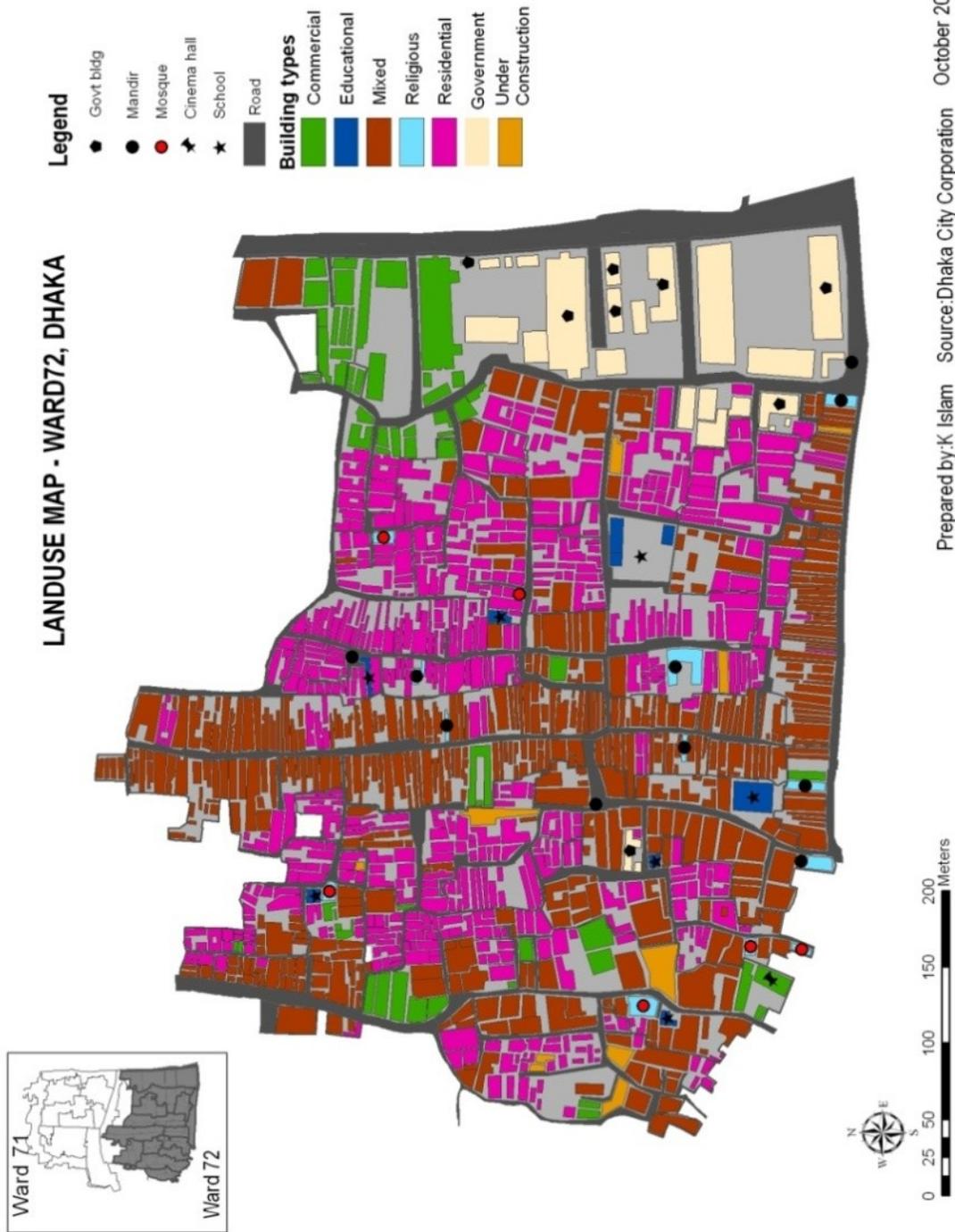


Figure 10.4 Land use map of ward 72, Dhaka City Corporation
(Source: Dhaka City Corporation)

10.2 Socio-demographic character analysis

The data on religion, age, gender, income, education, generation/time of living, nature of settlement and ownership pattern of two communities of Old Dhaka were analyzed to understand socio-demographic pattern. These data were also used to identify whether the community is generally heterogeneous or homogenous. Dissimilarities between religious norms may advance heterogeneity between the people and that could be expressed with their behavior. Age may guide specific social and spatial practices; for example, spatial activities would be different for seniors and younger. Gender also guides spatial practices where male and females might have different preferences for space and privacy. Income and education can affect the choice and abilities for selecting the means of travel. For example, higher income could permit more expensive means of travel. Higher education can make environmentally conscious people who may choose environmental friendly means of transportation such as, non-motorized transportation. Since longer 'time of attachment' may generate a different perception of space so difference in generation and time of living in the community can affect spatial preferences and behavior (Mowla, 2006).

Differences in spatial arrangements in settlements can bring changes in spatial qualities and that may affect people's spatial behavior. The following discussions identified correlation significance and causes behind the specific behavior.

Population is distributed in two major religions i.e. 'Muslim' and 'Hindu' in two settlements. Overall 55% of the survey population is Muslim and 45% is Hindu. There is a significant relation between settlement type and religion ($p < .05$, effect size = .719, large) (Appendix F: 1). The reason for the concentration of people from two religions has an historical reference. 82% of survey population in ward 72 is Hindu because initially Hindu craftsman started settlement and later continued for hundreds of years till now. Ward 71 is dominated by Muslims (90%) because historically Muslim traders and service holders started living there and the trend is similar in present days. In both of the settlements people from two religions preferred to belong in their religious and professional territories i.e. Muslim-Hindu territories or craftsman-service holder territories.

The dominant age groups for the street uses are (25-34), (35-44), and (45-54) years (Figure 10.5). People of these age groups are in a significant relation with street use because it is a social practice that seniors should be respected in the way that younger would do social and domestic works ($p = .05$; effect size = .376, moderate) (Appendix F: 2). The community is dominated with private sector employees and self-employed businessmen. The relation between these occupation types and settlement is significant because 77% people are engaged in either self-owned business or private sector employment ($p < .05$, effect size = .593 big) (Appendix F: 3) (Figure 10.8). Their business and employment premises are generally located

within the community. People can reach their business place in a short time either by walking or rickshaw.

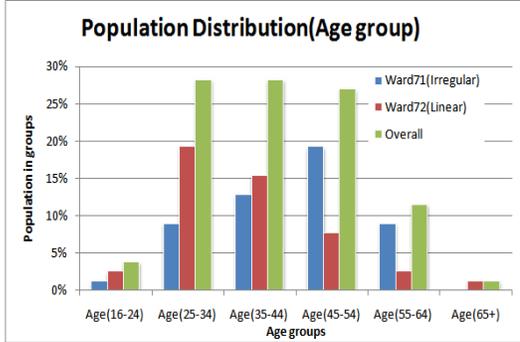


Figure 10.5 Population distribution by age groups

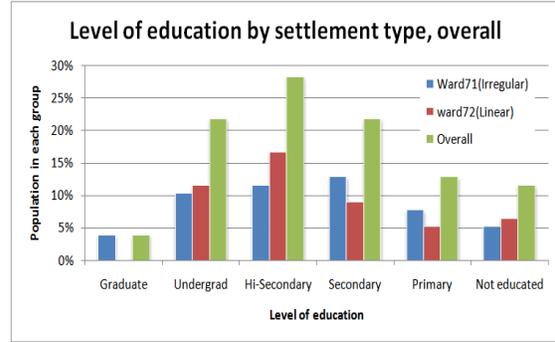


Figure 10.6 Education level by settlement type

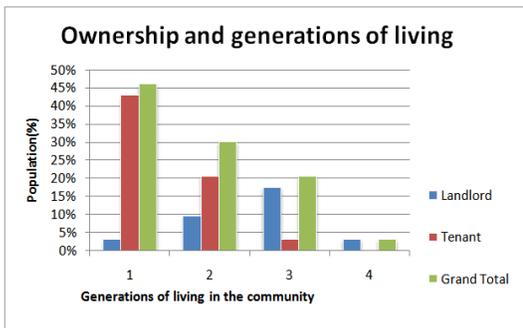


Figure 10.7 Relation between ownership and generation of living in the community

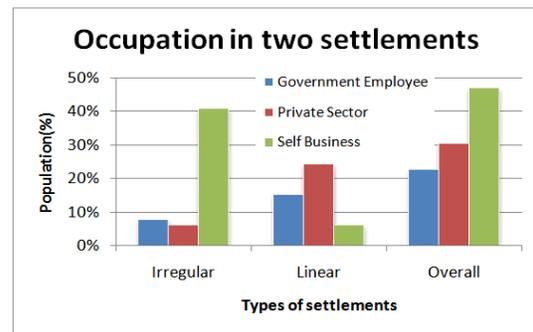


Figure 10.8 Occupation distribution in two settlement

In the last decades there has been a flow of people in this community from other professions irrespective of ethnic and religious background. As a result people who have been living for one generation is increasing and they are mostly tenants. On the other hand landlords have stronger ties with the community by living for more than one generation. The generation of living has significant relation with the ownership. Landlords are more dominant than tenant when the

relation was assessed with generation of living ($p < .05$; effect size = .69, big) (Appendix F: 10). The number of one-generation people is increasing in the society because of location advantage (Figure 10.7). One of the major reasons for selecting Old Dhaka as living place is the closer proximity to business locations. Inclusion of these newer people with diversified background in profession, ethnic, and religious increases the possibility of Old Dhaka to become a heterogeneous society.

10.3 Communication and spatial behavior

The verbal and non-verbal communication between 'people-people' and 'people-environment' are very specific in Old Dhaka. An outsider would easily be identified by the use of language as an important factor for verbal communication. In Old Dhaka the spoken language is Bangla but the pronunciation is different when they communicate among themselves. People have been maintaining this language for hundreds of years in verbal communication for their social life. To receive, decode, and send messages in their language is specific which can be learned through daily practice. People who apply standard Bangla might face obstacles in verbal communication. The reception and level of cooperation would be different with the use of local language and that is called 'Dhaka-ya'. This researcher was also asked a street direction in standard Bangla pronunciation while conducting the survey.

The language is a major intangible element of social life, which defines and maintains social territory. Manner of using language in social space determines the level of accessibility to an ongoing social territory. Without the help of a member of the ongoing territory it is hard to join and merge in social events because the outsider may not know the local language and social customs. Boundaries of some social territories are quite open because of the nature of social events. For example, it is not necessary to communicate with others verbally during the participation of Durga Puja³⁴. The major activities in this event are to visit different temples in the locality and pray to God (Appendix D). As religious practice people from other communities come and visit temples in Old Dhaka during Puja time. The presence of peoples from other areas may create secondary territories in public spaces. These secondary territories also share the space but seldom coincide with the ongoing primary territory.

Territories made with the spatial practices of cultural events are also impermeable for an outsider, which is caused by the nature of the events. For example, 'Halkhata' is one of the major socio-cultural events when shop owners only invite the regular customers to their shops for sweet snacks as a symbol of further continuation of business in the new Bangla calendar year. In this case customers are the local people and well known to the shop owners. Greeting, gesture, and applied language are specific at these events that create a sense of

³⁴ The major religious festival for Hindu people

territory. Presence of this territory might prevent non-local people participating in such cultural event.

People also maintain their specific non-verbal communication for receiving messages from people and environment. For example, when they occupy street space with mats for prayer then others understand the meaning of that space occupation and nobody would go against it. This understanding through non-verbal communication is common for Muslim and Hindus (Figure 6.29 and Figure 6.30). Decoding the cues in non-verbal communication is similar for other socio-cultural activities. Hindu people usually go inside the temple for prayer but sometimes they would pray from outside of temple standing on street. Standing in front of temple with special gesture provide message to pedestrians that they are busy praying. Pedestrians and vehicle drivers can read this cue and respect that space occupation (Figure 6.30). Even the shoes kept outside of temple provide message that some people are inside for a short time and won't occupy the street space for a long time. By following social practice people know that shoes will be taken inside the temple if the prayer takes a longer time. A similar example of non-verbal communication is the street space occupation for parade by groups. When the parade for socio-cultural or religious ceremonies moves, pedestrians and vehicle owners leave streets space willingly. This non-verbal communication is possible because of the homogeneity of the people. Homogeneous groups can decode messages from each other in non-verbal

communication because they have similar ethno-cultural background and experienced in local socio-cultural activities. The spatial practice of coding and decoding message in verbal and non-verbal communication is a speciality of Old Dhaka that might be unusual for other communities.

10.4 Construction of social spaces

Street spaces in Old Dhaka are socially constructed. It happened through the practices of socio-cultural activities for hundreds of years. Lack of open community spaces forced people to use streets as social spaces. Social cooperation is a major force in running its socio-cultural activities in public spaces. The primary street activities are cultural, religious, shopping, and political. Each of these activities involves mixing different groups of people in spaces. Meaning and nature of spaces are different when people appear for different types of activities. The difference in activities and user groups made the social spaces dynamic and vibrant.

Variety of socio-cultural and religious activities changes the street environment as static and dynamic character. Static activities are attached to a single space where people come to such space to participate. Dynamic activities are subject to move through street space such as a cultural rally. Asura and Rath Jatra are the

examples of religious activities that make the street environment dynamic (Appendix C, Appendix D). These religious processions are dynamic because the number and nature of participants change as they proceed through space. User groups change with different times of the day and different days of the week (Figure 10.9). In regular daytime, streets are mainly busy with business activities. Religious activities are the second most dominant in street space. In festival time cultural, religious, and business activities become dominant because these three activities are interrelated (Figure 10.9). For example, a religious festival mostly comes with business and cultural events.

