

Street Identity Assessment Model: Analysis of Spacio Physical Attributes of Street elements to Assess Place Identity - Case of Sampige Road, Malleshwaram, Bengaluru

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Abstract— Streets possess distinctive functional, socio-cultural and psychological characteristics which contribute to the Place Identity. Urban commercial streets in India are examples of liveable streets with complex activities and social interactions happening along the stretch. With the urban transformations due to various reasons there arises a threat of Physical Identity of these streets. It is important to look into retaining the existing identity of the streets and enhance the image ability through new interventions. The study aims to investigate the correlation between the physical attributes of Street elements and the attributes of Place Identity attributes to decipher the existing status of Place Identity. Weighted score method is employed to rate the physical attributes of Street elements and correlated with human comfort attributes contributing the Place Identity. The model thus developed is called Street Identity Assessment Model where the existing Place Identity Index is derived with the rating scales and the model explains how the physical attributes of street elements affect the Place Identity. The case chosen is Sampige Road, Malleshwaram, Bengaluru which one of the active mixed use Commercial Collector Street of the neighbourhood.

Index Terms— Place Identity, Street Identity Assessment model, Street elements

1 INTRODUCTION

Urban spaces should possess sense of place which contributes to a imageable and livable physical, social and cultural spaces. Such a space will provide its users with distinctiveness, sense of belonging and Identity over time. Lynch (1960) defines Identity as a quality with which a user recognizes a place and which is determined with numerous characteristics or identifiable elements. Relph (1976) lists the characteristics of Place Identity comprising of physical features, activities and meaning or symbols. A comprehensive understanding of different urban elements (streets, plazas, squares, buildings, etc) of a place may possibly give an expression of notion of Place Identity. Hence a method of detailed understanding of one such urban element is the main concern.

Rapoport (1977) adds that developing over a period of time, these streets become culture specific. Commercial streets create a unique sense of place by their function and temporal activities happening round the clock. Hence there is a need to critically understand the attributes of the physical environment which are contributing to the character of the street so as to retain them and transform in future carrying on the essence of the street. This will help to retain the unique Identity of the street developed over a period of time in the users.(Sagar, 2020)

The paper focuses on a model developed to assess the Place Identity of Urban Streets using 'Weighted Index Method'. The physical elements of the street are assessed for their qualitative nature and finally indexed to obtain 'Place Identity Index' which reflects the existing condition of the Place Identity parameters.

2. THEORITICAL FRAMEWORK

2.1 Place Identity Attributes

Various Urban design theories and concepts have been put forth by different urban designers, urban planners, anthropologists, sociologists regarding the qualitative aspects and attributes of public spaces which contribute to Place Identity. The current study refers to Relph (1976), John Montgomery (1998), Bentley (1985), Kevin Lynch (1988), Allan Jacobs (1195) and others to state the qualitative attributes of Street which contribute to Place Identity. Based on the above studies, the following qualities are considered for the study and defined as follows.

1. **Permeability** - is the quality that offers people/ users of the street to access various public-private, built-unbuilt spaces, physically or visually. It provides a obstruction free movement and provides safety and comfort for all the pedestrians and vehicles.



Fig1 - Sense of place. Source: Carmona, M., Tiesdell, S., Heath, T. (2010)

Streets are one such unique urban element which people perceive once they step out of their individual buildings. Streets in Indian context are complex with multiple functions, temporality and vivid nature. Indian streets provide a physical setting for socio-economic activities and bring people together (Jacobs,

2. **Adaptability** – refers to the temporal characteristics of the street and the options it offers in terms of activities and built environment.
3. **Visual Appropriateness** – This quality is also termed as coherence, which means about the communicative quality of the built environment and its appropriateness of being there in user perspective.
4. **Diversity** - 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.
5. **Vitality** - is the quality which draws people towards the public environment making them feel good, glad to be there, relaxed and excited.
6. **Complexity** - is the visual Richness 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 cosy walking environment.
7. **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.
8. **Distinctiveness** - is the quality which gives the user memories of the place where he moves through unique character and hence making the place image able.

