

REVITALIZING URBAN STREETS AS AN IDENTITY OF INTERACTIVE PUBLIC PLACE

CASE OF MAHATMA GANDHI ROAD, PUNE, MAHARASHTRA, INDIA.

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Abstract: Urban Streets are generic and pervasive elements of cities that form an integral part of our communication networks. The 'place' function is essentially what distinguishes a street from a road which encompasses a number of street design attributes -physical and visual that play important role in achieving the sense of interaction on the streets. Thus 'Streets' function as a channel of movement as well as act as place where public life and interaction takes place. The identity of interactive public place refer to the distinctive characteristics of the place in which human-place bonding is developed and reflected in the user's comfort parameters. The weakening of this place identity of streets has become one of the urban design issues for contemporary cities. This paper identifies and presents the issues concerning the physical and visual attributes of urban street spaces, discusses their relation with human comfort and street's identity as interactive public place. The place identity parameters of street can be used as assessment indicators for analyzing the sense of place and revitalization of streets as local urban places.

IndexTerms - Place Identity, Sense of Place, Local Distinctiveness, Human Comfort, Visual Quality.

I. INTRODUCTION

Social interaction is an important aspect of human life. Interaction in its all forms, informal or formal, spontaneous or well thought, or it may in the form of exchange of information, thoughts, ideas, and knowledge, among different individuals. These interactions contribute to the formation of self-identity, an important facet of human existence. Through these expressions and exchanges different individuals get connected to each other and forms community and in turn society. Social interaction is thus, a backbone of a community as well as a society. The "space" into which it happens is referred as the 'Public Space'. These spaces eventually become places, a structuring element of any community, shaping various socio-spatial patterns thereby giving rise to city structure. These places vary from micro to macro level within the city fabric like streets, squares, bazaar, ghats, maidan, etc. to a 'chouraha', 'temple square' at macro level. Besides the elements of physical organization, they are perceptual sources for human beings to associate themselves with the built environment of the city, making city legible and imageable. These places together contribute to the 'Image of city'. Street is one such social interactive public place, which contributes to the physical, perceptual and visual dimension. It not only links public and private realm but also contributes to identity of the area.

II. DATA AND SOURCES OF DATA

2.1 Concept of Interactive Public Place and its relation with Identity of Sense of Place

The term place has several different meanings. The place can define the unique characteristics, both tangible and intangible, of a location of a town, city, or region on the earth's surface. It includes the physical and visual attributes of a location, as well as associations and feelings the people have when they see or hear about a particular place strengthening their sense of place. Phrases such as place attachment or sense of place refer to the complex relationship between humans and their surrounding environment. This relationship involves both the influence of the natural environment on humans and the changes that human activities have imposed on the surrounding environment, thereby developing a strong relationship with that place and is becoming a part of people's identity. The influence place has on identity is seen as a result of a holistic and reciprocal interaction between people and their physical environment; people affect places, and the way places are affected.

The concept of place is physical and psychological. The physical form, activity and meaning are mixed together to form the sense of place (Montgomery, 1998). In the context of environmental psychology, place is predominantly defined by a physical environment constructed based on its interrelationship with individual's internal psychological and social processes and attributes and activities done at the place. The significance of people's psychological connection with places should be assessed which will contribute in determining place quality.

In contemporary cities, the weakening of identity is due to planning and development together with the co modification of places. Place identity is linked to meanings and sense of place held by the people in relation to their environment. The loss of identity weakens the depth of meaning, attachment and diversity of place experience. Sustaining the meanings and identity of the urban elements is important because they contribute to self-identity, sense of community and sense of place. Places are dynamic and continue to regenerate as people struggle to adapt to new meanings that might have detached from their culture and identity.

2.2 Concept of Sense of Place of street environment

Sense of Place is the degree to which a person feels attached to, or dependent on, a place is a function of how well his or her needs, goals, or motivations are satisfied or how positive he or she perceives his or her experiences to be in that location. It concerns the functional and utilitarian aspects of place attachment. It links to the functional quality of the physical elements and activities that are distinct from other places, which is central to urban design quality. Sense of place of any public environment is also treated as the outcome of the existing physical attributes of the place and their relation with the users' needs. Various Urban design theories and concepts regarding the qualitative aspect of public space have been put forth by well-known urban designers, urban planners, sociologists, anthropologists such as Bentley (1985), Kevin Lynch (1988) John Montgomery (1998), Allan Jacobs(1995), Jan Gehl (1987), Project for Public Spaces (2009) to name the few. Based on these concepts following are the spatial qualities of the public environment which are influenced by the relation with the physical attributes of street/ place and activates sense of place of typical street environment:

1. **Mobility** -refers to a walking environment which allows barrier-free movement from point of origin to destination at a comfortable walking speed with no or limited impedance and ensures ease in orienting oneself within the street network.
2. **Permeability** -is the quality that offers people choice of moving around and within the public environment physically and visually. It facilitates the pedestrian user to access the public-private; built-un-built interface with ease, comfort and safety, without any obstructions irrespective of socio-economic status.
3. **Variety**- is complex spatial quality which offers varied people (of different cultural-socio-economic background; different age groups and gender) with varied interest the choice to move around and explore different activities, forms, people and meanings of public environment.
4. **Publicness**- is the quality which draws people towards the public environment making them feel good, glad to be there, relaxed and excited.
5. **Adaptability** is the quality which explores diversity of single space, its temporal characteristics and how it can be put to multiple uses and merge the built environment with transforming urban fabric-physically, socially and culturally.
6. **Legibility** is the quality which creates a clear image of the public environment in person's mind and easy to understand recognizable routes, intersections and landmarks to help people find their way around.
7. **Visual appropriateness**
The appearance of the place speaks volumes for it. It speaks of about what happens there. This is because that place can communicate. These communications are interpreted by the people as meanings. When these meanings help to make people recognize the choice offered by the place, it possesses the quality termed as visual appropriateness.
8. **Visual Richness** is the complexity of a place depending on the variety of the physical environment, specifically the numbers and kinds of buildings, architectural diversity& ornamentation, landscape elements, street furniture, signage, and human activity. It adds to the visual quality of the public environment, making it aesthetically pleasant, organized with physical and visual comfort; generating the attractiveness, feeling of safety and cozy walking environment.

2.3 Human Comfort and their Components

The most basic components of human comfort are mobility, connectivity, accessibility, legibility, safety and health which can also be worded as Conviviality, Convenience, Connectedness, Conspicuousness and Comfort (5C's) (Gardner, 1996). Therefore, for the purpose of this research, human comfort is considered relative to the "5C" and are classified under following three major comfort components.

Physiological Comfort

The comfort experienced during physical movements and actions such walking, sitting, standing, seeing hearing and playing or unfolding activities. Comfort and connectivity are the two components.

Physical Comfort

The comfort experienced from external influences such as climatic protection, traffic accidents and walking path modal conflicts. Safety, protection and convenience are three comfort components.

Psychological Comfort

The mental and emotional comfort achieved from the sensory and memorable experiences such as legibility, sense of place and belongingness, personal security (from crime), relaxation, active and passive engagement, enjoyment, equity and discovery. Conviviality, conspicuousness and attractiveness are three comfort components.

Table 1 presents the working definitions of human comfort components to be measured.

2.4 Street as a Public Place

'Streets' are one of the important elements of public space and form integral part of our movement and communication network. They serve as an intersecting element between public and private realm, built and un-built space, individual and society, movement and place. It demands simultaneous attention to be given to people, physical environment and their numerous interrelations. Streets are the places where many of the conflicts or solutions between the public and private realm are accessed or actually laid out. They are the arenas which draw the boundary line between these elements. The streets are not only the public right of way but it also represents the line of demarcation between public land and private land.

Allan Jacobs (1995) has explored factors that make streets a great public place. He has emphasized on factors such as street definition, transparency, places for people to walk with leisure, physical comfort, maintenance, qualities that engages the

eyes, complementarily, and quality of construction and design. Thus the street after all is the largest assemblage of public space in any city, meant to be available to all people. It once served as centre for commerce, information, recreation within the cities. (Jacobs A. , Great streets, 1995)

Table-1: Human Comfort Components

Table-1: Human Comfort Components							
Physiological Comfort		Physical Comfort			Psychological Comfort		
Comfort	Connectivity	Safety	Protection	Convenience	Conviviality	Conspicuousness	Attractiveness
The extent to which walking is accommodated to competences of all types of pedestrians	The extent, to which the pedestrian network provides continuous movement without any physical obstructions, links to key trip origins and destinations between different routes on the network.	The state of being free from physical danger or injury while walking by limiting pedestrian-vehicle conflict, providing provisions to ensure that pedestrian-pedestrian and pedestrian-traffic accidents will not happen.	The state or activity of being covered or protected from daily and extreme climatic conditions.	The extent to which walking is possible and able to compete with other modes of transport in terms of efficiency (time, money and space).	Enjoyment and Security: The extent to which walking is a pleasant activity, (active and passive engagement) interaction with people, the built and natural environment, and other road users and would make one feel emotionally, mentally secure and stress-free while walking ensuring psychological comfort.	Legible : The extent to which walking routes feel inviting for pedestrians, in terms of clear and legible signing and information, orientation and direction.	The quality of aesthetics that appeals to the senses and arouses one's interest and sense of excitement .