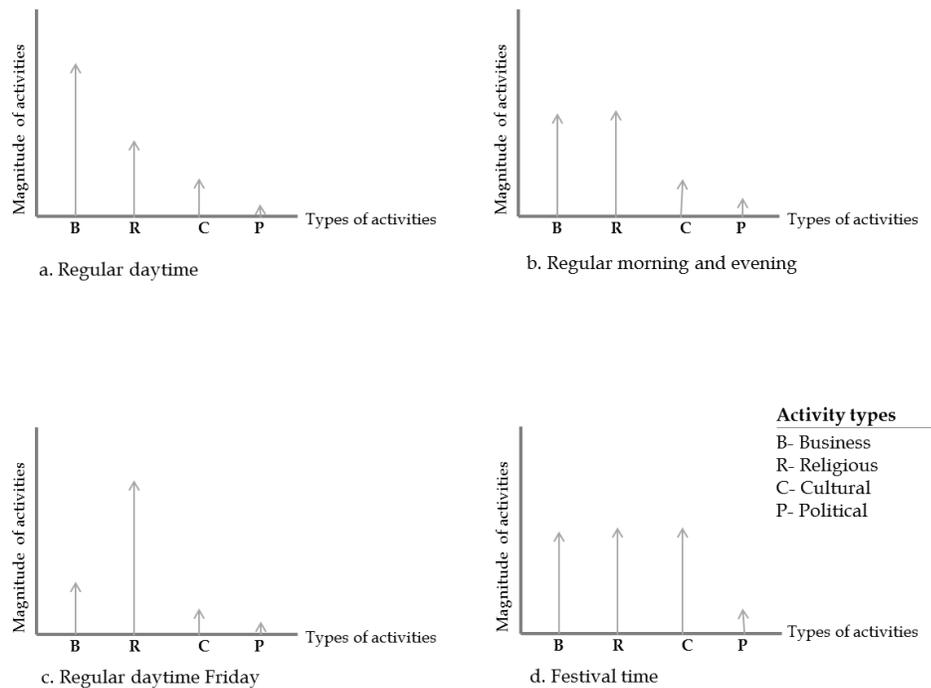


Figure 10.9 Magnitude (Schematic) of street activities in the streets of Old Dhaka (Source: Author)

Participation of male and female in outdoor activities is strongly guided by religious and social norms. Level and frequency of participation is different for male and female. It's a social practice that primarily man would come to outdoor space to do regular works. Moreover Muslim religion discouraged women to go to the public space unless it is unavoidable. The social and religious norms are clearly expressed in spatial practice. In ward 71 male Muslims are dominant in daytime street activities because they have to go to mosque five times in a day for prayer. This dominancy is even higher in Friday. Friday is the weekly holiday and on this day most of the shops remain closed. This is a religious and social practice that every Muslim man would go to mosque for weekly prayer. The streets in front of mosque at that time become a social gathering space that is associated with temporary business activities (Figure 6.20, Figure 6.21). 80% people are Hindu in ward 71 and there are few mosques in that community. Since there is no Friday prayer for Hindus so fewer people can be observed on streets of ward 71 (Figure 10.10, Figure 10.11). This is the speciality of Old Dhaka that shows how outdoor spaces are dominated by male users, religious, and business activities.



Figure 10.10 Community street on Friday noon, Ward 71



Figure 10.11 Community street on Friday noon, Ward 72

The male-female domains in public spaces are not only dominated by religious and social norms but there are also other reasons. Vendors are the most available and preferred mode for business in Old Dhaka (Figure 10.12). Because of the streets configuration and the supportive hierarchical level female members can maintain privacy during shopping. Zigzag and narrow streets at secondary or tertiary levels are such kind of streets space where females can do shopping and at the same time maintain privacy (Figure 10.12, Figure 10.13).

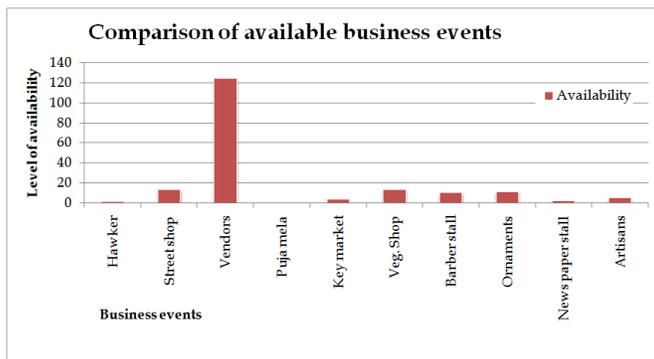


Figure 10.12 Level of preference for business events

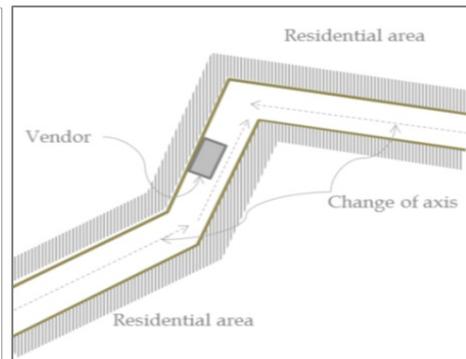


Figure 10.13 Shopping environment in tertiary streets

Intangible territories i.e. male and female territories are socially accepted and supported by physical division of spaces. The physical space division for male and female is perpendicular to stage for religious events such as puja and Waz mahfil (Figure 10.14, Appendix C, Appendix D). The space division is horizontal when the event is cultural and that has a specific reason. In cultural events the front layer is reserved for women and rear layer for male. In both cases more space is reserved for male, which is the evidence of woman's lesser participation in public space due to social and religious restrictions. The reason behind the vertical division of physical space in a Hindu religious event is the strong passion for male and female to go as close to the deities in a temple as possible. In this arrangement the Pujari³⁵ can receive offerings directly from the male and female (Figure 10.14).

In cultural events a smaller area is reserved for females at the front so that a large number of males can get their space at the back. This specific division of space is rooted in society's practices that are also reflected in preference for participation i.e. keeping male and female territories separate. Territories based on gender are clearly reflected in the physical divisions of space. These social practice and decisions are collectively made defining social spaces. Social homogeneity is

³⁵ The priest in Hindu temple.

working as a major factor behind the collective decision-making. Homogeneity helps removing barriers between community members and achieves cooperation which is helpful for decision making.

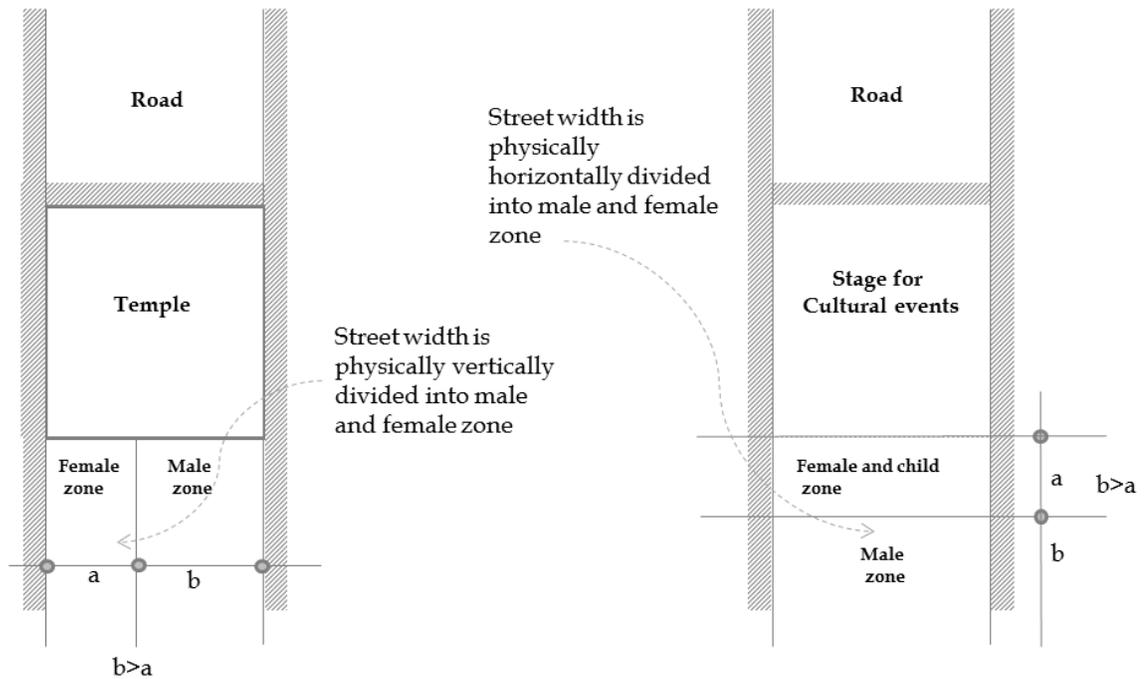


Figure 10.14 Physical space divisions for religious and cultural events. (Source: Author)

10.5 Control, sharing and negotiation for multiple uses of space

Sharing of spaces is socially supported because decisions are made collectively. Different forms of sharing such as time and space sharing indicate how spaces would be used for multiple purposes. Sharing of spaces in terms of activities are business and non-business types. It is a common practice that a certain width on both sides of streets is occupied by vendors and shop owners. Vendors play a

major role in space occupation though it is informal and illegal. They occupy both fixed and temporary space for business (Figure 6.24). The fixed spaces are in front of permanent shops in primary streets whereas non-fixed vendors provide service in secondary and tertiary streets and basically from door to door at home level (Figure 6.13).

The demand for daily necessary products and lack of space for shops forced this occupation of streets for business. Secondary and tertiary streets do not face this type of space occupation because of very narrow width. Only temporary space occupation for business is present there because it is not possible to accommodate vendors with fixed position in these streets (Figure 10.13).

Footpath is available only on wide roads. In wide roads, parts of footpaths are occupied only by adjacent shop owners (Figure 6.28). Vendors are less prominent here because pedestrians are not local and they are on the way to some other places.

Space sharing for non-religious purposes also starts with social cooperation. Sharing includes the use of whole or part of the width of the street which requires controlling multiple users groups of streets i.e., pedestrians, vehicle owners, vendors, businessman, and overall the inhabitants. Space sharing and control is done by negotiation between these stakeholders. The negotiation for space use is unique in Old Dhaka and the process demonstrates how a decision

could be collectively made (Figure 10.16). One might be curious about the way of controlling urban public space by non-administrative people. The answer is social acceptance and reliance on collective decision-making. Informal and social cooperation for the use of private space for public use is unique in Old Dhaka. People have been using other's private space to access their own lands under mutual cooperation. These streets are actually the spaces between buildings and because of the private ownership they were not included in the municipality's official map. The streets are very narrow (1-1.5 m) that are only accessible for pedestrians.

10.5.1 Process of negotiation in space control and pedestrian flow

The streets are for public and all people have equal right to use them. But negotiation takes place when there is the need for multiple use of street space. The negotiation for space control and pedestrian flow in socio-cultural events are mainly socially controlled. Any socio-cultural event on street is generally organized and controlled by a local committee and residents. Local politicians, leaders, and the respected seniors often become the key members of these committees. These respected and influential community members play vital roles in organizing events, pedestrian flow and controlling space. The committee individually or in combination with police control about 75% of pedestrian flows and vehicular movements during socio-cultural events. According to the

responses, police individually control only 14% of pedestrian flow and rest is controlled by community people.

Though events are organized and controlled mainly by the members of society but an official permission is required for controlling pedestrian and vehicle flow during an event. The permission can be obtained from police, local politicians, or both. Though official permission³⁶ may only be issued by Police but there also exist other parallel social practices to manage such events. Permission from both local and government authorities usually requires a recommendation from either a local politician or ward commissioner. Based on their recommendation police would issue the official permission.

Although formal permission for street activities is required but the informal or verbal permission is a very common practice. Organizing and controlling the street spaces are done in two basic steps (Figure 10.16). These steps are: a. Obtain permission, b. Arrange and organizing events. Presence of verbal permission and roles of community people is strong because social control of street space is more dominant than administrative control and community people collectively take their own decision to use and control street activities.

³⁶ A permission for any procession or congregation to be obtained from Dhaka Metropolitan Police.



Figure 10.15 Smaller social units in a ward (Para/Mahallah)

(Source: Dhaka City Corporation)

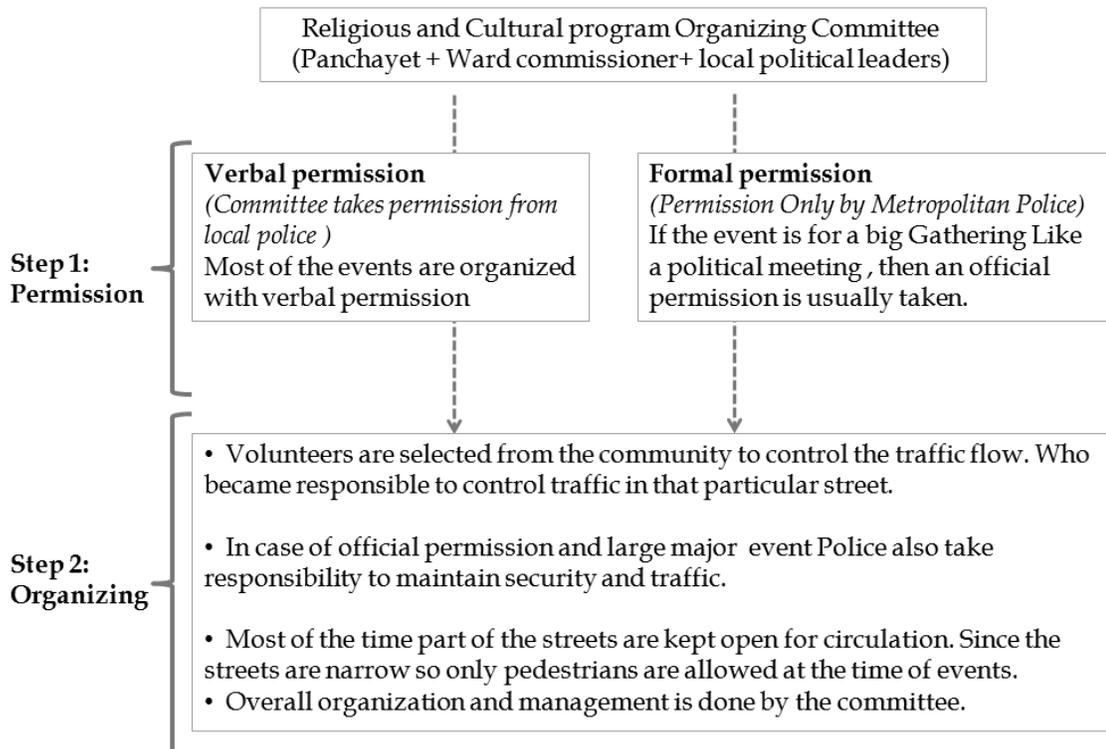


Figure 10.16 Steps of organizing socio-cultural events on streets.

(Source: Author)

10.6 Perception, preference, and practice of space use

Environmental quality can be judged by physical character of the street and the ongoing activities. People mostly prefer streets with the flow of pedestrian and non-motorized vehicles (Table 10.1). Streets with only vehicular flow are the least preferred. The reasons behind this preference are; a. community streets (zigzag, narrow, winding) are not appropriate for motorized vehicles, b. residences don't have space for parking motorized vehicles, and c. non-motorized vehicles (rickshaw) are available to move within the community. People are concerned that vehicular movement would make traffic congestion in the street, which would eventually hamper business and regular movement.

| Street types | Preferred rank for street |
|--|---------------------------|
| Pedestrian + Vehicular (Non-motorized) streets | 4 (Highest preference) |
| Pedestrian only street | 3 |
| Pedestrian + Vehicular(Motorized + Non-motorized) street | 2 |
| Vehicular (Motorized) street | 1 (Lowest preference) |

Table 10.1 General preferred street type

Type of occupation has a significant relation with street use that is similar to general preference pattern ($p < .05$, effect size = .389, medium) (Appendix F: 4) (Table 10.1). In this case 'pedestrian' and 'non-motorized vehicle' are the highest

preferred streets because ‘private sector employee’ and ‘self-business’ travel with non-motorized vehicle i.e. rickshaw or by walking to go to their work place within the community. Government employees also use rickshaw to go to the nearby bus stop from their home.