3. **Comfortable:** the extent to which walking is accommodated to capabilities and skills of all types of pedestrians with attributes and amenities that ease the walking experience.
4. **Convivial:** (Liveability/ Place making) the extent to which walking is a pleasant activity, in terms of interaction with people, the built and natural environment, encompassing social and recreation activities.
5. **Conspicuous:** (Ambience/ Creative use of space) the extent to which walking routes and public spaces are discernible and inviting for pedestrians, in terms of clear and legible signing and information and in terms of spatial legibility, complexity and coherence
6. **Coexistence:** (Safety & Protection) the extent to which the pedestrian and other transport modes can coexist at the same time and place with order and peace.
7. **Commitment:** the extent to which there is evidence of engagement, liability and responsibility towards the pedestrian environment, by local communities and administration.

Table 1: Place Identity Matrix showing relationship between Place Identity attributes and Human comfort attributes

PLACE IDENTITY	Place Identity Attributes	Human Comfort Attributes						
		CONNECTIVITY	CONVENIENCE	COMFORT	CONVIVIALITY	CONSPICUOUSNESS	COEXISTENCE	COMMITMENT
PHYSICAL FEATURES	Permeability							
	Adaptability							
	Visual Appropriateness							
ACTIVITIES	Vitality							
	Diversity							
MEANING	Distinctiveness							
	Complexity							
	Legibility							

2.2 Human Comfort Attributes

Many different methodologies are existing to measure the quality of built environments. There are audit tools, checklists, inventories, level of service scales, surveys, indices which have merged to assess the walkability of urban streets. In order to facilitate the structuring of the physical parameters on to the the abovesaid Place identity attributes a series of human comfort attributes are defined and rated to find the correlation between the physical attributes to human comfort attributes of street elements. The following 7’C’s layout was selected for the study which was developed by London Planning Advisory committee and further developed by Moura (2017).

1. **Connected:** (Mobility) the extent to which the network links to key trip origins and destinations, as well as the extent of linkages between different routes on the network. Connectivity is regarded as a major environmental feature, creating more options and shorter, more direct routes to destinations. It includes movement, linkages, and network.
2. **Convenient:** (Accessibility) the extent to which walking is possible and able to compete with other modes of transport in terms of efficiency (time, money and space). It is related to the diversity of land uses and functions conveniently accessible on foot. It relates to the land use mix, diversity of functions, and accessibility to various activities.

2.3 Physical Attributes of Street elements

The study divides the street zones into eight categories based on the zones except the Universal accessibility attributes which are common for many zones. The following are the zones identified for the study.

1. Carriageway zone
2. Pedestrian only zone / footpath zone
3. Multifunctional zone
4. Dead width/ frontage zone
5. Universal accessibility
6. Plot/ Block zone
7. Buildings
8. Open spaces

The above eight zones had 41 physical parameters identified and 117 sub - parameters of characteristics of the physical parameters. Table 2 shows parameters which were identified based on Indian Street design guidelines by Indian Road Congress (IRC 2012), Unified Traffic and Transportation Infrastructure Planning and Engineering Centre (UTTIPPEC) AND Delhi Development Authority (DDA), ITDP Design guidelines. The

characteristics of each parameter and sub parameter were described as per the guidelines.