Table 2: Place Identity Matrix: Relation of Human comfort with sense of street environment as a public interactive place

Sense of Street Environment as an Identity of public interactive Place	Design Parameters of Sense of Place (Place Identity)	Comfort	Connectivity	Safety	Protection	Convenience	Convivial	Conspicuousness	Attractiveness
Local Distinctiveness	Variety								
	Legibility								
	Adaptability								
Human Interaction	Publicness								
	Mobility								
	Permeability								
Visual Quality	Visual Appropriateness								
	Visual Richness								

III. THEORETICAL FRAMEWORK

3.1 Design Elements of a Typical Street Environment as a Public Place and their Attributes

Based on these Indian Street design guidelines mainly designed by Unified Traffic and Transportation Infrastructure Planning and Engineering Centre (UTTIPEC) and Delhi Development Authority (DDA), ITDP design guidelines, Indian Road Congress (IRC) guidelines there are fifteen design elements of the street environment that accommodate or serve specific functions and are presented in Table 3 and Figure 1 and 2. All these elements need to be located in their defined location since they interact with one another and hence demand detailed planning.

Thus a typical street has elements classified under two main zones- 'Carriageway Zone' and 'Sidewalk Zone'. The sidewalk zone as explained in Figure 1 is further categorized in three distinct zones - 'Frontage Zone, Through Route Zone and Street Furniture Zone'. (ITDP-EPC, 2011)

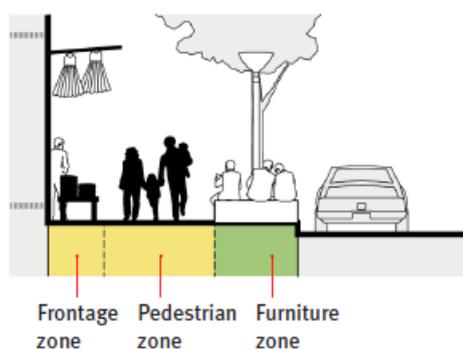


Figure 1: Elements of Sidewalk Zones

Source: Institute for Transportation and Development policy Street Design Guidelines(ITDP)

Pedestrian or Through Route zone: This zone provides continuous space for walking and should be clear of any obstructions.

Frontage zone: Provides a buffer between street-side activities and the pedestrian zone. *Next to a compound wall, the frontage zone can become a plantation strip.*

Street Furniture zone: This is a space for landscaping, furniture, lights, bus stops, signs, and private property access ramps.

Majority of the street elements (nine out of fifteen elements) come under sidewalk zone. Apart from these elements there are other three parameters- streetscapes, signscape and abutting street activities or land use, which influences the street environment. Thus for the study purpose, overall twelve elements are considered under sidewalk environment and three carriageway elements- cycle track, on-street parking and storm water drainage are considered. These are presented in Table 3.

Table 3: Street Zones and their Design Elements

No	Design Elements Of Street Environment	Street zones	
1	Sidewalk/ Footpath	1.Through Route Zone	SIDEWALK ZONES
2	Disability / Accessibility infrastructure	2. Street Furniture Zone	
3	Road side plantation		
4	Bus stops		
5	Street Lighting		
6	Seating Benches		
7	Other Street Furniture elements and amenities such as public toilets, drinking water facilities etc.		
8	Underground Utilities And Overhead Services		
9	Street Vending Spaces		
10	Signscape		
11	Streetscape	4. Carriageway Zone	Carriageway Zone
12	Street Activities		
13	Cycle Track		
14	On street Parking		
15	Storm water drainage facility		

Source: ITDP: 'Better Streets Better cities', Street Design Guide in Urban India (2011)

3.2 Physical Attributes of Street Design Elements as Performance Indicators

The physical attributes of street design elements serve as performance indicators to analyse the street environment and are an important tool to identify street issues. Based on the street design guidelines of Western and Indian context the physical attributes of street elements have been put forth.

1. The physical attributes of through route zone elements includes footpath width, kerb height, footpath surface, continuity, their gradient, cross falls, their beginnings and endings, protrusions, obstructions and encroachments on footpath and overhead clearances, effective footpath width available and provision of disability infrastructure.

2. The physical attributes of street furniture zone elements includes zone width, location, adequacy and attractiveness of street furniture elements. The physical attributes of Street furniture elements are explained as follows:

- Road Side Plantation include type of trees, their location, canopies and root system and its relation with sense of place, safety, street lighting, climatic comfort and tree maintenance, tree Guards and gratings.
- Public Transport Interface/ Bus stop Shelters include bus stop location, their signage and shelter provision, seating arrangement etc.
- Street Lights include their location, type of lighting and their illumination level.
- Street Furniture and other amenities such as seating benches, public toilets, drinking water facilities, garbage disposal facilities etc., include their location, adequacy and provision of support facilities and maintenance.
- Underground Utilities and Overhead Service: include their location, adequacy and provision of support facilities and maintenance.
- Street Vending Spaces- include type of street vendors, their location
- Traffic signs and regulators: include their location, readability, visibility etc.

3. The physical attributes of frontage zone elements includes zone width, location, adequacy and visibility and attractiveness of signage and street facades (measured in terms of signscape and streetscape) and sidewalk abutting street activities. Signscape includes advertisement signs while streetscape elements include façade or appearance details of built form and their relation with visual and aesthetical quality of the street environment.

4. The physical attributes of carriageway elements include width and location of cycle track, location of storm water drainage facility and on street parking.