Shopping is the mostly preferred because people do their shopping either on a daily or weekly basis in street markets (Figure 10.17). Availability of fresh vegetable and fish has created the dependency on shopping (Figure 6.16).

Cultural events do not occur regularly on daily, weekly, or monthly basis rather occasionally on various specific days of the year. For this reason ‘occasional’ visits to street’s cultural activities have the highest use frequency (Figure 10.18).

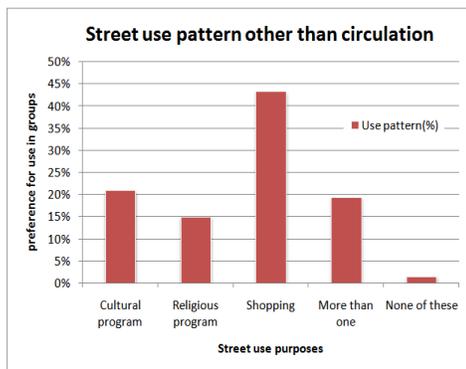


Figure 10.17 General street use pattern

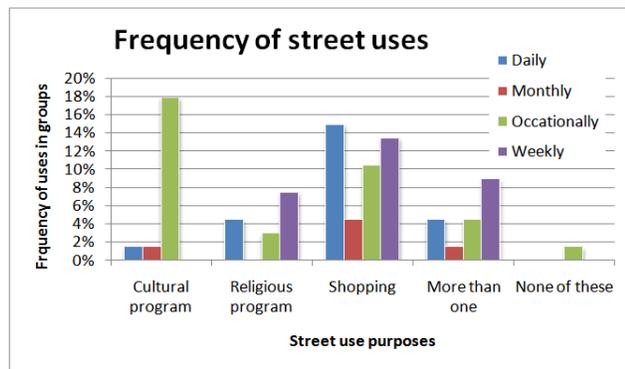


Figure 10.18 Frequency of street use for different purposes

Religious guidance and norms have a strong role in regulating male and female behavior in public spaces. Perception of a function guides perceiving the nature of that space. In old Dhaka people often equate religious and cultural events. The

cause behind this synonymous perception is the mixing up religious and cultural events. By practicing some of the religious functions for hundreds of years they receive wide social acceptance and become socio-cultural. Participation in cultural events by Hindus and Muslims are not equal and this relation is significant ($p < .05$, effect size = .508, big) (Appendix F:5). Because of the acceptance of some Hindu religious events as cultural, Hindus participate more in cultural events. Twenty-one cultural events were recorded that are regularly organized in the community. 12 programs in the list of cultural events are actually religious (Figure 10.19, Figure 10.20). It is also evident that people from other religions participate in different religious events such as, 38% Muslim responded that they participate in Mela³⁷. Mela is a part of Durga Puja and Ratha Jatra in Hindu religion (Appendix D). The reason behind this participation is, mela includes non-religious acts that made no obligation for Muslims to go and participate there.

Perception of a street based on the dominant function has been identified from the stated preference of streets. There are gaps between the physical qualities of preferred streets and the streets they are using. In most of the cases the preferred streets are wide and have footpath, close to home, and have availability of daily necessary goods (Table 10.3). But the streets at community level are narrow and don't have footpath. This mismatch between preference, perception, and practice

³⁷ Mela (In Bengali): Festival

indicate that sometimes spatial behavior do not reflect the preference if there is no alternative.

There are also matches between perception, preference, and spatial practices when the events are political and some religious. Straight and wide roads are perceived and preferred for political events taking place. In case of mismatch between perception, preference, and practice it is important to know how present streets are sustained as community space. The streets have been serving as community spaces because the spaces are fulfilling three needs of community people. The needs are basic needs (physiological, safety), social interaction, and self-fulfillment (Figures 4.7 - 4.11).

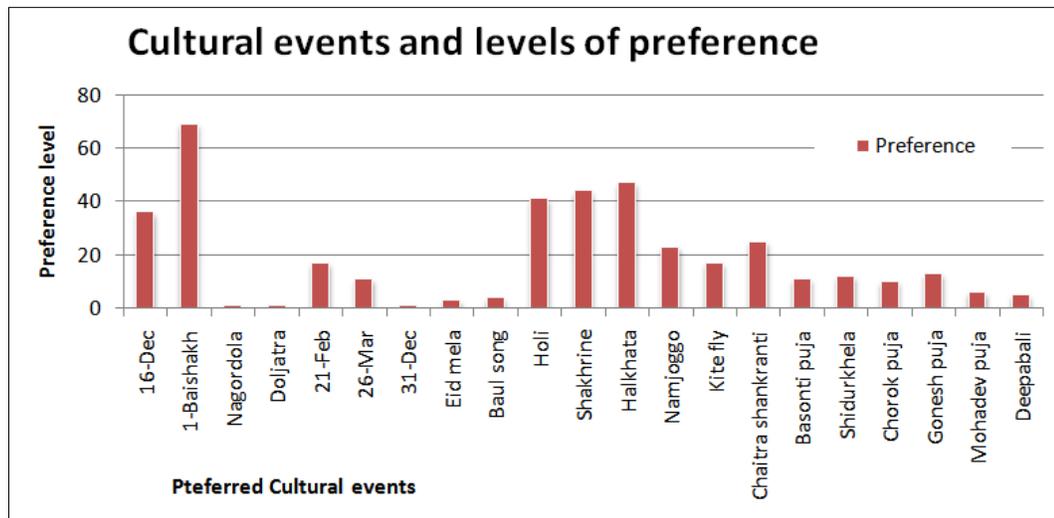


Figure 10.19 Cultural events and levels of preference

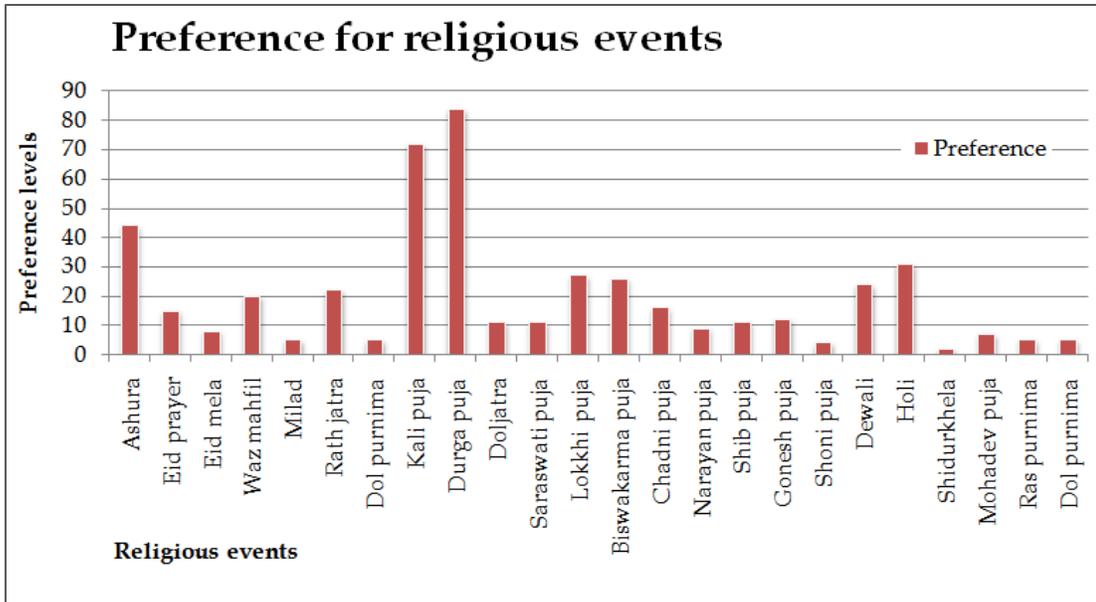


Figure 10.20 Religious events and levels of preference

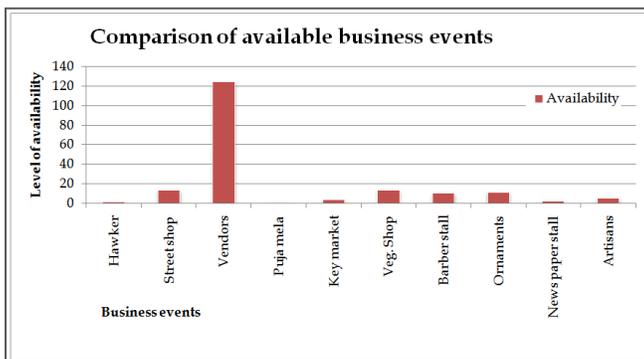


Figure 10.21 Religious events and levels of preference

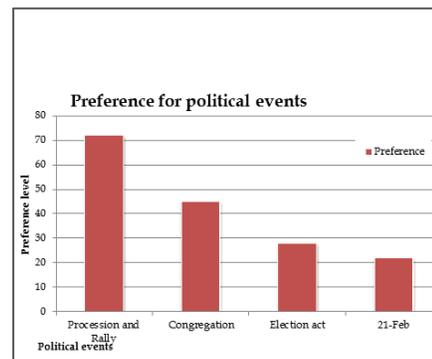


Figure 10.22 Political events and levels of preference

Cultural activities are open to all members of the society irrespective of religion, gender, and ethnic background. Absence of religious restrictions and social acceptance for cultural activities ensure maximum participation from all levels of people. Female and male actively participate in the programs such as, Pohela Boishakh, and Ekuse February (Appendix B). Here active participation means

performing some acts and observing those events are passive participation. Whether an active or passive participation, people maintain the specific pattern to choose association in attending cultural events. Association to participate in socio-cultural events are specific and the relation is significant ($p < .05$, effect size = .421, big) (Appendix F:7). People maintain their family and friends territory separate in participating cultural events. Mixing up friends and family members is least preferred in participating cultural events because there is religious and social restriction against mixing up male members with females from other families (Figure 11.3, Figure 11.4) (Table 10.1).

| Level of participation | Frequency of participation | | Total |
|------------------------|----------------------------|--------------|-------------|
| | Monthly | Occasionally | |
| Individually | 2% | 21% | 23% |
| With family members | 0% | 36% | 36% |
| With friends | 0% | 32% | 32% |
| Friend and Family | 0% | 7% | 7% |
| Others | 0% | 2% | 2% |
| Grand Total | 2% | 98% | 100% |

Table 10.2 Level of participation in cultural events

People at younger age (25-34 years) prefer to participate with friends whereas seniors (55-64 years and up) prefer friends and family together. The reason is religious and social practice where a senior person usually does not have social restriction in mixing up friends and family ($p < .05$, effect size = .461, large)

(Appendix F:6). People from both of the religions have significant relations when they participate in religious events ($p < .05$, effect size = .668) (Appendix F:8). Muslims and Hindus both prefer to participate individually because of the nature of regular religious activities. If it is a religious festival then the participation is similar like cultural events i.e. association of family members are the most preferred. Other than religious festival, Hindu women would pray at home and men go individually to temple whenever they have time. Other than Friday prayers Muslim men would go to mosque alone and women pray at home. For Hindu women this is social practice but for the Muslim women that is a socio-religious restriction.

People are less interested in political activities such as rallies, processions, and congregation. The relation is significant where only (25-34) years age group passively participate in political events ($p < .05$; effect size = .422, big) (Appendix F:9). Because of the engagement in business activity, dependency and reliability on local authority people became less interested in political events. Since spaces are socially constructed through collective decision that ensured wider acceptance of street's use as community space.

The space use pattern in Old Dhaka is deeply rooted in societal practice that made street's physical factors secondary important. The most dominant streets for religious, cultural, and business are Shakhribazar, Tatibazar, Panitola. These

streets are narrow, have no footpath and other amenities which does not match with the stated qualities of most favourite streets (Table 10.3 - 10.7). These evidences indicate that social acceptance is more important for making a space community space.

| Type of streets | Stated qualities that are expected for different types of streets |
|------------------|---|
| Walking | Footpath, close to home, wide and open, lower occupancy by human and vehicle. |
| Shopping | Close to home and availability of necessary products |
| Cultural events | Close to home, wide and open. |
| Religious events | Close to home, presence of temple/ mosque, enough space to arrange large volume of people, footpath |
| political events | Wide and large space, Should have nodal points, Close to public amenities |

Table 10.3 Stated qualities for different types of streets

By overlapping responses for most-favoured and least-favoured streets the general preference for streets was identified. There are dissimilarities between the choices for streets and it has been identified that one person's most favored street sometimes become another's least favored (Figure 10.23 and Figure 10.24). These most favored and least favored streets are not matching because individual preferences are different. For example closer proximity to home is a

major preference for Favorite street which would not match (Table 10.3). Close proximity makes a street easy to reach some functions moreover attachment for long time it creates the sense of belongingness. Old Dhaka is an example where it is evident that sense of belongingness and social attachment can make a space favorite. If the community streets of Old Dhaka were compared with the streets having standard amenities then they (Old Dhaka streets) would get least priority. So if spaces are socially are constructed through collective decision making and people have sense of belongingness then that space could be turned into successful public space.