Table 2: Physical attributes of Street elements

CARRIAGEWAY	18. Carriage way width	PEDESTRIAN ONLY ZONE	1. Foot Path width
	19. Shoulders and storm water drain		2. Kerb Height
	20. On Street Parking		3. Footpath Surface finish
	21. Pedestrian Crosswalks		4. Footpath continuity
	22. Traffic Calming measures	FRONTAGE/ DEAD WIDTH ZONE	13. Building Frontage zone width
23. Road marking, Traffic signs, Advertisements/Boardings etc.	14. Building Signages		
MULTIFUNCTIONAL ZONE	5. Provision of Street furniture zone & width		15. Streetscape
	6. Road side Plantation/Landscaping		16. Street Activities
	7. Public transport interface/Bus stop/ Rickshaw & Taxi stands		17. Cycle Track
	8. Street Lighting	INTERSECTIONS	24. Street intersection characteristics
	9. Seating benches		25. Kerb Ramps
	10. Other street Amenities (Toilet, Drinking water, Garbage bins)		26. Raised Table Top Crossings
	11. Underground utilities and overhead services	UNIVERSAL ACCESSIBILITY	27. Tactile Paving
12. Street vending spaces	28. Auditory Signals & Accessible Signages		
	29. Special Seating facilities		
BLOCK/PLOT	30. Block Length		
	31. Land Use Mix		
	32. Plot Density		
	33. Set Back		
BUILDINGS	34. Building Massing		
	35. Building Height		
	36. Building Façade		
	37. Building Access		
	38. Landmark Characteristics		
OPEN SPACES	39. Planning & Design		
	40. Boundary elements		
	41. Accessibility		

2. RESEARCH METHODOLOGY

The research adopts Weighted Index method to derive the Place Identity Index. The Data collection was carried out in two phases. The secondary data was collected from various development authority documents and development plans, etc and a primary survey was done to document the existing condition of the street element.

An expert rating of preferences of physical parameters and sub parameters was carried out to derive the weightages for each of the 41 parameters and 117 sub parameters. The field survey was carried out by the researcher and the data was rated on a 5 – scale of Likert scale which had defined characteristics taken from various design guidelines discussed in the above section. The documented score of each sub parameter was multiplied by the weighted score derived from the expert rating score to attain the index of the parameter. Table 3 shows the Level of Service considered to derive the existing condition of the physical parameters of the Street elements.

Table 3: Street elements performance Indicators

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 by 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.	Unsatisfactory 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.

Based on the performance indicator the ratings of each qualitative attribute of the street were rated. The score obtained for each of the qualitative street attribute was then put into the Place Identity matrix to obtain the Place Identity Index.

3. SAMPIGE ROAD, MALLESHWARAM

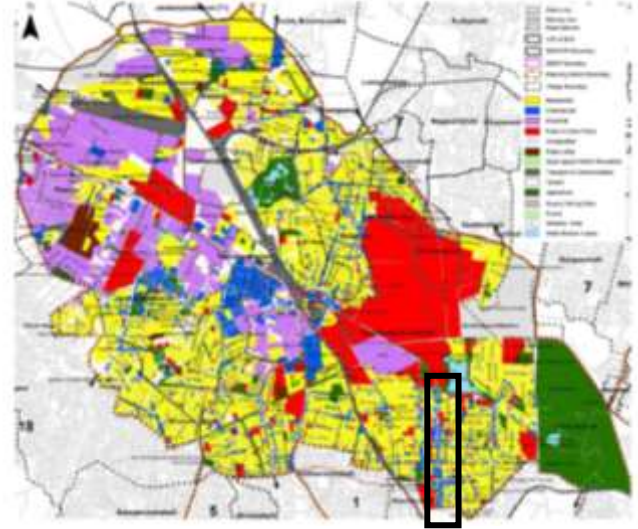


Fig 2 - Land use plan of Mallechwaram (source- Bangalore Master plan, 2031)

Yeshwantpur – Mallechwaram planning district (PD 6) is located in the core of BMA and predominantly consists of residential areas like Mallechwaram and Nandini layout; public – semi public and areas under transportation/communication including Yeshwantpur Railway Station.(Revise master plan, BBMP, 2031). Mallechwaram is a planned neighbourhood during 1890s during the outbreak of Plague in Bangalore city. Sampige road, named after a flower called ‘Sampige’ is the main spine which connects the neighbourhood with the old city and to the northwestern parts of Bangalore. The street was developed to be a commercial strip to serve the neighbourhood.