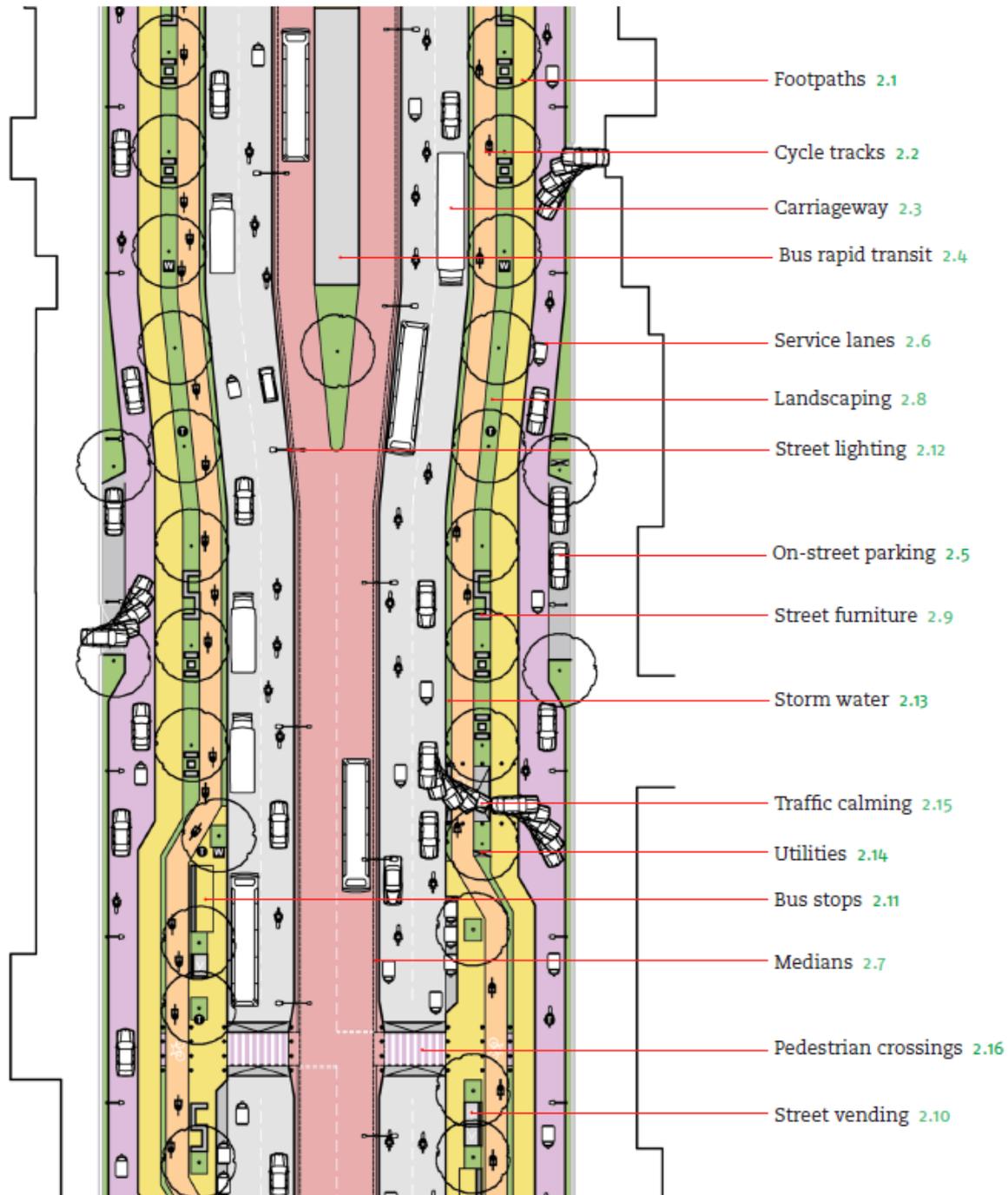


Figure 2: Street Design Elements

Source: ITDP: 'Better Streets Better cities', *Street Design Guide in Urban India*, (2011)

3.3 Relation of Human Comfort Components with Performance Indicators of Street Design Elements

Based on the Pedestrian Planning and Design Guide (2009) of New Zealand Transport Agency of New Zealand Government, Pedestrian Facilities Users Guide (2002) of Federal Highway Administration, USA and Institute for Transportation and

Development policy Street Design guidelines (2011) the performance indicators of street design elements and their relation with human comfort components are presented in Table-4

Table-4: Human Comfort Matrix: Relation of Human Comfort with Street Design Elements for Evaluating Place Identity