Figure 10.23 Preference for travel mode in streets (Ward 71)

| Walking streets | Stated qualities(by respondents) | | | | Observed physical qualities of streets | | | |
|----------------------|---|--|---|---|--|-------------|---------------------------------|-------------------------------|
| | Street Amenities (Footpath, seating etc.) | Connectivity (Connected with home, office, parks etc.) | Road space (Width, openness, volume etc.) | Facilities for walking | Width (Meter) | Alignment | Height of built forms (Stories) | Street hierarchy in community |
| Malitola Road | | Nearer to home | | Low density | 4.43 | Zigzag | 2-3 | Secondary |
| North-South | Footpath | | Wide and open | | 30 | Straight | 3-4 | Primary |
| Johnson | Footpath | Connected to Victoria Park | Wide | Comfortable | 17 | Straight | 5-6 | Primary |
| Victoria Park | | | Large and open | | 15 | | | |
| English | Foot path | Park connected | Wide and open | | 35.5 | Curvilinear | 3-4 | Primary |
| Radhika Mohan Bosak, | | | | | 3.75 | Zigzag | 1-2 | Secondary |
| Nawabpur | Foot Path | | Wide | Less people, vehicle in morning | 16 | Zigzag | 5-6 | Primary |
| Sutrapur Road | | | | Less busy | | | | |
| GoalnagarL | | | | | 4.5 | Straight | 1-2 | Secondary |
| Shakhari Bbazar | | Good connectivity and accessibility | | Color, smell, peoples presence, live interaction with history | 4.5 | Straight | 3-4 | Primary |
| Hazi A Sarker | | Pond around | | | 3.25 | Straight | 2-3 | Secondary |
| Anwar Hossain | Footpath | | | | 3.5 | Zigzag | 2-3 | Secondary |
| Ashat Jomaddar | | | Open space | | 2.75 | | | |

Table 10 4. Stated and observed qualities of walking streets

| Shopping streets | Stated qualities(by respondents) | | | | Observed qualities | | | |
|--------------------------|--------------------------------------|---|---|--|--------------------|-----------|-----------------------|-------------------------------|
| | Street Amenities (Footpath, seating) | Connectivity (Connected with home, office, parks) | Road space (Width, openness, volume etc.) | Facilities available for Shopping | Width (Meter) | Alignment | Height of built forms | Street hierarchy in community |
| French | | Market, Nearest | | Necessary Product available | 12 | Straight | 1-2 | Primary |
| Johnson | | Market | | Necessary Product available | 17 | Straight | 5-6 | Primary |
| Bongshal | | Close to home | | | 7.75 | Straight | 3-4 | Primary |
| North-South | | Market | Wide | | 30 | Straight | 3-4 | Primary |
| Ray Shaheb bazaar | | | | Necessary Product available | 7 | Straight | 1-2 | Secondary |
| Shadarghat | | | | Necessary Product available | 5 | | | |
| Shakharibazar | | | | Wide variety of choice, Show piece, musical instrument | 4.5 | Straight | 4-5 | Primary |
| Anwar Hossain | | | | Available | | | | |
| Bazar deuri | | | | Main market in the community | 2.75 | Zigzag | 2-3 | Secondary |
| Court House | | | | Product of daily need available | 7 | Zigzag | 2-3 | Secondary |
| TatiBazar | | | | Ample choice of products | 3.5 | Zigzag | 2-3 | Secondary |
| Radhika Mohan Bosak Lane | | | | Hotel and food vendor | 3.75 | Zigzag | 1-2 | Secondary |
| Raisa Bazar | | Close to home | | | 5 | Zigzag | 1-2 | Secondary |
| Thatari Bazar | | | | Various product available | 4.5 | | | |

Table 10.5 Stated and observed qualities of shopping streets

| Cultural streets | Stated qualities | | | | Observed qualities | | | |
|---------------------|---|--|---|---|--------------------|-------------|-----------------------|-------------------------------|
| | Street Amenities (Footpath, seating etc.) | Connectivity (Connected with home, office, parks etc.) | Road space (Width, openness, volume etc.) | Socio-cultural | Width (Meter) | Alignment | Height of built forms | Street hierarchy in community |
| English | Footpath | Park beside street, nearest | | | 35.5 | Curvilinear | 3-4 | Primary |
| Malitola Road | | Closed end | Wide, Open space | | 4.43 | Zigzag | 3-4 | Secondary |
| Bongshal | | | | | 7.75 | Straight | 3-4 | Primary |
| North South | | | Wide and big enough for stage | | 30 | Straight | 3-4 | Primary |
| Johnson | | | | | 17 | Straight | 5-6 | Primary |
| GoalNagar | | | | Self-community | 3.5 | Straight | 1-2 | Secondary |
| French | | | Wide | | 12 | Straight | 1-2 | Primary |
| Nawabpur | | Close to home | Wide | | 16 | Zigzag | 5-6 | Primary |
| Malitola Lane | | Close to home | | | 2.75 | Zigzag | 3-4 | Tertiary |
| Tatibazar | | | | Traditional, Shops (cultural), All year round, Business, Halkhata | 3.5 | Zigzag | 2-3 | Secondary |
| ShakhatriBazar | | All people can gather | Traditional for long years | Year round active, Historic Temples | 4.5 | Straight | 4-5 | Primary |
| Victoria park | Large gathering space | | | | 15 | | | |
| Radhika Mohan Bosak | | Close to home | | | 3.75 | Zigzag | 1-2 | Secondary |

Table 10.6 Stated and observed qualities of cultural streets

| Religious streets | Stated qualities | | | | Observed qualities | | | |
|---------------------|--------------------------------------|---|--|---|--------------------|-------------|-----------------------|-------------------------------|
| | Street Amenities (Footpath, seating) | Connectivity (Connected with home, office, parks) | Road space (Width, openness, volume etc.) | Facilities for religious activities | Width (Meter) | Alignment | Height of built forms | Street hierarchy in community |
| English | Foot path | Close to home | Spacious, wide, open space, stage possible | | 35.5 | Curvilinear | 3-4 | Primary |
| French | | Close to mosque, house, | wide | | 12 | Straight | 1-2 | Primary |
| Golok Pal lane | | Close to mosque, school | | | 4 | Zigzag | 1-2 | Tertiary |
| Johnson | | | | | 17 | Straight | 5-6 | Primary |
| Malitola lane | open space | Nearest, | | | 2.75 | Zigzag | 3-4 | Tertiary |
| Goal Nagar lane | | Nearer | | Self-community | 4.5 | Curvilinear | 1-2 | Tertiary |
| Nawabpur | | Nearer | | | 16 | Zigzag | 5-6 | Primary |
| Bongshal | | | Wide | | 7.75 | Straight | 3-4 | Primary |
| Radhika Mohan Bosak | | Nearer | | | 3.75 | Zigzag | 1-2 | Tertiary |
| TatiBazar | | | All year activities | Temple, traditional, | 3.5 | Zigzag | 2-3 | Secondary |
| Shakharibazar | | | | Temple, Puja Mondop, Historic, Traditional, All year round activities | 5.25 | Straight | 4-5 | Primary |

Table 10.7 Stated and observed qualities of religious streets

| Political streets | Stated qualities | | | | Observed qualities | | | |
|-------------------|---|--|---|---|--------------------|-------------|-----------------------|-------------------------------|
| | Street Amenities (Footpath, seating etc.) | Connectivity (Connected with home, office, parks) | Road space (Width, openness, volume etc.) | Facilities available for political activities | Width | Alignment | Height of built forms | Street hierarchy in community |
| English | Footpath | Close to Gulistan | Wide, | Open Space for stage | 35.5 | Curvilinear | 3-4 | Primary |
| Malitola lane | | | Wide, closed end, | Enough space | 2.75 | Zigzag | 3-4 | Tertiary |
| North South | | | Wide | Enough space | 30 | Straight | 3-4 | Primary |
| Goal Nagar Lane | | | | Self-community | 4.5 | Curvilinear | 1-2 | Tertiary |
| Nawabpur | | | Wide | | 16 | Zigzag | 5-6 | Primary |
| Nawabbazar | | Nodal Point, Access point for other streets | Spacious, large area | | | | | |
| Victoria Park | | Node point, | Large area | | | | | |
| Johnson | | | | Enough space for demonstration, | 17 | Straight | 5-6 | Primary |
| Tati Bazar | | Close to Gulistan | Wide | | 3.5 | Zigzag | 2-3 | Secondary |
| Courthouse | | Close to Gov. Offices, | | | 7 | Zigzag | 2-3 | Secondary |

Table 10.8 Stated and observed qualities of streets preferable for political events

Chapter 11: Discussion and Conclusion

11.1 Discussion

Globally, cities are becoming heterogeneous, as people from diversified backgrounds are joining urban societies. Ethnicity, religion, and profession are the factors that people carry from generation to generation in societies.

Homogeneity develops when such similar groups dominate in a community. In Old Dhaka people from the same religion, profession, and in some cases ethnic background formed the various social groups throughout the community. As an example, Shakhribazar is a settlement where most of people were craftsmen and this is still in evidence in that community based on these professions (Ahmed, 2006).

Following the economic and political changes in local and global context, cities are also changing their nature. Nowadays, professions (other than crafts based) are not being controlled and maintained by social groups. Provision of diversified professions and businesses initiated the influx of people from varied social groups in urban areas. As a result societies are experiencing the fragmentation of its larger groups into the formation of smaller sub-groups. The fragmentation of homogenous and larger social groups into heterogeneous and smaller groups is affecting the use pattern of urban space. When a space is shared by homogenous groups of people then a 'singleness' of space occurs. In public spaces, people from heterogeneous background prefer to create or join

small clusters according to their own specific interests. This might hamper community singleness and later may produce fragmented space. This phenomenon is becoming the norm for urban areas globally as well as in Dhaka.

Old Dhaka is still dominantly homogeneous but it is on the way to transforming into a more heterogeneous society. The transformation is happening as existing people are moving in who practice diversified professions and newer businesses, and newer people of different background are coming into the community. Changed societal condition has also introduced privatization of public space. Privatization puts controls on space use by imposing use and a time limit (Figure 4.2). Restrictions by privatization influence all groups of people participating in public space. The effect of segmentation of social groups and privatization are seen as examples of causes behind challenges to the traditional sharing of space.

It is claimed that interdependency is strong in Old Dhaka with its homogeneous communities. Collective decision-making and protecting each other's rights are the demonstrable outcomes of interdependency. For example, people protested against a government rule that imposed restrictions on the construction/modification of buildings in Shakhribazar community. Though the rule was affecting a few people, the protest rally was initiated from a

collective decision, which involved the whole community (Figure 6.45). The effect of social heterogeneity has also been found in the control of public space. For example, social segmentation has already begun in Old Dhaka that imposes segmentation of public space. Gated communities are the examples of physical segregation of space by controlling the access of certain streets. Installation of gates on streets is obviously the reflection of social fragmentation that resulted in uneven sharing of public streets (Figure 6.18, figure 6.19). Both of these examples; i.e. common social protest and gated community are showing social efforts to maintain the group's territory in larger and smaller scales. To protect social territory people are resisting the intervention by government institutions. On the other hand, a gated community is another dominant form of territorial control that is protecting a limited number of people.

Verbal and non-verbal communication between people are very specific and that can be identified by the use of local language *Dhaka-ya'*³⁸. It is well known in the country that this specific dialect is commonly used to communicate between people of Old Dhaka, which enhances intercommunication between various disparate groups. Along with similar professions and religion this place-specific dialect is also acting as a promoter for effective interpersonal communication. In

³⁸ This is a form of Bengali language. It can be differentiated from the commonly practiced Bengali language with the specific way of pronouncing, and gesture.

communication the use of a specific dialect helps easier and effective exchange of cues through coding and decoding. This research fulfilled the objectives in a manner that contributed in two major areas of knowledge. Firstly this research developed an appropriate method of recording behavior data in public space. Secondly, it identified the behavioral pattern in the streets of Old Dhaka.

The analysis chapter identified how and to what extent human factors i.e., cultural, religious, and physical factors i.e., street width and configuration affect spatial behavior. In analyzing environment and behavior it is a common practice to start with layering or grouping of social and communal activities. Researchers do this layering in order to simplify research and to go deep into analyzing each factor. In this manner, Rapoport (2000) proposed to make groups from socio-cultural activities in terms of 'filters' (Figure 7.1). This research also started with the layering of activities and analyzed data accordingly. The following discussion focuses on the relevance of analyzing theories and methods of space behavior for this research.

11.2 Relevance of space-behavior theories analyzed and applied

In this research theories of studying urban spaces were analyzed. With the help of these theories, street morphology and the space formation process has been

identified (Chapters 2 and 5). Theories of morphology were applied to identify the characters of street spaces in Old Dhaka such as the pattern of connectivity, space volume and enclosure. This information was applied in analyzing behavior and space preference (Chapter 5). Theories of interpersonal communication helped understanding the meaning of the cues used in verbal and non-verbal communication. The knowledge of interpersonal communication methods contributed in identifying the nature of social territories. By understanding cues and territoriality the factors behind spatial behavior were identified (Chapter 3). Theories of socio-cultural aspects and rights in using urban spaces helped in the identification of society's homogeneous and heterogeneous character. These theories also contributed in identifying the formation process of social clusters/territories. Knowledge on territoriality helped identify how people act in groups (Chapter 4). Theories of observation and recorded behavior data were analyzed to adapt an appropriate method for this research (Chapter 7).

11.3 Relevance of analysis and application of methods to record behavior data

The analysis and extraction of information in this research were done by applying the proposed 'combined method' for recording behavior data (Figure 7.11). The method has potential to capture behavior data for space-behavior

analysis. The proposed combined method included important features from three methods for recording behavior data such as, Direct observation, Time budget, and Self-reporting. The strength of these methods helped in capturing different types of behavior data required for an in depth analysis (Figure 11.1).

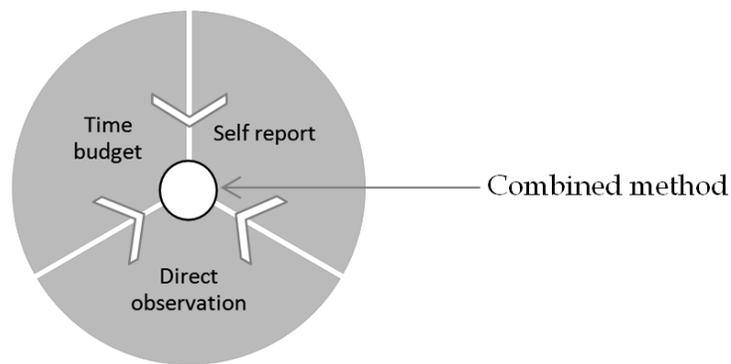


Figure 11.1 Structure of applied 'combined method' for recording behavior data

Direct observation: This method was used as one of the important non-verbal communication methods. The method helped identify some of the data that was hard to acquire by verbal communication methods. Observation of natural behavior in environment is one of the key strategies to capture authentic data. For example, one can extract valuable information by observing prayers on streets (Figure 4.11, Figure 6.22, and Figure 6.23). These observations helped in identifying the presence of stronger attachment of people with religious events. Direct observation of people's natural behavior helped identify relationships between socio-cultural factors and spatial behavior. This observation identified

that there is mutual understanding among people for using streets for multiple activities. Mutual respect, attachment with people and collective decision influence the sharing of street spaces. Identification of streets' potentialities as social space was also possible by direct observation. For example, streets corners or water collection points in the study area were found to be social spaces where people exchange information through verbal and non-verbal communication (Figure 4.10, Figure 6.3, Figure 6.4).

Time budget: This method helped to identify frequencies of space use by individuals and groups. Frequencies of space use indicated the level of attachment of the people with street activities. Higher frequency of visiting the streets refers to higher preference to participate in different socio-cultural events in streets (Table 10.3).

Self-report: This study establishes the contribution of this method in identifying preference of street space, preferred modes of circulation in community streets, identification of the process of space control and negotiation. Important information on social territoriality was obtained using this method. By applying this method, it was also identified that most of the surveyed people prefer streets as pedestrian and non-motorized (Table 10.1). A significant application of this

method was to assess the identification of ‘most preferred’ and ‘least preferred’ space in a community.