Being part of one of the fast transforming neighbourhood of the city, Sampige road has undergone lot of transformations in its physical environment yet retains the character of a street shopping stretch till today. People across Bangalore relate Sampige road as one the major shopping hub of Bangalore. The historicity, fast transforming nature and association of the



case.

people are the factors considered for choosing the

PHYSICAL ATTRIBUTES OF STREET ELEMENTS		CONNECTIVITY	CONVENIENCE	COMFORT	CONVIATLITY	CONSPICUOUSNE \$\$	COEXISTENCE	COMMITMENT
PEDESTRIAN ONLY ZONE	1. Foot Path width	3.00	3.00	3.00		3.00	3.00	
	2. Kerb Height		3.67	3.67			3.67	
	3. Footpath Surface finish		3.43	3.43			3.43	3.43
	4. Footpath continuity	3.87	3.87	3.87				3.87
MULTI FUNCTIONAL ZONE	5. Provision of Street furniture zone & width	1.30	1.30		1.30			
	6. Road side Plantation/ Landscaping			3.71	3.71	3.71		3.71
	7. Public transport interface/ Bus stops/ Rickshaw & Taxi stands	2.00	2.00	2.00			2.00	2.00
	8. Street Lighting	3.00	3.00	3.00		3.00	3.00	
	9. Seating benches			1.00	1.00	1.00		1.00
	10. Other street Amenities (Toilet, Drinking water, Garbage bins)		2.60	2.60				2.60
	11. Underground utilities and overhead services						2.67	2.67
	12. Street vending spaces		1.33		1.33	1.33		
FRONTAGE ZONE	13. Building Frontage zone width	1.33	1.33			1.33		
	14. Building Signages	4.67		4.67			4.67	4.67
	15. Streetscape	3.61	3.61	3.61	3.61	3.61		
	16. Street Activities			3.83	3.83	3.83		
	17. Cycle Track	1.00	1.00				1.00	1.00
CARRIAGE WAY ZONE	18. Carriage way width	4.00		4.00			4.00	4.00
	19. Shoulders and storm water drain		3.00				3.00	
	20. On Street Parking		1.00				1.00	1.00
	21. Pedeshrian Crosswalks	1.00		1.00			1.00	1.00
	22. Traffic Calming measures			2.00			2.00	2.00
	23. Road marking, Traffic signs, Advertisements/loadings etc.		3.00				3.00	3.00
	24. Street intersection characteristics			1.00			1.00	1.00
UNIVERSAL ACCESSIBILITY	25. Kerb Ramps	1.67	1.67	1.67			1.67	1.67
	26. Raised Table Top Crossings			1.00			1.00	1.00
	27. Tactile Paving	2.00	2.00	2.00			2.00	2.00
	28. Auditory Signals & Accesible signages						1.00	1.00
	29. Special Seating facilities		1.00	1.00			1.00	
BLOCK	30. Block Length	5.00	5.00	5.00		5.00		
	31. Land Use Mix		4.00	4.00	4.00	4.00		
	32. Plot Density				4.33	4.33		
	33. Set Back		3.33			3.33		3.33
BUILDING	34. Building Massing	4.00				4.00		
	35. Building Height		4.00	4.00		4.00		
	36. Building Façade	3.73				3.73		
	37. Building Access	3.67	3.67		3.67		3.67	
	38. Landmark Characteristics				3.33	3.33		
OPEN SPACE	39. Planning & Design		3.00	3.00	3.00		3.00	3.00
	40. Boundary elements	3.00				3.00	3.00	
	41. Accessibility	3.00			3.00	3.00		3.00
Average		2.89	2.70	2.84	3.01	3.25	2.38	2.36
Grade		C	C	C	B	B	C	C
OVERALL GRADE		C - 2.78						