Physical Attributes Of Street Design Elements		Human Comfort Components							
		Physiological Comfort		Physical Comfort			Psychological Comfort		
		Comfort	Connectivity	Safety	Protection	Convenience	Conviviality	Conspicuous	Attractiveness
1.Through Route Zone	1. Through Route Width								
	2. Footpath Kerb Height								
	3. Footpath Surface								
	4. Footpath Continuity								
	5. Effective Footpath Width								
	6. Disability Infrastructure								
2.Street Furniture Zone	1.Provision Of Street Furniture Zone And Their Width								
	2.Roadside Plantation								
	3.Bus Stop								
	4.Street Ligting								
	5.Seating Benches								
	6.Other Street Amenities								
	7.Underground Utilities And Overhead Services								
	8.Street Vending Spaces								
3.Frontage Zone	1.Frontage Zone Width								
	2.Signscape								
	3.Streetscape								
	4.Street Activities								
4. Carriageway Elements	1. Cycle Track								
	2. Stormwater Drainage								
	3. On Street Parking								
HUMAN COMFORT INDEX									

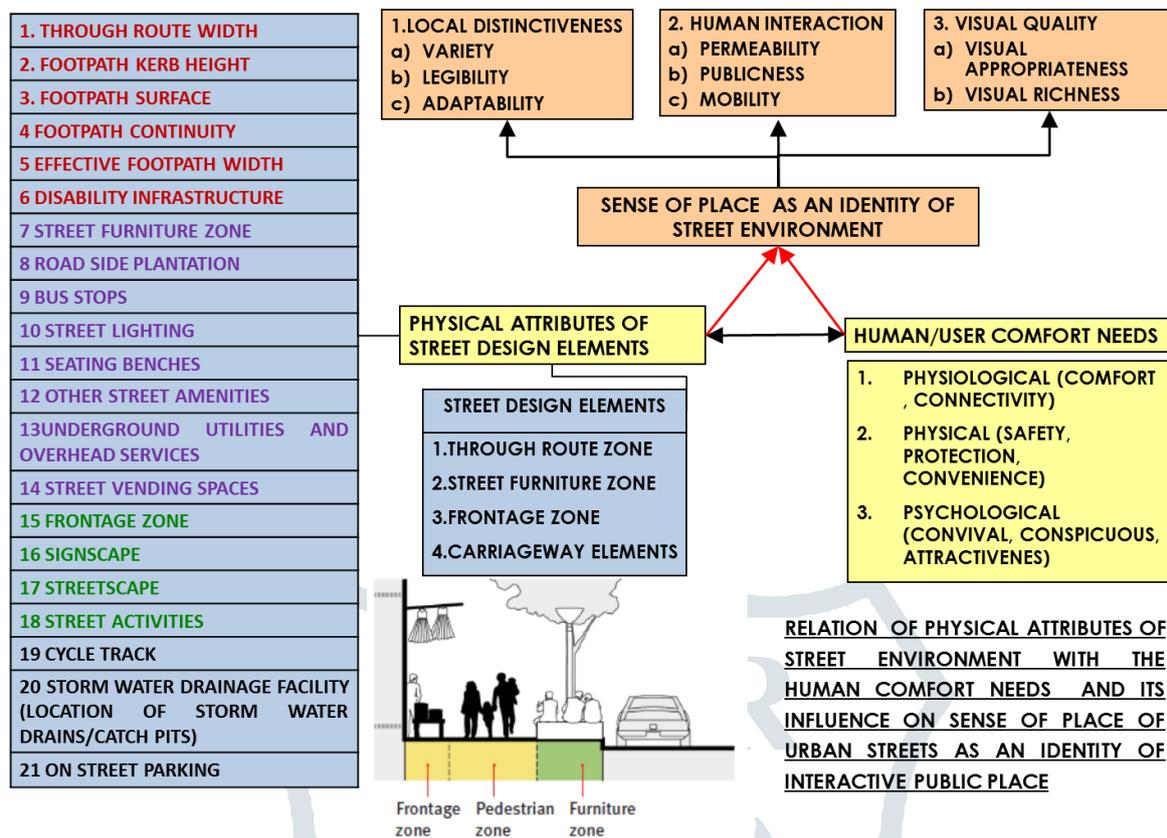


Figure 4-Research Methodology for analysis of street environment as a sense of public interactive place based on ‘Place Identity Index’

IV. RESEARCH METHODOLOGY ADOPTED FOR THE STUDY

To proceed with the analysis of existing sidewalk environment of M.G. Road field observation survey of one kilometre stretch was under taken. In this survey both sides of street were mapped and recorded in the form of detailed drawings and descriptive format. These drawings included street plans presenting the existing land use and activity pattern, street furniture, amenities and infrastructure facilities, transportation service such as bus stops built and unbuilt spaces with their area distribution, street sections and street elevations highlighting the issues related to streetscape elements and signage. The survey also covered the existing sidewalk scenario in the form of on-site photographs and video recordings of the street activities at different times of the day. These field observations were used for deriving Human Comfort index and Place Identity Index (PII) of M.G. Road where street evaluation model and weighted index method was applied. The research methodology adopted for the study is explained in detail in Figure 3.