11.4 Outcomes and fulfillment of research questions and objectives

The results and analysis of this survey support the hypothesis that environment can affect and mould human behavior in public space. Control, negotiation, and use of streets are socially controlled and determined. People adjust their lifestyle within the established space control mechanisms. Fulfillment of the objectives of this research also ensured the applicability of the proposed behavior recording method that was developed for this research. Major achievements of this research are,

- Contribution to the methodological development in recording behavior data.
- Contribution to the creation of new knowledge by uncovering hidden layers of spatial behavior in Old Dhaka.
- Understanding some of the underlying mechanisms for space-sharing in Old Dhaka.

Achievement of these major contributions was done through fulfilling the stated objectives of this research. Firstly, a method and framework to record and analyze behavior data has been developed. Methodological development was

done in two steps such as, step-a: development of method and its application in a space-identification study prior to a main survey and step-b: Suggestions from the space identification study were considered, modified and finalized to apply in the main survey (Chapter 7) (Figure 7.11). Secondly, the mechanism of space sharing and negotiation in street spaces of Old Dhaka has been identified and presented in Chapter 10 (Figure 10.16). Data from the structured questionnaire and informal interview were compiled to generalize the space sharing and negotiation process. Thirdly, spatial behavior in the streets of Old Dhaka has been identified and presented as behavior maps and in other analysis (Chapters 6 and 10). Behavior maps show how streets spaces are used in different times of the day by different user groups (Figures 6.22-6.28, 6.33-6.36). Recorded behavior data was analyzed and relationships between variables were established (correlational analysis, Chi-square tests). Information on significant relations was used to explain the reason behind behavior pattern in time and space (Chapter 10). Finally, preference for streets as community space has been identified and presented in Chapter 10. To identify the preference, stated qualities of spaces and physical condition of the present environment were compared. It has also been identified and discussed how socio-cultural factors are more significant than physical factors for a community space (Chapter 10). Besides the fulfillment of the objectives this research also specifically uncovered some space-behavior information. The major outcomes of the research are:

Preference for community streets is not diversified but rather is commonly held in Old Dhaka

It was assumed that preference patterns for movement and streets would be different as users are different in age, religion, profession. The analysis of street space preference and movement preference shows that the overall pattern is similar for various ages, profession, and religious groups in a community. In Old Dhaka only the 65+ years age people expressed different preference for street. Since people in this age group was very low in number (5% of total survey population), their opinion can be considered to have little impact. The unique preference for street in Old Dhaka is a. 'Pedestrian and non-motorized streets', b. 'pedestrian streets', c. 'pedestrian, motorized, and non-motorized streets', and d. 'motorized streets' only ordered from highest to lowest preference.

All activities are 'social' and grouping of activities should come at later stages of research

Street use patterns, other than circulation and the frequencies of street use for different purposes (religious, cultural, business etc.), highlight the prominent spatial uses of street where 'shopping' dominant. This result is valid if we separate activities into groups instead of perceiving them as connected through complex webs. Religious and cultural activities are deeply interlinked and can sometimes carry similar images to people. Boundaries of these activities are

sometimes blurred and become common for social members. In such cases it is hard to specify an activity as religious or cultural (Figure 11.2). It is important to note that in the study area 66% of the religious activities are also mentioned as cultural activities. This might have happened either due to the difficulties to differentiate activity types or people have learned to perceive some of the religious activities as cultural.

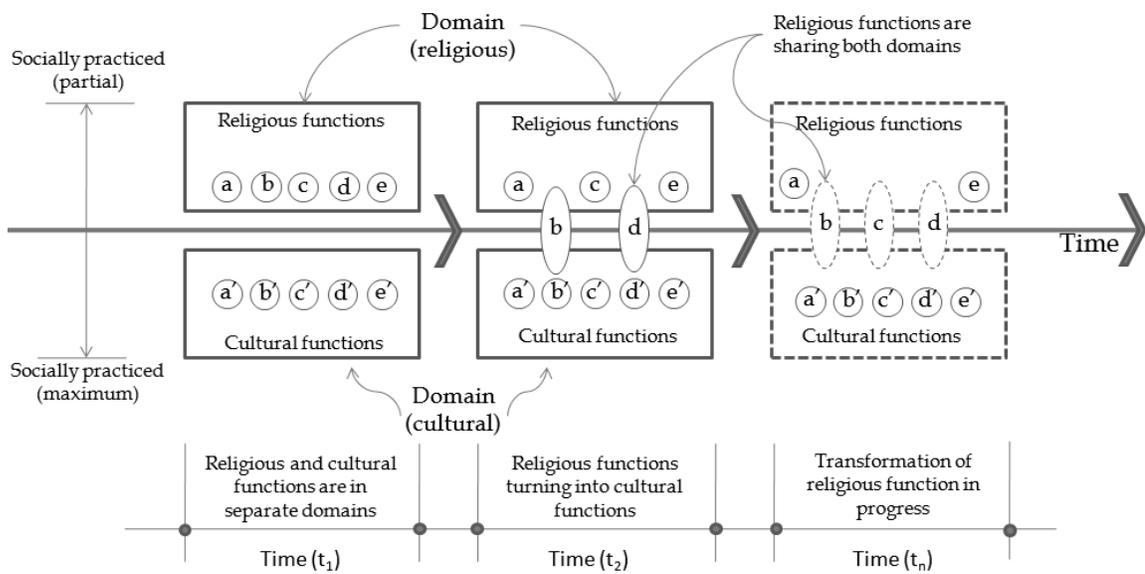


Figure 11.2 Conceptual model of transformation religious functions into cultural (Source: Author)

The dilemma of differentiating religious and cultural events can be explained as; when some religious functions are socially practiced and accepted they may cross religious boundaries and be shared within the local cultural domain (Figure 11.2). This conceptual model shows that at time (t_2), religious functions 'b' and 'd' are sharing both religious and cultural domains. This sharing creates confusion in identifying the proper domain of a function. For example, people

identified some religious functions as cultural. In this sense, if the survey respondents were asked to classify the preference only by name (as individual function) instead of categories, then different preference patterns could emerge. The same inference is also appropriate for the result in identifying level of participation in cultural events. Muslims expressed highest preference for 'not observe or participate' in cultural events. On the other hand highest preference for Hindu people is 'observe and participate'. This result suggests that Muslims participate less in cultural events than Hindus, which might not be a reflection of actual behavior. Since 66% of the stated cultural events are Hindu religious events and Muslims did not perceive them as appropriate events in which to participate.

To avoid this confusion it would be appropriate if all street events were considered as social events only. Preference should be asked for individual social events and later social activities would be grouped as religious, cultural, political, or professional for analysis. Figure 11.3 shows the modified sequence of environment-behavior analysis where the position of 'grouping the social activities' has been altered. Importantly it should be noted that in the revised sequence all the activities are mentioned as social event to avoid confusion and individual bias of the respondents (Figure 11.3). The alteration in the sequence can be compared with the sequence applied in this research (Figure 10.1).

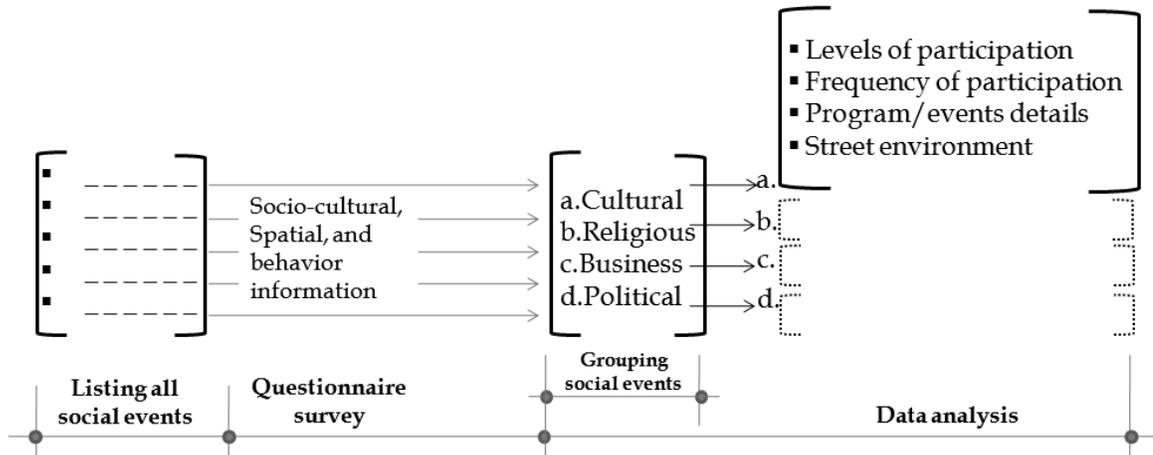


Figure 11.3 Proposed modifications in sequence of environment-behavior study

Social territories and level of interpersonal communication in public spaces are identified

In any society a person can belong to more than one territory such as family, friends, or professional colleagues (Figure 11.4). In the survey area 68% respondents prefer to be in groups (either with family or with friends) when they participate in social events. This phenomenon indicates interpersonal communication works well within family members and friends for the people in Old Dhaka. It has been identified that members maintain 'family' and 'friends' territories in public space. Communication within individual territory is effective since members belong to similar group. There is only 6% common area in two territories where people can communicate effectively because each territory has a boundary that is difficult to cross for others (Figure 11.5).

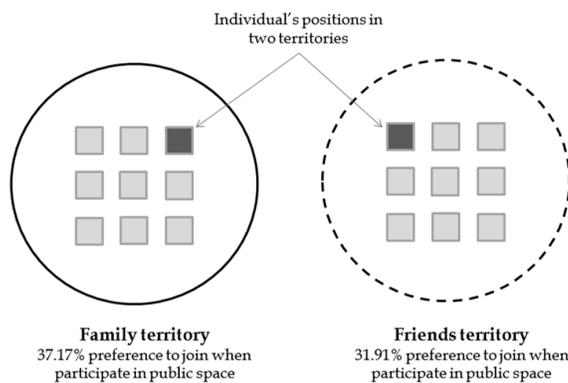


Figure 11.4 Individual's positions in multiple territories

Source: Author

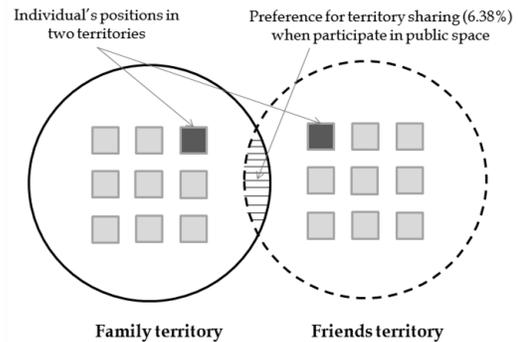


Figure 11.5 Individual's positions in shared territories

Source: Author

Space preference is being guided by historical image and the people themselves

There are arguments in identifying the parameters that make spaces more preferable. To identify preferable space, researchers emphasized available functions, wider space for easy movement, safety and security, historical image and so on. In the study area the most preferred streets are Shakhribazar, Panitola, and Radhika Mohan Bosak (Figure 10.26). These highly preferred streets are rich with cultural values, as they routinely accommodate major religious and socio-cultural activities. But one may comment that the volume of physical space and infrastructures are not good enough in these streets (Figure 5.9). In most of the cases average street width is 4.5 meters (Tables 10.4, 10.5, 10.6). Then the question arises: without the standard infrastructure and space

how can these streets become 'most preferable' streets. Moore (1987) indicated that some streets have characteristics that attract people even when there are other better spaces available. 'People' and 'historical image' are the major factors that can make a space attractive to individuals or groups. The survey analysis also identified that the most important factors for street preferences are the historical images and association of social members. These associations seem to create a sense of a larger territory where people feel comfort to belong. This finding indicates that presences of homogenous people and accessible territories are the prime factors for a space to be preferable. Additionally, close proximity to residence, availability of necessary products, and ability to meet some basic needs of community people can increase the level of preference.

11.5 Conclusion

Research and analysis results indicate the importance and future application of behavior data for urban planning and development. The example of Shakhribazar Street indicates how socio-cultural factors can be very important in making a space preferable when there is limitation of space. We need to collect behavior data first in order to design community streets that are capable of satisfying the major social needs of their users in a more meaningful way. Without knowing behavior pattern and preferences it would be difficult to understand the social and psychological needs of a community. Analysis of

behavior data would indicate the exact needs (physical, social, and psychological) and assess a street's ability to satisfy those needs. Contemporary practices of developing street spaces are concerned with physical factors i.e. proper width, alignment, amenities, and infrastructure. Social and psychological factors got less emphasis in the design or decision-making process (Figure 11.6).

Evidence from both developed and developing countries show historically social needs have been ignored in the development of streets (Sideris & Ehrenfeuch, 2009., Bhoumik, 2005., Hackenbroch, 2011). Research also highlighted that needs of lower social class people were ignored in the development and providing access to the streets. Through common practice all social groups should have equal right to access and use of streets. Without the inclusion of every social group for making collective decision making it is not possible to bring out a successful street space. Figure 11.6 shows current planning/ decision making process with relation to the need hierarchy of urban public space. The figure indicates that there is a gap of information related to socio-psychological factors in the planning process. A proper behavior study and analysis might help overcoming such shortcoming.

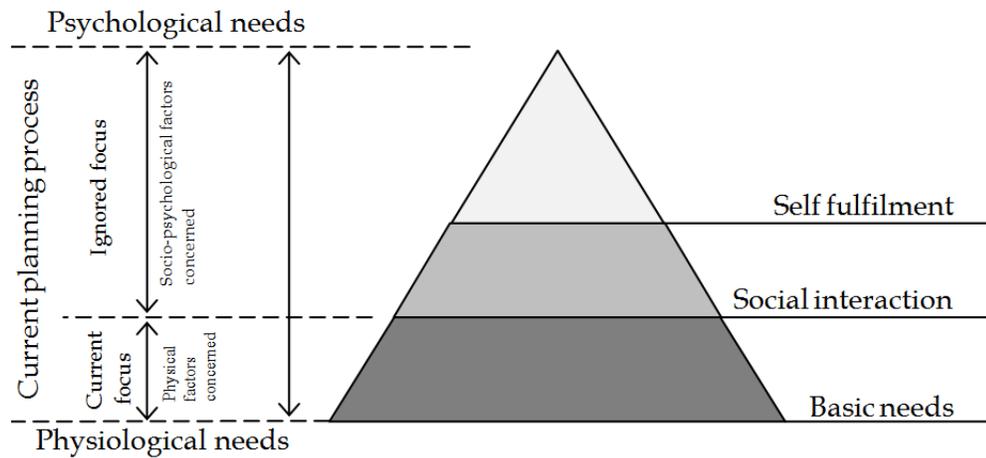


Figure 11.6 Planning process and focus on 'need hierarchy' of public space

Source: Author (Adapted from Childs (2006))

Potentials for this kind of research are high in developing countries where public spaces are at a stagnated state of development and need revitalization. Similar study can also be applicable in developed countries in order to assess whether public spaces, especially streets, are fulfilling basic needs of the society.