Fig 3 - Photo of Sam-pige Road (Source: author) Table 4: Human Comfort Index of Sam-pige Road

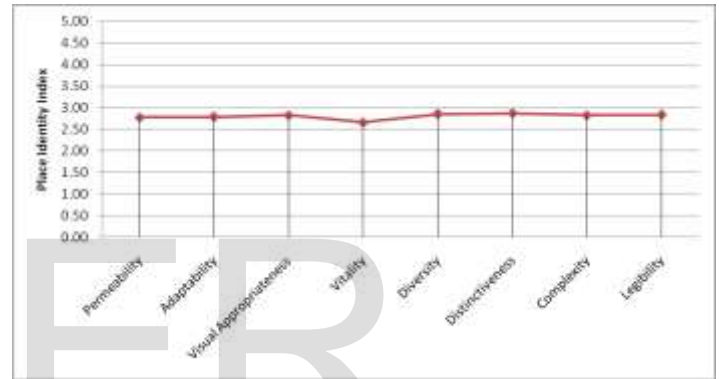
physical parameters of street elements of Sampige Road

Table -4 and Figure 4 show the existing weighted score for the 41 physical parameters which affect the Place identity of Sampige road. The spider web diagram shows which parameter contributes more to the existing character of Sampige road and which is the least contributor. Table - 5 shows the Place Identity Index of Sampige road derived by assigning the scores obtained from the Human comfort indices or the 7 'C's.

4. RESULTS AND DISCUSSION

The Overall Place Identity Index for various attributes of Place Identity shows that the over score is Grade 'C' as per the Level of service indices. The highest rating is obtained for Distinctiveness (2.87), which deciphers that the street has strong imageability characteristics which make the street unique.

The next level of rating is obtained for Diversity (2.85), Legibility (2.84), Complexity and Visual Appropriateness (2.83) sug-



gesting that the Street possesses variety of activities and visual richness. The score for Adaptability (2.79) states that the street has limited opportunities to transform at different times comfortably. The least of scores is rated to Vitality (2.66) which states that the street is not convenient for people to hang out, and indulge in social activities. (Fig. 5)

Fig 5 – Graph showing the levels of Place Identity attributes

4. ANALYSIS

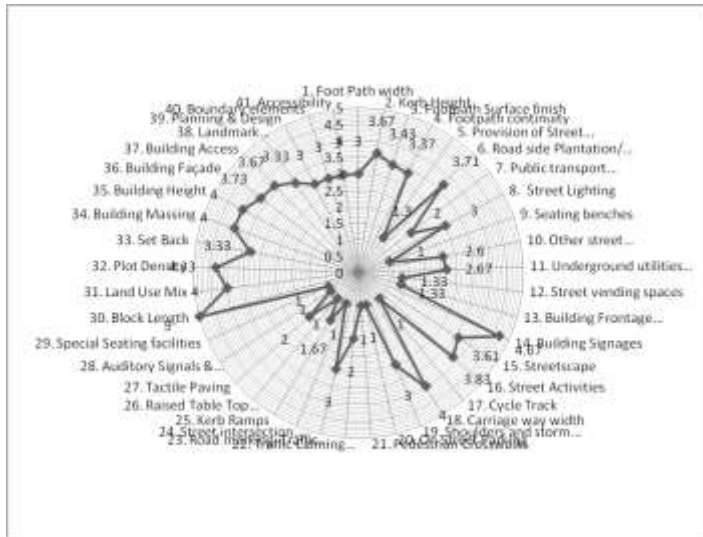


Fig 4 - Spider web diagram of existing level of service of

Further analyzing on the scores obtained for the Human comfort attributes which contribute to the Place Identity shows the status of 7 'C's considered for the study. The Highest among the seven attributes is Conspicuousness which states that the street has better quality of visual and spatial quality in terms of characteristics contributing to various street activities, visual character and inviting character of the street. Conviviality being the second in the order states that that the street has given ample opportunities for the people to engage in various activities and make the street more liveable. The least score has been recorded for Commitment which informs that the street is not provided with many mandatory facilities to be provided by the local authorities. The second lowest in the order is Coexistence which means that the street is unsafe for the users and lacks necessary protective measures. (fig. 6)