4.1 Street Evaluation Model for Place Identity

To analyse existing street conditions on M.G. Road and derive ‘Place Identity Index’, the weighted index method of ‘Street Evaluation model’ is applied. This model consists of five point assessment rating scale designed for the performance indicators of street elements based on national and international street design guidelines and approved by five experts from various field such as urban planning, urban design, transportation planning, psychology. Weighting of these indicators was done by five experts for measuring the degree of importance of a particular indicator among the twenty one indicators. This is presented in Table 5 and Table 6.

Table-5- Weightage of Street Parameters

Street design elements	Performance indicators of street parameters	Weightage based on experts opinion
1. Through route zone	1. Through route width	16
	2. Footpath Kerb Height	17
	3. Footpath Surface	19
	4 Footpath Continuity	20
	5 Effective Footpath Width	21
	6 Disability Infrastructure	18
2 Street Furniture Zone	7 Provision Of Street Furniture Zone	15
	8 Road Side Plantation	11
	9 Bus Stops	7

	10 Street Lighting	14
	11 Seating Benches	10
	12 Other Street Amenities	13
	13 underground Utilities And Overhead Services	9
	14 Street Vending Spaces	12
3. Frontage zone	15 Frontage Zone Width	4
	16 Signscape	3
	17 Streetscape	5
	18 Street Activities	8
4. Carriageway elements (related to sidewalks)	19 Cycle Track	2
	20 Storm Water Drainage Facility	6
	21 On Street Parking	1

Table 6- Rating Scale of Performance Indicators of Existing Street Condition

PERFORMANCE INDICATORS	EXCELLENT RATING-5 LOS -A	GOOD RATING-4 LOS -B	SATISFACTORY RATING-3 LOS -C	POOR RATING-2 LOS -D	VERY POOR RATING-1 LOS -E
STREET CONDITION	Ideal condition is defined as the street possessing more than 18 of 21 parameters as per standards and the factors that affect are minimal.	Reasonable condition is defined as the street possessing 15 to 18 of 21 parameters as per standards. and that exist but smaller number of factors has impact on the performance level.	Basic condition is defined as the street possessing 10 to 14 of 21 parameters as per standards. but significant number of factors impacts the performance level	Poor condition is defined as the street possessing 6 to 9 of 21 parameters as per standards. and the major factors that negatively affect the level of service are wide ranging and individually severe	Unsuitable condition is defined as the street possessing less than 5 of 21 parameters as per standards. where all more than 80% of the parameters are below the acceptable standards.

The Application of Weighted Index Method for Calculation of 'Place Identity Index' (PII) is mentioned as below:

$$PII = (\sum W \times R) \div \sum W$$

Where

W= Weightage of the parameter (based on experts' opinion) as explained in Table-5

R= Rating of the Parameter (based on five point Street Assessment Rating scale designed as Street Evaluation Model) which is presented in brief in Table 6

This method is applied so as to prioritize and decide the relative importance of the selected parameter among the overall parameters. Lowest PII – 1 indicates poor street conditions and Highest PII -5 indicates most favourable street conditions. Street conditions represent sense of place as an identity of public interactive space.

V. CASE EXAMPLE

5.1 Case of Mahatma Gandhi Road as a Public Place: Observations and Issues

Following are the lacunae and issues explained in brief, found during the field observation survey of sidewalks on both sides of Mahatma Gandhi Road (M.G.) Road and are presented in Figure 5 and Figure 6:



Figure 5: Photographs showing Existing Street conditions

- Footpath Kerb Height-** Footpath height is 174 mm, not as per IRC standards and is inconsistent throughout the footpath length.
- Obstructions-** Pedestrian traffic is mildly inconvenienced and is blocked by temporary and permanent obstruction; Effective width of through route varies between 1 to 1.5meter.
- Protrusions-** Protrusions are randomly placed in any zone- frontage or street furniture or through route zone, not as per standards; with many projections in through route zone, partially obstructing physical and visual continuity of pedestrian movement. More than 76% of the footpath length has protrusions in through route zone.
- Disability Infrastructure:** is absent. Kerb ramps and guardrails are absent.
- Street Furniture Amenities-** Street furniture zone is absent. Litter bins, post boxes, bollards are provided randomly, not planned as per public dominated areas and are inadequate. Street furniture elements are inadequate. 21 to 40% amenities are provided. People hang out on spaces such as steps, boundary walls abutting the footpaths- in through route zone and frontage zone. Bus stops, seating benches, public toilets and drinking water facilities are absent.
- Street Vending Spaces-** are absent, encouraging street vendors to encroach upon footpath and in parking zone. There are stationary and mobile street vendors which occupy the through route space mostly in evening, in haphazard manner with poorly managed supportive infrastructure creating unhygienic conditions and partially obstructing pedestrian movement.
- Frontage Zone Width-** Frontage zone is absent with no building setback to serve as frontage zone creating many conflict points.
- Signscape-** Less than 20% of the street facades are clear of advertisement hoardings and shop displays. Cluster of hoardings are cluttered in unorganised pattern, size and colours creating visual distraction, makes street character partially legible. Somewhat complex and coherent signage, somewhat difficult to read and understand with simple phrases and graphics.