Spatial qualities and behavior pattern analysis is a fundamental point of research in environment-behavior studies. Recently, environment-behavior study has garnered immense attention in the field of built environment such as, in architecture and urban planning. By conducting such research a vast field of knowledge can be discovered. By conducting more research in this field researchers could bring 'cues' for professionals and policy makers in urban planning. It is hoped that with new knowledge, professionals can move forward to make a better environment for future generations.

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Appendices

Appendix A: Questionnaire for Space identification study

I am a Concordia student administering this survey for a class in the Department of Geography, Planning and Environment. The goal of this study is to determine how people identify different functional zones in public space and what are the attributes they consider in determining space (zone) boundary. Another notion of this research is to find out how functional zones overlap this knowledge will eventually help in predicting workability of any spatial organization. It is anticipated that through a better understanding of the influences of certain attributes, the result from this research may help in developing better design policies to improve the distribution of zones in public space. The survey is entirely voluntary and will only take approximately 5 minutes. It is completely anonymous, and you may stop participating at any time if you choose to do so. If you have any questions, you may ask the researcher directly in person or contact the principal investigator **A.K.M. Kausarul Islam** at riaz_ku@yahoo.com.

Date _____ Time _____

Concordia University, Departments of Geography, Planning and Environment

Self report (Respondents activity summary)

Academic and demographic information:

| | |
|--|--------------------------------|
| 1. Study level: Undergraduate () Graduate () | 2. Department: |
| 3. Year(s) of study: _____ | 4. Gender: Male () Female () |

5. Activity summary

| Activities | Y | N | Duration (mins) | Presence (single) | Presence (group) | Academic | |
|------------|--------------------------|---|--------------------|----------------------|---------------------|----------|---|
| | | | | | | Y | N |
| 1 | Sitting | | | | | | |
| 2 | Talking | | | | | | |
| 3 | Reading | | | | | | |
| 4 | Writing | | | | | | |
| 5 | Meeting | | | | | | |
| 6 | Eating and drinking | | | | | | |
| 7 | Walkthrough | | | | | | |
| 8 | Interactions | | | | | | |
| 9 | Pacing | | | | | | |
| 10 | Watch TV | | | | | | |
| 11 | Phone | | | | | | |
| 12 | Photocopy | | | | | | |
| 13 | Recreations | | | | | | |
| 14 | Student group activities | | | | | | |
| 15 | Others | | | | | | |

Please response to the following questions

6. Is there any specific space for an/group activity(ies)? Y () N ()

7. Is there any indication/direction for specific activities here? Y () N ()

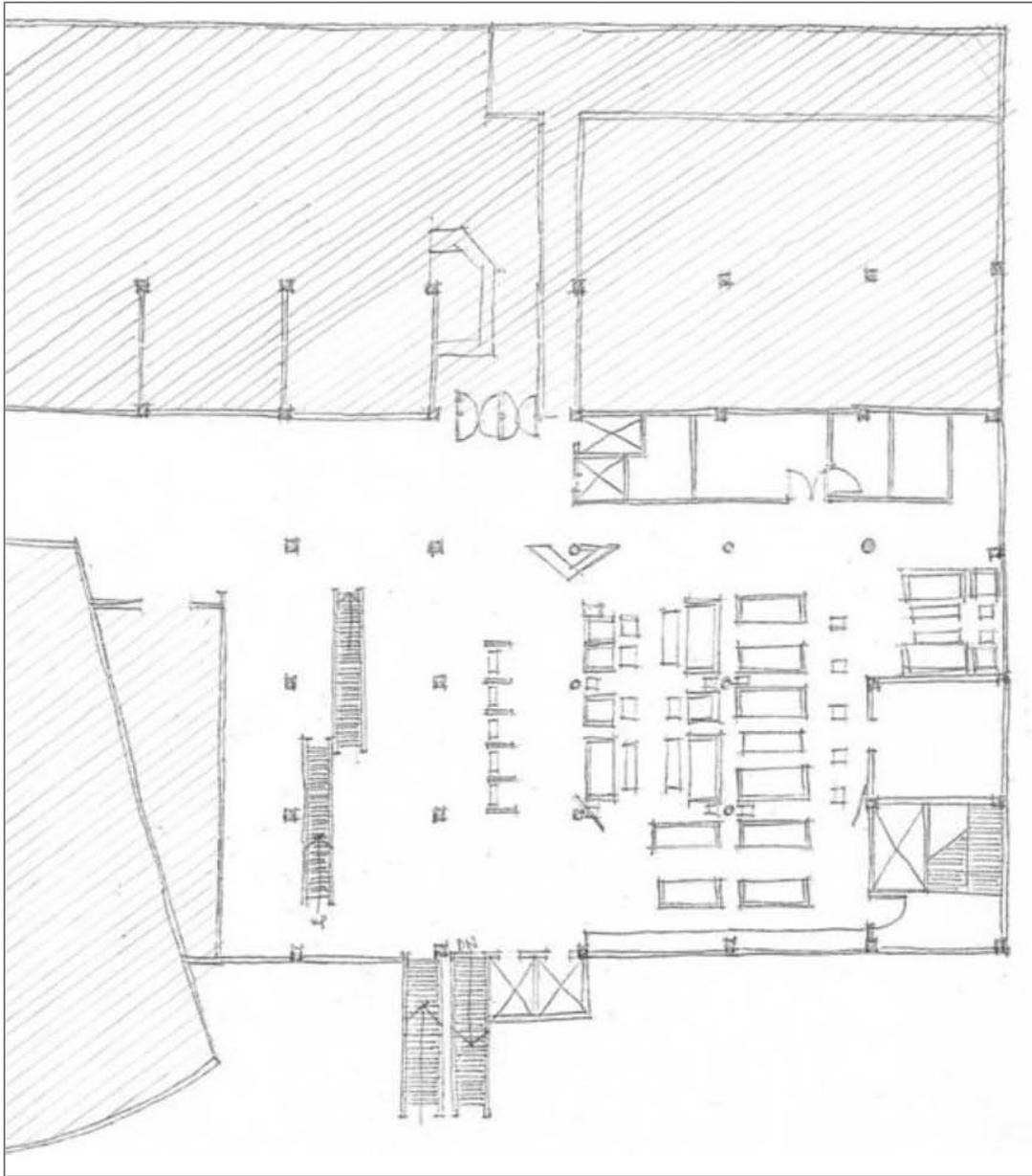
7.a If yes then, _____

8. Do you see any overlap in these specific space? Y () N () (please mention in the plan)

9. Can you identify any barrier in between these activity spaces? Y () N ()

If Y, then _____ (please mention in the plan)

Continuation of Appendix A



Plan: Mezzanine level, Hall building, Concordia University, Montreal. Not in scale.

Appendix B: Stated and observed qualities of streets with cultural events

| Cultural events | | | | | | | | | |
|---|-------------------------------|--|-----------------------------|-------------------|-----------------|---|---|--------------------------------------|---|
| Name of events | Frequency (yr/mon/week/daily) | Time of the year | Duration | Group/individual | Male/Female | Place: home/mosque or street | Main participation time | Associated public gathering/festival | Special Comments |
| 1 st Baishakh | Yearly | 1 st day of the bengali new year that falls on 24 th or 25 th April | 1 day | Individual/Group | Male and female | In public open spaces, street | Basically starts in early in the morning and last for several hours | Boishakhi mela. | Boishakhi Mela is a major festival for Bengali people. All religion, age, and genders participate in this festival. |
| Baul song ¹ | Occasionally | Different time of the year | Undefined but several times | Individual/groups | Male and female | Public space | Day time specially in afternoon | Associated with mela. | It is an essential part of 1 st Boishakh festival. But in other cultural programs Baul songs are also played. |
| Halkhata | Yearly | 1 st Boishakh (24 th or 25 th April) | 1 day | Individual/groups | Male and female | Public space basically at business stations like shops. | Whole day | | <i>Hal</i> means new and <i>khata</i> refers to account books for the businessman. On the first of Bengali new year they start new accounts and for this reason peoples are invited to shop and entertained with sweet meals. |
| <i>Nagorāola</i> known as 'Merry go round' in English | Occasionally | Different time of the year | Undefined but several times | Individual/groups | Male and female | Public space | Day time specially in afternoon | Comes with <i>mela</i> (festivals) | This event comes with different cultural and religious festivals specially in 1 st Boishakh. The main target groups are children and younger. |

¹ A special kind of Bengali song played with a special instrument called 'Ektara'.

Continuation of Appendix B

| | | | | | | | | | |
|---|------------|---|-----------------|-------------------|-------------------------|------------------------------------|---|----------------------|--|
| 21 st February | Yearly | 21 st of the month February | 1 day | Individual/Group | Male and female | Mainly street | Early morning to noon | Cultural programs | 21 st February is the international mother language day. Bengali people remember and celebrate this day who sacrificed their lives to retain Bengali as state language. Activities include procession, drama, song & music. |
| 26 th March Known as Independence day of Bangladesh. In Bengali স্বাধীনতা দিৱস | Yearly | 26 th March | 1 day | Individual/Group | Both male and female | In public place | Basically in day time. But some continues in night times also. | | 26 th March is the 'Independence day' of Bangladesh. On this day the independence was officially declared. Nation celebrates this day with rally, speeches, fair and festivals, concerts. |
| 16 th December Known as 'Victory day' of Bangladesh In Bengali বিজয় দিৱস. | Yearly | 16 th December | 1 day | Individual/groups | Both male and female | Streets space | Evening through whole night | | 16 th December is the Victory day of Bangladesh. On this day East Pakistan won the war against West Pakistan and become Bangladesh. |
| 31 st December | Yearly | 31 st December | 1 day | Individual/groups | Male and female | Public space | Midnight | | On 31 st night of December people celebrate the moment of the new year. |
| Kite flying | Occasional | Different times fo year. Mainly dry season. | Several days | Individual/group | Basically male | Public space. Mainly roof tops. | Daytime | | |
| Eid mela, Doljatra, Holi, Shakhirne, Namjoggo, Chaitra shankranti, Basonti puja, Shudurkhela, Chorok puja, Gonesh puja, Mohadev puja, Deepaboli (These are religious events. Please see the list of religious events). | | | | | | | | | |

Appendix C: Stated and observed qualities of streets with Muslim religious events

| Religious events ² (Muslim) | | | | | | | | | |
|--|-------------------------------|--|---------------|-----------------------------|--|--|---|--------------------------------------|---|
| Name of events | Frequency (yr/mon/week/daily) | Time of the year | Duration | Group/individual | Male/Female | Place: home/mosque or street | Main participation time | Associated public gathering/festival | Special Comments |
| Ashura | Yearly | 10 th day of the month <i>Muharram</i> in Islamic calendar. | 1 day | Individual/Group | Male | In street spaces | In day time (from Late morning until evening) | | This event is to remember the martyrdom of one of the grandson of Prophet(Sa) in 680 AD ³ . |
| Eid prayers, Eid-ul Fitr & Eid-ul-Adha | Twice in a Year | a.1 st day of the month <i>Sawwal</i> in Islamic calendar. b.10 th day of the month <i>Al-Hazza</i> | 2 days | Individual/Group | Generally male participant but females are also participating in some areas. | In a large public open space generally. In rainy season public gather in mosque. | Morning (7am to 12am) | Eid mela | These are main festival for Muslims. |
| Eid mela | Twice in a year | Same two days of Eid | 2 days | Individual/Group | Both male and female | In public place | Basically in day time. But some continues in night times also | | <i>Eid mela</i> is becoming popular in these days. Stalls for selling special foods, souvenirs are installed in a public open space. A musical program is often performed at these festivals. |
| Waz mahfil | Various times of the year | Generally arranged in winter | Several days. | Individual/groups | Basically male. Female also participate but in segregated space. | Streets space | Evening through whole night | | This gathering is to hear religious talks from intellectuals of Muslim religion. |
| Milad | Different times of the year | Generally at afternoon or evening times | Several days | People attend by invitation | Male and female | Home and public space | Afternoon, evening | | A collective religious event arranged to wish everyone's good. |

² Muslim religious events follow Islamic calendar which does not match the same times in each year with Gregorian calendar. Because Islamic calendar is a Lunar calendar that has 355 or 356 in a year. For this reason there is always a ongoing gap(11 days approximately) between widely used Gregorian calendar with Islamic calendar.

³ <http://www.bbc.co.uk/religion/religions/islam/holydays/ashura.shtml>

Appendix D: Stated and observed qualities of streets with Hindu religious events

| Religious events (Hindu) | | | | | | | | | |
|--------------------------|---|--|----------|--|---------------|---|-------------------------|--|---|
| Name of events | Frequency (yr/mon/week/daily) | Time of the year | Duration | Group/individual | Male/Female | Place: At home or temple | Main participation time | Associated public gathering/festival | Special Comments |
| Durga Puja | Yearly | 11-14 September <i>Shorokhal</i> September-October | 5 days | Group and individual | Both | Basically at permanent or in temporarily built temple | Morning to night | Mela on Doshomi close to temple | This is main Hindu religious festival. The main objective is to incorporate and ensure participation of all groups of people. It's a ritual part of Durga puja |
| Sidurkhela | Yearly | This a ritual part of the Durga Puja held at the last day of the Durga Puja. | 1/2 day | Group/individual | Only Female | At home/Temple | Morning to Afternoon | | |
| Chadmi Puja | Yearly | Do (full moon night) | 1 day | Individual | Only female | At home | Night | | It's a ritual part of Durga puja Fasting for whole day that ended after watching full moon at night. |
| Loksmi Puja | Yearly | 18 september After 3 days of Durga puja, must be held first full moon night after Durga puja. | 1 day | Family wise/ Individual preferred | Mainly female | Temple and Home | Evening/At Night | Not in city or town but in some villages | This is mainly held at home where female of the household lead the process, and participate by the all family members. |
| Shoni Puja, Narayan Puja | Yearly/sometimes occasionally as wished by the family | Afternoon | 1 day | People attended by invitation | Both | Home based | Night | | Desired to get blessing and relief from suffer and ill forces. |
| Swarassati Puja | Yearly | Mid-February <i>Magh</i> | 1 day | Both/individual preferred. Mainly students play lead role. | Both | Home, temples, and academic institutions | Morning/day time | Cultural festival at temple | Dedicated for the development of all kind of creative arts like, music, dance, painting, engineering and so on. |

Continuation of Appendix D

| Kali Puja | Yearly | 2 November, Kali Puja is celebrated on new moon day during Diwali festivity (Anabasya) Chaytra | 1 day | Group/individual | Both | Temple/home | Midnight | Slaughter goat dedicated to Kali at temple | |
|---|--|--|--------------|------------------------|--|------------------------------------|---|--|---|
| Rathjatra, Holi, Rashi purnima (Doljatra) | Yearly <i>Rash purnima Doljatra</i> | Rath jatra- 10 th July Doljatra-(April-March) Vadro 27 March(Purnima) Ras Purnima-3 rd November | All in 1 day | Group | Both | Temple/Home | Day Raspurnima night Doljatra –Noon | | <i>Rath-A</i> procession. <i>Holi-</i> Festival by spreading colour to each other. <i>Rash Purnima- Female based home oriented,</i> |
| Diwali | Yearly | <i>Chaytra</i> | 1 day | Group | Both | Home/temple. But home is preferred | Evening and night | | |
| Bishwakarma Puja | Yearly | <i>Poush</i> (Nov-Jan) | 1 day | Do | Both but in that context male participate most | Temple/ home | Middle of the day | | Dedicated for the crafts mans/business related to crafts. |
| Shub Puja | Yearly | 10 th March Last week of <i>Chaytra</i> | 1 day | Basically individual | Female | Home is mainly /Temple | Night | Religious drama etc | |
| Charak Puja | Yearly | 1 st April | 1 day | Group | Both | Temple | Day/night | | |
| Gonesh Puja | Yearly | 9 th September | 1 day | Basically individually | Both but in the context by male | Home mainly/business place/temple | Day | | Business mans prayers to satisfy God <i>Gonesh.</i> |

Appendix E: Questionnaire for the survey data collection

Questionnaire survey:

I am conducting this survey on behalf of a Ph.D research at Concordia University, Montreal. The title of research is “*Mapping Spatial Qualities and Behavioural Pattern in Traditional Urban Street: Analyzing the Scope of Street as Urban Open Space.*”. The goal of this study is to understand space sharing mechanism in the streets of older part of Dhaka, Bangladesh. Other targets are to map behavior in time-space and to analyze how socio-cultural factors (gender, age, cultural background, profession) affect space use. It is anticipated that through a better understanding of spatial qualities, socio-cultural factors and behavioral pattern from this research may help in developing better planning policies to improve urban public space.