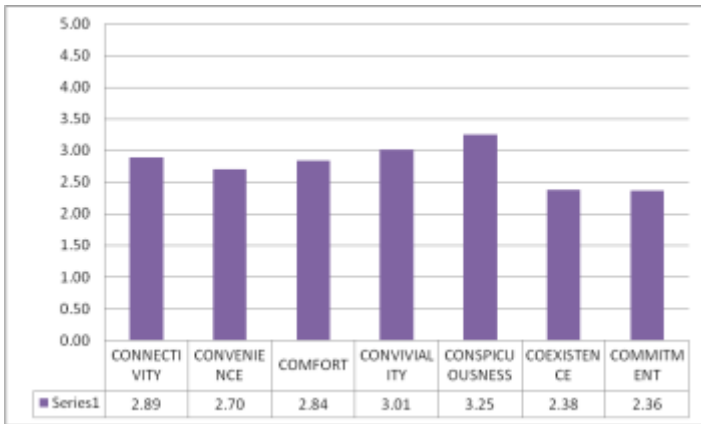


Fig 6 – Graph showing the levels of Human comfort Indices

The attained scores for various physical attributes were categorized into the seven zones considered for study. The score is the average of the scores attained for the parameters and sub parameters of that respective zone. The grouping of the data shows that the least score is achieved by the Universal Accessibility parameters which majorly affect Commitment and Coexistence attributes. The second least score is for Parameters of Carriageway zone which also states that the safety and protection measures along the street are not sufficiently provided. The third least is the Multi Functional Zone where majority of the pedestrian amenities, street vending zones, public transport interfaces are to be provided. The highest rating is obtained for the Plot & building parameters which suggest that the plots are accessible, the street ratio, scale, ambience, street elevation, streetscape, street activities are attracting factors which contribute to the current Place identity. (Fig. 7)



Fig 7 – Graph showing the levels of Street Zones

Table 5: Place Identity Index of Sampige Road

4. CONCLUSION

The Street Assessment model developed can be used to assess the Place Identity score of Indian Streets based on which a sensitivity analysis can be done to project the proposals to be undertaken to upgrade the facilities of physical parameters of the street and in turn analyse how it reflects on the Place Identity score of the street. The Weighted Index method has few constraints like the expert rating was done by five experts and it can be increased for obtaining a more just result. The physical analysis rating score was based on the field observation survey done by the researcher and hence a data validation through User survey would enhance the authenticity of the results obtained. The Place Identity Assessment model can nevertheless be an efficient aid to urban planners and urban designers to develop appropriate development and re-development of urban streets enhancing the character and bringing about a better sense of place.

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PLACE IDENTITY	Place Identity Attributes	Street Attributes							PLACE IDENTITY INDEX	LEVEL OF SENSE OF IDENTITY
		CONNECTIVITY	CONVENIENCE	COMFORT	CONVIVIALITY	CONSPICUOUSNESS	COEXISTENCE	COMMITMENT		
PHYSICAL FEATURES	Permeability	2.89		2.84	3.01			2.38	2.78	C
	Adaptability		2.70	2.84		3.25	2.38		2.79	C
	Visual Appropriateness	2.89				3.25		2.36	2.83	C
ACTIVITIES	Vitality	2.89	2.70				2.38		2.66	C
	Diversity		2.70	2.84	3.01				2.85	C
MEANING	Distinctiveness			2.84	3.01	3.25		2.36	2.87	C
	Complexity			2.84	3.01	3.25		2.36	2.83	C
	Legibility	2.89		2.84		3.25	2.38		2.84	C

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