☐ Cycle Track- Cycle Track zone is absent.

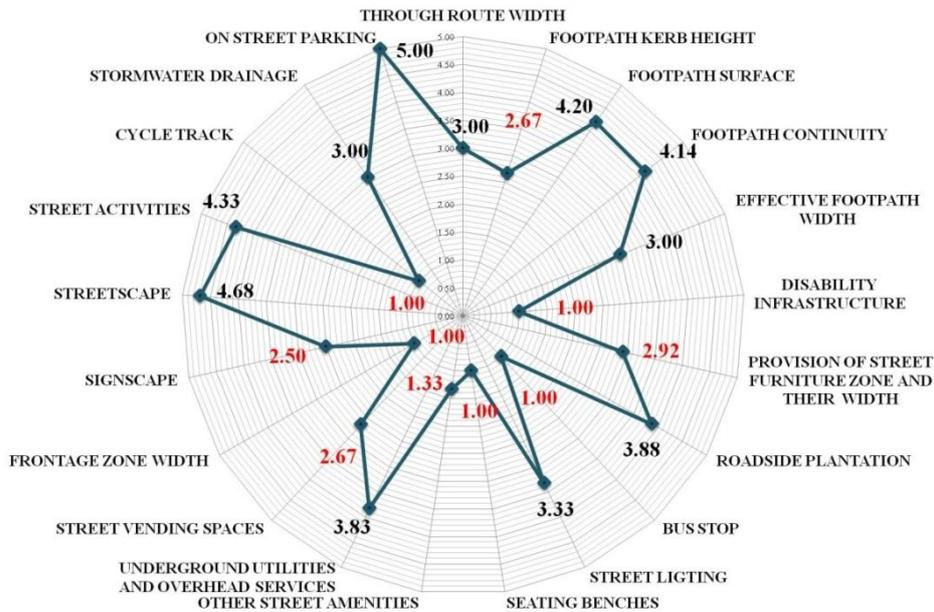


Figure 6: Spider web diagram of existing performance level of street elements of M.G. Road which highlights the existing street parameters below satisfactory level.

VI. RESULTS AND DISCUSSION

The paper presents the findings on the physical and visual attributes which influence the human comfort and sense of place as an identity of interactive public place.



Figure 7: Bar chart presenting Human Comfort Index of M.G. Road

Table 7- Human Comfort Index of M.G. Road

Relation Of Street Attributes With Human Comfort Of M.G. Road	Physiological Comfort	Physical Comfort	Psychological Comfort
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Performance Indicators Of Street Elements		Comfort	Connectivity	Safety	Protection	Convenience	Convivial	Conspicuousness	Attractiveness
1. Through Route Zone	1. Through Route Width	2.83					2.83		
	2. Footpath Kerb Height	2.67		2.67					
	3. Footpath Surface	4.20		4.20					
	4. Footpath Continuity	4.15	4.15	4.15		4.15			
	5. Effective Footpath Width	3.00		3.00					
	6. Disability Infrastructure	1.00	1.00	1.00		1.00			
2. Street Furniture Zone	1 Provision Of Street Furniture Zone And Their Width	2.92				2.92	2.92		2.92
	2. Roadside Plantation	3.81			3.81	3.81	3.81	3.81	3.81
	3. Bus Stop		1.00			1.00		1.00	
	4. Street Lighting	3.34		3.34	3.34		3.34	3.34	3.34
	5. Seating Benches	1.00				1.00	1.00	1.00	1.00
	6. Other Street Amenities					1.34		1.34	1.34
	7. Underground Utilities And Overhead Services	3.84		3.84	3.84				
	8. Street Vending Spaces		2.67			2.67	2.67	2.67	2.67
3. Frontage Zone	1. Frontage Zone Width	1.00			1.00		1.00		
	1. Signscape							2.50	2.50
	1. Streetscape						4.74	4.74	4.74
	1. Street Activities					4.34	4.34	4.34	4.34
4. Carriageway Elements	1. Cycle Track			1.00			1.00		
	2. Stormwater Drainage			3.00	3.00				
	3. On Street Parking			5.00					
Human Comfort Needs Of M.G. Road		2.813	2.205	3.120	3.00	2.470	2.765	2.749	2.962
		C	C	B	B	C	C	C	B
Human Comfort Level		2.509		2.863			2.825		
		C		C			C		
		Physiological Comfort		Physical Comfort			Psychological Comfort		



Figure 8: Bar chart presenting Place Identity Index of M.G. Road
 Table 8- Place Identity Index of M.G. Road

Sense Of Place Of M.G. Street Environment		Comfortable	Connectivity	Safety	Protection	Convenience	Convivial	Conspicuousness	Attractiveness	Place Identity Index	Level Of Sense of Place
Local Distinctive- Ness	Variety					2.47	2.765		2.962	2.73	C
	Legibility					2.47		2.749	2.962	2.73	C
	Adaptability	2.813		3.12	2.998					2.98	C
Human Interaction	Permeability	2.813	2.205			2.47	2.765			2.56	C
	Publicness	2.813			2.998		2.765			2.86	C
	Mobility	2.813	2.205	3.12		2.47				2.65	C
Visual Quality	Visual Appropriate- Ness							2.749	2.962	2.86	C
	Visual Richness	2.813					2.765		2.962	2.85	C

Figure 6 presents poor status of connectivity and convenience of M.G. road while safety and protection are the human comfort components satisfied, having provision of adequate road side plantation, street lighting and surface water drainage facility.