Please be advised that if your age is less than 18 years please don't take part in this survey. To take part in this survey is voluntary and will only take approximately 20 minutes. It is completely anonymous, and you may stop participating at any time if you choose to do so. If you have any questions, you may ask the researcher directly in person or contact the principal investigator A.K.M. Kausarul Islam at riaz_ku@yahoo.com or Phone no. +1(403) 479 7190.

Date:

Serial no: W71_a/b _____

Name of Surveyor:

Part A: Socio-demographic information:

Address: _____

1. Sex: 1.Male, 2.Female

2. Age: 1. (15-24), 2. (25-34), 3. (35-44), 4. (45-54), 5.(55-64), 6. (65+)

3. For how many years you have been living in this community? _____ yrs

4. For how many generations you have been living in this community? _____

5. Your ownership status:

1.Tenant, 2. Landlord

6. Your monthly average income:

1. (\geq 15,000), 2. (15,001- 25,000), 3. (25,001- 35,000), 4. (35,001- 45,000),
 5. (45,001- 55,000), 6. (<55,000),

7. Your education level:

1. No formal education, 2.Primary, 3. SSC, 4. HSC, 5.Bachelor, 6. Post- graduate

8. Your employment status:

1. Employed, 2. Unemployed

(If your answer is 'Employed' then answer question 8.1 otherwise 8.2.)

8.1. Your occupation:

1. Government employee, 2. Private sector employee, 3. Self business

(If your answer is '3. Self business' then please answer the Q.8.2 otherwise go to Q.9)

8.2. Your status:

1. Household work, 2. Student, 3. Other _____

9. Do you operate a business in this community?

1 . Yes, 2. No

(If your answer is 'yes' then please also answer **Part B.Questionnaire for shop owner.**

(Please indicate your business location on the map)

Street space preference information

10. To you; Community streets should be,

(Please rank your preference, 1=highest, 4 = lowest preference)

| Street type | Rank (1,2,3,4) |
|--|----------------|
| a. Motorized only | |
| b. Only pedestrian | |
| c. Pedestrian and non-motorized | |
| d. Mix of pedestrian, motorized and non-motorized vehicles | |

11. What are your purposes of street use other than circulation?

- 1.Shopping, 2.Cultural Program, 3.Religious program, 4.None of these

(If your answer is 1,2,or 3 then please answer Q11.1-11.4)

11.1. You frequency of shopping.

1. Daily 2. Weekly 3. Monthly 4. Occasional

11.2. Physical nature of the shops that you most visit.

(You can choose more than one option)

1. Permanent store, 2. Street vendor, 3. Both types

11.3. Do you know the shop owners personally?

1. Yes, 2. No

11.4. Is the shop owner a local resident?

1. Yes, 2. No, 3. Don't know

Activities and participation

12. Please mention the cultural programs performed on street (most common 4). Also answer the following question with each of the programs you are mentioning.

1. _____, a. I Observe, b. I Participate c. a & b, d. None

2. _____, a. I Observe, b. I Participate c. a & b, d. None

3. _____, a. I Observe, b. I Participate c. a & b, d. None

4. _____, a. I Observe, b. I Participate c. a & b, d. None

(If any of the answer in question 12 is 'a', 'b' or 'c' then answer Q12.1-12.3)

12.1 Please mention your level of participation in those cultural programs.

1. Individually, 2. With family members, 3. With friends, 4. others

12.2 What is the frequency of street use for cultural activities?

1. Daily, 2. Weekly, 3.Monthly 4. Occasional,

12.3 Please mention 3 streets used for cultural purposes (Please Mark on the map)

1. _____ 2. _____ 3. _____

13. Please mention the religious programs performed on street (most common 4). Also answer the following question with each of the programs you are mentioning.

1. _____, a. I Observe, b. I Participate c. a & b, d. None

2. _____, b. I Observe, b. I Participate c. a & b, d. None

3. _____, c. I Observe, b. I Participate c. a & b, d. None

4. _____, d. I Observe, b. I Participate c. a & b, d. None

If any of the answers in question 13 is 'b' or 'c' then answer Q13.1-13.3)

13.1. Please mention your level of participation in those religious program

1. Individually, 2. With family members, 3. With friends, 4. others

13.2. What is the frequency of street use for religious activities?

1. Daily, 2. Weekly, 3.Monthly 4. Occasional,

13.3. Please mention 3 streets used for cultural purposes (Please Mark on the map)

1. _____ 2. _____ 3. _____

14. Please mention the business activities performed on street (most common 4)

1. _____, a. I Observe, b. I Participate c. a & b, d. None
2. _____, b. I Observe, b. I Participate c. a & b, d. None
3. _____, c. I Observe, b. I Participate c. a & b, d. None
4. _____, d. I Observe, b. I Participate c. a & b, d. None

If any of the answers in question 14 is 'a', 'b' or 'c' then answer Q14.1-14.3)

14.1. Please mention your level of participation in economic/business activities

1. Individually, 2. With family members, 3. With friends, 4. others

14.2. What is the frequency of street use for cultural activities?

1. Daily, 2. Weekly, 3. Monthly 4. Occasional,

14.3. Please mention 3 streets used for Business purposes (Please Mark on the map)

1. _____ 2. _____ 3. _____

15. Please mention the political activities performed on street (most common 4)

1. _____, a. I Observe, b. I Participate c. a & b, d. None
2. _____, b. I Observe, b. I Participate c. a & b, d. None
3. _____, c. I Observe, b. I Participate c. a & b, d. None
4. _____, d. I Observe, b. I Participate c. a & b, d. None

If any of the answer in question 15 is 'a', 'b' or 'c' then answer Q15.1-15.3)

15.1. Please mention your level of participation in political activities

1. Individually, 2. With family members, 3. With friends, 4. others

15.2. What is the frequency of street use for cultural activities?

1. Daily, 2. Weekly, 3. Monthly 4. Occasional,

15.3. Please mention 3 streets used for cultural purposes (Please Mark on the map)

1. _____ 2. _____ 3. _____

16. Do you think occupation of street spaces by those socio-cultural activities cause problem for pedestrians or vehicular movement?

1. Y, 2. N

17. During these activities (religious, business, political, cultural) who controls the pedestrian and vehicle movement?

1. The committee
2. Traffic police
3. Local people
4. No control measure taken
5. I don't know

18. Is it necessary to get permission to organize such a function?

1. Y 2. N

(If the answer 'yes', then answer 18.1)

18.1 Who gives the permission?

1. Government
2. Local political representative
3. Other _____

19. Do you know the process of getting permission to arrange the activities on street?

1. Y 2. N

(If your answer is 'yes' then please mention the major steps)

1. _____
2. _____
3. _____
4. _____

Movement pattern in street

20. Your preferred mode of circulation within the community;

(Please rank your preference, 1=highest, 4 = lowest preference)

| Mode of circulation | Rank (1,2,3,4) |
|----------------------------------|----------------|
| Car (or other motorized vehicle) | |
| Rickshaw | |
| Walk | |
| Other (Please mention) | |

21. Do you own a car or a motorized vehicle?

1. Yes, 2. No

(If your answer is 'yes' then please answer Q.25.1)

21.1. Your vehicle is;

1. Car, 2. Motorcycle, 3. Bicycle 4. Other _____

22. You have a car (or assume you have a car). If you were given any incentives (tax rebate, reduced parking fee etc) to park somewhere within walking distance from your home then will you agree?

1. Yes, 2. No (If your answer is 'no' then answer the question 22.1)

22.1. I don't want to park my car far from my home because,

- 1. I feel lack of security for my car
- 2. I don't like to walk
- 3. I have Health problem
- 4. I want to avoid bad weather condition
- 5. Other _____

23. Do you prefer for any control on vehicular movement on your community street?

1. Yes 2. No

(If your answer is 'yes' then answer Q.23.1)

23.1. What type of control you prefer?

***(Surveyor you may explain the meanings of these controls to respondents)**

1. Time control, 2. Speed control, 3. Vehicle type control, 4. Mix of controls (please specify _____)

24. Do you feel safe in streets when you walk in your community?

1. Yes 2. No

(If your answer is 'no' then please mark those streets on the provided map which you feel unsafe. Please mention the reasons for feeling unsafe)

24.1. Reasons for feeling unsafe

1. _____ 2. _____
3. _____ 4. _____

25. Please rank the streets in your community that you feel safe.

(Please put 1,2,3,4 on map for ranking highest to lowest safe streets.)

Note: Surveyors, please take notes on width, adjacent building height, activities of these streets.

| Name of street | Rank (1,2,3,4) | Street order (do not fill) |
|----------------|-------------------|-------------------------------|
| a. | | |
| b. | | |
| c. | | |
| 4. | | |

26. Which is the most preferred street for the purpose of,

(Please mark on the map with a,b,c,d,e,f,)

| Purpose of street use | Name of the street | Reason for choosing this street |
|------------------------|--------------------|---------------------------------|
| a.Walking | | |
| b.Shopping | | |
| c.Cultural activities | | |
| d.Religious activities | | |
| e.Political activities | | |
| f.Other | | |

27. Please draw lines of your movement (3 major movements of the day) with different colours on the provided map.

Note: Surveyors, Please request your respondents to draw lines for regular week days and week ends with different colours.

1. Draw the path of your three major movement in a day (3 lines for week days and 3 lines for week ends)
2. Indicate the most favorite street space
3. Indicate the most unexpected street space

Part B. Questionnaire for Shop owners

(This section should be filled in if the respondent has answered 'Yes' for the question 9)

(Questions 1,2,3) To be filled by surveyor

1. The space for the business is
1. Permanent shop 2. Temporary shop (Vendor etc)
2. Location of business is on street: 1. At the corner 1. Somewhere in the middle
3. Physical character of the adjacent street
 1. Width of the street _____ ft
 2. Presence of pedestrian footpath, 1. Yes 2. No
 3. Adjacent building height _____ ft
 4. Type of street: 1. Thoroughfare 1. Cul-de-sac

To be filled by shop owner/operators:

4. For how many years you have been operating this business? _____ yrs
5. Do you own this business?
1. Yes 2. No
6. Please mention the controlled and occupied area of your shop?
(Surveyor Please mark on the map)
7. Your proprietorship on this space.
1. Owner, 2. Rented *(If you are renting the space then answer the questions 7.1 and 7.2)*
 - 7.1. To whom you pay the rent?
1. Government, 2. Individual
 - 7.2. Is there any formal agreement for renting this space?
1. Yes, 2. No
8. Type of your business permission:
1. Formal, 2. Informal (Please specify) _____
9. You operate the business
1. Only week days, 2. Weekends, 3. 7 days a week
10. Your business hours are,
1. Morning (from _____ to _____) 2. Day (from _____ to _____) 3. Night (from _____ to _____)
11. How to get permission to operate a business?
1. From government authority, 2. From local people
3. One can just start his business no need to have a permit, 4. Don't want to answer
12. Ownership of your business premise: 1. Landlord 2. Tenant
13. Do you share same space with other businessman?
1 . Yes, 2. No *(If your answer is 'yes' then answer Q13.1 and 13.2.)*
(Surveyor please draw the area and location for space sharing)
 - 13.1. Your shared time is: From _____ to _____
 - 13.2. Your shared space is: _____ % of space

Thank you for your cooperation.

Appendix F

1. Cross tabulation: Settlement type * Religion

Settlement type * Religion Cross tabulation

| | | | Religion | | Total |
|-----------------|-----------|---------------|----------|-------|-------|
| | | | Muslim | Hindu | |
| Settlement type | Irregular | Count | 36 | 4 | 40 |
| | | Std. Residual | 3.0 | -3.3 | |
| | Linear | Count | 7 | 31 | 38 |
| | | Std. Residual | -3.0 | 3.4 | |
| Total | | Count | 43 | 35 | 78 |

Chi-Square Tests

| | Value | df | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|------------------------------------|---------------------|----|--------------------------|-------------------------|-------------------------|
| Pearson Chi-Square | 40.362 ^a | 1 | .000 | | |
| Continuity Correction ^b | 37.520 | 1 | .000 | | |
| Likelihood Ratio | 44.996 | 1 | .000 | | |
| Fisher's Exact Test | | | | .000 | .000 |
| Linear-by-Linear Association | 39.845 | 1 | .000 | | |
| N of Valid Cases | 78 | | | | |

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 17.05.

b. Computed only for a 2x2 table

Symmetric Measures

| | | Value | Approx. Sig. |
|--------------------|------------|-------|--------------|
| Nominal by Nominal | Phi | .719 | .000 |
| | Cramer's V | .719 | .000 |
| N of Valid Cases | | 78 | |

$\chi^2 = 40.362, p < .05$. There is significant relation between **settlement type and religion**. Effect size (Cramer's V) is .719 that is large.