Figure 7 presents sense of Place Identity, adaptability, publicness, visual richness and visual appropriateness contributing majorly based on human comfort parameters

Based on the results following are the issues concerning the physical and visual attributes of urban street spaces, their identity as interactive public place which can be used as assessment indicators for revitalization of streets as social public place.

1. Through route width
2. Footpath kerb height
3. Disability infrastructure
4. Provision & location of street furniture elements
5. Location of bus stop
6. Seating benches
7. Street vending spaces
8. Frontage zone width
9. Provision of cycle track
10. Other street amenities
11. Signscape

VII CONCLUSION

To conclude 'Street Evaluation Model' served as a pioneer tool for evaluating existing physical conditions of the street environment, qualitatively and quantitatively, based on which human comfort index and place identity index was derived. These indices played important role in quantifying and evaluating the qualitative aspects of street as a public space. Further the indices of human comfort and place identity analysis will also contribute in planning, design and operation of street elements and conducting sensitivity analysis which can assess the effect of change in the physical attributes on identity scenario of the overall street environment, human comfort level and thereby on sense of place. In tackling the impact of globalization, revitalization is considered as the most resilience approach. Urban street revitalization defined as rejuvenation of culturally significant outdoor space in between built form and street space. The livability of streets is based on active participation of manager, developers and end users in the said space without scarification made to demolishing the existing built-unbuilt form setting. The strategy of revitalization is through addressing and enhancement of physical and visual attributes of streets and thereby on sense of place. Place Identity Index and Human Comfort Index are the indices that can be applied in analysis of urban revitalization parameters.

REFERENCES

- Bentley, Murrain, Smith. (1985). *Responsive Environments- A Manual for Urban Designers*. New York: Architectural Press.
- Gardner. (1996). *Developing a pedestrian strategy for London*. In: *ETC Proceedings, London*, . Retrieved from <http://www.etcproceedings.org/paper/developing-a-pedestrian-strategy-for-london>.

- Gehl, J. (1987). *Life between Buildings*. New York: Van Nostrand Reinhold Danish Architectural Press, Copenhagen.
- ITDP-EPC. (2011, September). Better streets, better cities: A guide to street design in urban India. Ahmedabad, India. Retrieved March 24th, 2015, from <https://www.itdp.org/where-we-work/annual-report>.
- Indian Road Congress. (2012). *103:2012: Guidelines for Pedestrian Facilities*. Retrieved April 2014, from <http://www.irc.org.in>.
- Jacobs, A. (1995). *Great streets*. Cambridge: MIT Press Massachusetts.
- Lynch, K. (1969). *Image of the City*. Cambridge: MIT Press.
- Methorst, R. (2008). *Pedestrian Quality Needs: Introduction, Theory and Research Methods*. Delft: DVS-Centre for Transport and Navigation.
- Ministry of Urban Development and Wilbur Smith Associates. (2008). 'Study on Traffic and Transportation Policies and Strategies in Urban areas in India'. Retrieved April 2010, from <https://casi.sas.upenn.edu/sites/casi.sas.upenn.edu/files/iit/GOI%202008%20Traffic%20Study.pdf>: www.urbanindia.nic.in
- Montgomery, J. (1998). "Making a City: Urbanity, Vitality and Urban Design". In . *Journal of Urban Design*. Vol. 3, No. 1.
- New Zealand Transport Agency, Land Transport New Zealand. (2007). *Pedestrian Planning and Design Guide*. Retrieved September 9, 2009
- Pedestrian Quality Needs Project. (2008, September). *Pedestrian Quality Needs*. Retrieved January 2012, from <http://www.walkeurope.org/>.
- Project for Public Spaces. (2009). *Project for Public Spaces*. Retrieved 2011, from <http://www.pps.org/reference/squaresprinciples>.
- SANDAG. (2002). *Planning and Designing for Pedestrians: Model Guidelines for the San Diego region*. Retrieved September 2011, from http://www.kerncog.org/blueprint/resources/sandag_plan.pdf.
- Unified Traffic and Transportation Infrastructure Planning & Engineering Centre (UTTIPEC) and Delhi Development Authority (DDA). (2009). *Pedestrian Design Guidelines: Don't drive....Walk*. Retrieved April 2012, from [http://uttipec.nic.in/writereaddata/mainlinkFile/File215.pdf](http://uttipec.nic.in: http://uttipec.nic.in/writereaddata/mainlinkFile/File215.pdf)