2. Cross tabulation: Settlement type * Age

Settlement type * Age Cross tabulation

| | | | Age | | | | | | Total |
|-----------------|-----------|----------|-------|-------|-------|-------|-------|-----|-------|
| | | | 15-24 | 25-34 | 35-44 | 45-54 | 55-64 | 65+ | |
| Settlement type | Irregular | Count | 1 | 7 | 10 | 15 | 7 | 0 | 40 |
| | | Std. | -.4 | -1.3 | -.4 | 1.3 | 1.1 | -.7 | |
| | | Residual | | | | | | | |
| | Linear | Count | 2 | 15 | 12 | 6 | 2 | 1 | 38 |
| | | Std. | .4 | 1.3 | .4 | -1.3 | -1.1 | .7 | |
| | | Residual | | | | | | | |
| Total | | Count | 3 | 22 | 22 | 21 | 9 | 1 | 78 |

Chi-Square Tests

| | Value | df | Asymp. Sig. (2-sided) |
|------------------------------|---------------------|----|-----------------------|
| Pearson Chi-Square | 11.015 ^a | 5 | .051 |
| Likelihood Ratio | 11.761 | 5 | .038 |
| Linear-by-Linear Association | 6.662 | 1 | .010 |
| N of Valid Cases | 78 | | |

a. 6 cells (50.0%) have expected count less than 5. The minimum expected count is .49.

Symmetric Measures

| | | Value | Approx. Sig. |
|--------------------|------------|-------|--------------|
| Nominal by Nominal | Phi | .376 | .051 |
| | Cramer's V | .376 | .051 |
| N of Valid Cases | | 78 | |

$\chi^2 = 11.015, p = .05$. There is significant relation between **settlement type and age**. Effect size (Cramer's V) is .376 that is medium.

3. Cross tabulation: Occupation * Settlement type

Occupation * Settlement type Cross tabulation

| | | | Settlement type | | Total |
|------------|-------------------------|---------------|-----------------|--------|-------|
| | | | Irregular | Linear | |
| Occupation | Government employee | Count | 5 | 10 | 15 |
| | | Std. Residual | -1.1 | 1.2 | |
| | Private sector employee | Count | 5 | 16 | 21 |
| | | Std. Residual | -1.9 | 2.1 | |
| | Self business | Count | 26 | 4 | 30 |
| | | Std. Residual | 2.4 | -2.6 | |
| Total | | Count | 36 | 30 | 66 |

Chi-Square Tests

| | Value | df | Asymp. Sig. (2-sided) |
|------------------------------|---------------------|----|--------------------------|
| Pearson Chi-Square | 23.208 ^a | 2 | .000 |
| Likelihood Ratio | 25.241 | 2 | .000 |
| Linear-by-Linear Association | 15.692 | 1 | .000 |
| N of Valid Cases | 66 | | |

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.82.

Symmetric Measures

| | | Value | Approx. Sig. |
|--------------------|------------|-------|--------------|
| Nominal by Nominal | Phi | .593 | .000 |
| | Cramer's V | .593 | .000 |
| N of Valid Cases | | 66 | |

$\chi^2(2, N=66) = 23.208, p < .05$, There is significant relation between Occupation and settlement types. Effect size (Cramer's V) is large (.593).

4. Cross tabulation: Purpose of street use * Religion

Purpose of street use * Religion Cross tabulation

| | | | Religion | | Total |
|-----------------------|---------------|---------------|----------|-------|-------|
| | | | Muslim | Hindu | |
| Purpose of street use | Shopping | Count | 13 | 16 | 29 |
| | | Std. Residual | -.7 | .7 | |
| | Cultural | Count | 13 | 1 | 14 |
| | | Std. Residual | 2.0 | -2.1 | |
| | Religious | Count | 5 | 4 | 9 |
| | | Std. Residual | .1 | .0 | |
| | None of these | Count | 9 | 1 | 10 |
| | | Std. Residual | 1.6 | -1.7 | |
| | More than one | Count | 1 | 13 | 14 |
| | | Std. Residual | -2.4 | 2.6 | |
| Total | | Count | 41 | 35 | 76 |

Chi-Square Tests

| | Value | df | Asymp. Sig. (2-sided) |
|------------------------------|---------------------|----|--------------------------|
| Pearson Chi-Square | 27.088 ^a | 4 | .000 |
| Likelihood Ratio | 31.716 | 4 | .000 |
| Linear-by-Linear Association | 2.049 | 1 | .152 |
| N of Valid Cases | 76 | | |

a. 3 cells (30.0%) have expected count less than 5. The minimum expected count is 4.14.

Symmetric Measures

| | | Value | Approx. Sig. |
|--------------------|------------|-------|--------------|
| Nominal by Nominal | Phi | .597 | .000 |
| | Cramer's V | .597 | .000 |
| N of Valid Cases | | 76 | |

$\chi^2 = 27.088, p < .05$, There is significant relation between Street use and religion. Effect size (Cramer's V) is .597 that is large.

5. Cross tabulation: Participation status * Religion

Participation status * Religion Cross tabulation

| | | | Religion | | Total |
|----------------------|-------------------------|---------------|----------|-------|-------|
| | | | Muslim | Hindu | |
| Participation status | Observe | Count | 11 | 8 | 19 |
| | | Std. Residual | .4 | -.4 | |
| | Participate | Count | 2 | 2 | 4 |
| | | Std. Residual | .0 | .1 | |
| | Observe and participate | Count | 3 | 18 | 21 |
| | | Std. Residual | -2.4 | 2.5 | |
| | None | Count | 22 | 7 | 29 |
| | | Std. Residual | 1.8 | -1.9 | |
| Total | | Count | 38 | 35 | 73 |

Chi-Square Tests

| | Value | df | Asymp. Sig. (2-sided) |
|------------------------------|---------------------|----|--------------------------|
| Pearson Chi-Square | 18.855 ^a | 3 | .000 |
| Likelihood Ratio | 20.388 | 3 | .000 |
| Linear-by-Linear Association | .842 | 1 | .359 |
| N of Valid Cases | 73 | | |

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 1.92.

Symmetric Measures

| | | Value | Approx. Sig. |
|--------------------|------------|-------|--------------|
| Nominal by Nominal | Phi | .508 | .000 |
| | Cramer's V | .508 | .000 |
| N of Valid Cases | | 73 | |

$\chi^2=18.855$, $p<.05$, There is significant relation between Street use and participation status. Effect size (Cramer's V) is .508 that is large.

6. Cross tabulation: Level of participation-culture * Age

Level of participation-culture * Age Cross tabulation

| | | | Age | | | | | | Total |
|--------------------------------|--------------------|---------------|-------|-------|-------|-------|-------|-----|-------|
| | | | 15-24 | 25-34 | 35-44 | 45-54 | 55-64 | 65+ | |
| Level of participation-culture | Individually | Count | 0 | 2 | 4 | 2 | 2 | 1 | 11 |
| | | Std. Residual | -7 | -1.0 | .3 | .3 | .8 | 1.6 | |
| | With family | Count | 0 | 4 | 8 | 5 | 0 | 0 | 17 |
| | | Std. Residual | -9 | -9 | 1.1 | 1.6 | -1.3 | -6 | |
| | With friends | Count | 2 | 10 | 2 | 0 | 1 | 0 | 15 |
| | | Std. Residual | 1.7 | 2.0 | -1.3 | -1.5 | -5 | -6 | |
| | Friends and family | Count | 0 | 1 | 1 | 0 | 2 | 0 | 4 |
| | | Std. Residual | -4 | -4 | -.2 | -.8 | 2.4 | -.3 | |
| Total | | Count | 2 | 17 | 15 | 7 | 5 | 1 | 47 |

Chi-Square Tests

| | Value | df | Asymp. Sig. (2-sided) |
|------------------------------|---------------------|----|-----------------------|
| Pearson Chi-Square | 30.002 ^a | 15 | .012 |
| Likelihood Ratio | 31.052 | 15 | .009 |
| Linear-by-Linear Association | 3.147 | 1 | .076 |
| N of Valid Cases | 47 | | |

a. 21 cells (87.5%) have expected count less than 5. The minimum expected count is .09.

Symmetric Measures

| | | Value | Approx. Sig. |
|--------------------|------------|-------|--------------|
| Nominal by Nominal | Phi | .799 | .012 |
| | Cramer's V | .461 | .012 |
| N of Valid Cases | | 47 | |

$\chi^2 = 30.002$, $p < .05$, There is significant relation between **Age and participation in cultural events**. Effect size (Cramer's V) is .468 that is large

7. Cross tabulation: Level of participation-culture * Religion

Level of participation-culture * Religion Cross tabulation

| | | | Religion | | Total |
|--------------------------------|--------------------|---------------|----------|-------|-------|
| | | | Muslim | Hindu | |
| Level of participation-culture | Individually | Count | 8 | 3 | 11 |
| | | Std. Residual | 2.0 | -1.5 | |
| | With family | Count | 4 | 13 | 17 |
| | | Std. Residual | -.9 | .7 | |
| | With friends | Count | 4 | 11 | 15 |
| | | Std. Residual | -.6 | .5 | |
| | Friends and family | Count | 1 | 3 | 4 |
| | | Std. Residual | -.4 | .3 | |
| Total | | Count | 17 | 30 | 47 |

Chi-Square Tests

| | Value | df | Asymp. Sig. (2-sided) |
|------------------------------|--------------------|----|--------------------------|
| Pearson Chi-Square | 8.347 ^a | 3 | .039 |
| Likelihood Ratio | 8.175 | 3 | .043 |
| Linear-by-Linear Association | 4.377 | 1 | .036 |
| N of Valid Cases | 47 | | |

a. 3 cells (37.5%) have expected count less than 5. The minimum expected count is 1.45.

Symmetric Measures

| | | Value | Approx. Sig. |
|--------------------|------------|-------|--------------|
| Nominal by Nominal | Phi | .421 | .039 |
| | Cramer's V | .421 | .039 |
| N of Valid Cases | | 47 | |

$\chi^2 = 8.347$, $p < .05$, There is significant relation between **Religion and participation in cultural events**. Effect size (Cramer's V) is .421 that is large

8. Cross tabulation: Level of participation-religious * Religion

Level of participation-religious * Religion cross tabulation

| | | | Religion | | Total |
|---------------------------------------|--------------------|---------------|----------|-------|-------|
| | | | Muslim | Hindu | |
| 13.1 Level of participation-religious | Individual | Count | 8 | 1 | 9 |
| | | Std. Residual | 3.2 | -2.1 | |
| | With family | Count | 6 | 18 | 24 |
| | | Std. Residual | -.5 | .3 | |
| | With friends | Count | 0 | 2 | 2 |
| | | Std. Residual | -.8 | .5 | |
| | Friends and family | Count | 0 | 11 | 11 |
| | | Std. Residual | -1.8 | 1.2 | |
| Total | Count | 14 | 32 | 46 | |

Chi-Square Tests

| | Value | df | Asymp. Sig. (2-sided) |
|------------------------------|---------------------|----|-----------------------|
| Pearson Chi-Square | 20.547 ^a | 3 | .000 |
| Likelihood Ratio | 23.263 | 3 | .000 |
| Linear-by-Linear Association | 14.559 | 1 | .000 |
| N of Valid Cases | 46 | | |

a. 4 cells (50.0%) have expected count less than 5. The minimum expected count is .61.

Symmetric Measures

| | | Value | Approx. Sig. |
|--------------------|------------|-------|--------------|
| Nominal by Nominal | Phi | .668 | .000 |
| | Cramer's V | .668 | .000 |
| N of Valid Cases | | 46 | |

$\chi^2 = 20.547$, $p < .05$, There is significant relation between **Religion and level of participation in religious events**. Effect size (Cramer's V) is .668 that is large

9. Cross tabulation: Participation status-political events * Age

Participation status-pol * Age Crosstabulation

| | | | Age | | | | | | Total |
|---------------------------------------|-------------------------|---------------|-------|-------|-------|-------|-------|-----|-------|
| | | | 15-24 | 25-34 | 35-44 | 45-54 | 55-64 | 65+ | |
| Participation status-political events | Observe | Count | 1 | 5 | 2 | 3 | 0 | 0 | 11 |
| | | Std. Residual | .9 | .9 | -.7 | .3 | -1.1 | -.5 | |
| | Observe and participate | Count | 0 | 1 | 0 | 1 | 1 | 1 | 4 |
| | | Std. Residual | -.4 | -.2 | -1.1 | .1 | .8 | 3.4 | |
| | None | Count | 1 | 10 | 14 | 8 | 5 | 0 | 38 |
| | | Std. Residual | -.4 | -.4 | .7 | -.2 | .3 | -.8 | |
| Total | | Count | 2 | 16 | 16 | 12 | 6 | 1 | 53 |

Chi-Square Tests

| | Value | df | Asymp. Sig. (2-sided) |
|------------------------------|---------------------|----|-----------------------|
| Pearson Chi-Square | 18.896 ^a | 10 | .042 |
| Likelihood Ratio | 13.963 | 10 | .175 |
| Linear-by-Linear Association | 1.399 | 1 | .237 |
| N of Valid Cases | 53 | | |

a. 15 cells (83.3%) have expected count less than 5. The minimum expected count is .08.

Symmetric Measures

| | | Value | Approx. Sig. |
|--------------------|------------|-------|--------------|
| Nominal by Nominal | Phi | .597 | .042 |
| | Cramer's V | .422 | .042 |
| N of Valid Cases | | 53 | |

$\chi^2 = 18.896$, $p < .05$. There is significant relation between **Age and participation status in political events**. Effect size (Cramer's V) is .422 that is large

10. Cross tabulation: Generation of living * Ownership

Generation of living * Ownership Cross tabulation

| | | | Ownership | | Total |
|------------------------|---------------|--|-----------|----------|-------|
| | | | Tenant | Landlord | |
| Generation of living 1 | Count | | 28 | 1 | 29 |
| | Std. Residual | | 2.0 | -2.8 | |
| 2 | Count | | 13 | 6 | 19 |
| | Std. Residual | | .1 | -.1 | |
| 3 | Count | | 3 | 13 | 16 |
| | Std. Residual | | -2.3 | 3.3 | |
| 4 | Count | | 0 | 2 | 2 |
| | Std. Residual | | -1.2 | 1.6 | |
| Total | Count | | 44 | 22 | 66 |

Chi-Square Tests

| | Value | df | Asymp. Sig. (2-sided) |
|------------------------------|---------------------|----|-----------------------|
| Pearson Chi-Square | 32.213 ^a | 3 | .000 |
| Likelihood Ratio | 36.179 | 3 | .000 |
| Linear-by-Linear Association | 30.902 | 1 | .000 |
| N of Valid Cases | 66 | | |

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is .67.

Symmetric Measures

| | | Value | Approx. Sig. |
|--------------------|------------|-------|--------------|
| Nominal by Nominal | Phi | .699 | .000 |
| | Cramer's V | .699 | .000 |
| N of Valid Cases | | 66 | |

$\chi^2 = 32.213, p < .05$. There is significant relation between generation of living and ownership. Effect size (Cramer's V) is .699 that is big.