

MIXED USE DEVELOPMENT AS SOLUTION FOR CREATING WALKABLE NEIGHBOURHOODS

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ABSTRACT

Sustainable mode of transportation is necessary for a city to be a sustainable one. Walking is seen as the most sustainable one provided all the destinations are in close proximity. This study validates the theory that a mixed land use development that has its destination in close proximity makes the area walkable. This paper uses walk score index as the method to calculate the walkability of the study area. The distances were all measured from point of residences to various amenities that are major destinations that promote walking. Further the study confirms that mixed use development promotes walkability.

Keywords: Walkability, mix use, transportation, mobility, amenity.

INTRODUCTION

India is developing as one of the fastest developing economies on the planet, almost 40 crores people lives in urban areas, yet almost nothing has been considered to plan and shape walkable urban communities. Fast Economic development and widespread urbanization have brought urban transport emergencies in numerous Indian cities. As per United Nation study, by 2050 almost 70 present of the worldwide populace will live in the urban communities. The fast developments of the urban communities as far as financial and social improvement are the reasons that lead to real advancement issues in the vast majority of the nation around the globe [1]

Walking is an extremely noteworthy method of transport in India and every single Indian individual are likewise people on foot. The most vital, open and reasonable type of transportation in any nation is without a doubt walking. Walkability on the other hand is a proportion of how neighbourly a region is to walking. Walkability has been characterized from numerous points of view and is "the degree to which walking is promptly accessible as a sheltered, associated, available and lovely method of transport" [13]. A locality is named to be walkable when "the constructed condition strengthens and supports walking by accommodating person on foot respite and security, associating individuals with shifted goals inside a sensible measure of time and exertion, and offering visual enthusiasm for the adventure all through the system" [14]

The possibility of the city as a blending pot for individuals of various social, ethnic and class foundations has never lost its essentialness. Mixed use structures with proper thickness make a feeling of 'urbaneness' and energy, which are fundamental criteria for any liveable city. Mixed use structures benefit as much as possible from an urban territory and can all the more likely supplement what is as of now here. The properties of conservativeness, mixed use and walkability are a city's rich and suffering characteristics, where grand city structures contact us and where quality thickness shows itself through assorted variety in varieties of 3 to most extreme 10-story urban squares, supporting the open domain and streetscape. They are additionally notable standards of immortal urban structure that ought to be connected to every new improvement, and an accomplished urban originator will dependably know about how to apply them liberally to existing urban circumstances to guarantee lovely, human-scale, minimal yet agreeable, mixed use regions and neighbourhoods.

Issues in Transport and Mobility: The usage of the car as a plan component in urban advancement makes an entire exhibit of issues, which is known as transport disservice [4]. Spatially, the long separations between goals are hard to make by walking. From a multimodal point of view, mass travel frameworks are troublesome and costly to assemble and to work, and from a financial viewpoint. Walking and travel urban communities permit everybody (counting drivers) to be portable and to have openness. Versatility should not to be reliant on salary levels, since it is a crucial freedom allowed to everybody. Despite the fact that

from a welfare state point of view, absence of access to various shopping and recreational spots probably won't be as basic as absence of access to employments, it establishes a noteworthy deterrent for the vehicle burden.

Walkability in a mixed-use area: A conservative manufactured condition expands the maintainability of the urban structure [9]. For instance, numerous research proposes that the higher the density of a zone, the lower the utilization of transportation [11]. The way to expanding the measure of walking, cycling, and open transport use is minimization: on the off chance that when residences are closer to offices, at that point travel time is decreased, and alternative techniques for transport are energized.

The settlement of various uses in closeness to one another urges individuals to walk and cycle to class, work, and the shops. While even mixed use is increasingly normal, little scale advancement that blends use vertically inside the structure, with a functioning business ground floor and private pads and lofts above, makes the high avenues and auxiliary roads that structure the core of an area.

The purpose of this study was to find whether mixed use development that includes various spatial land uses is a solution to walkability of a neighbourhood taking into consideration their proximity to some of the major amenities that have been drivers for walkable destination.

METHODOLOGY

Walk Score Index:

Walk score computes a region's walkability dependent on the proximity of close-by conveniences to the occupant's home to. Walk Score figures the walking capacity of a location by finding adjacent stores, eateries, schools, parks, and so on. It depends on:

- 1) The distance to walkable areas in a location.
- 2) Calculating a score for every one of these areas.
- 3) Combining these scores into one easy to read Walk Score.

Study Area:

The study looks for the walkability of Lovely Professional University(LPU) Jalandhar, India. It manages an area of 600 acres of land in NH1 and has 28000 students from various parts India and the World. Currently over 15000 students reside in the university hostel. Apart from the educational areas, it has a varied mix of land uses and programmes including administrative, residential, commercial and recreational areas.

Walk scores for different amenities would be calculated by taking various Boys' Hostel Blocks as the origin. Amenities within a range of 800m-1600m radius would be accounted for and appropriate weights would be applied within the amenity category [15]. Pedestrian distances to various amenities from the residential blocks are calculated using Google Maps. Walking routes around are taken to be the pedestrian routes planned within the campus. Amenities within a range are observed and recorded manually with field surveys. The scope of the study is restricted to the Boys Hostels of LPU with a study radius of 800m-1600m.



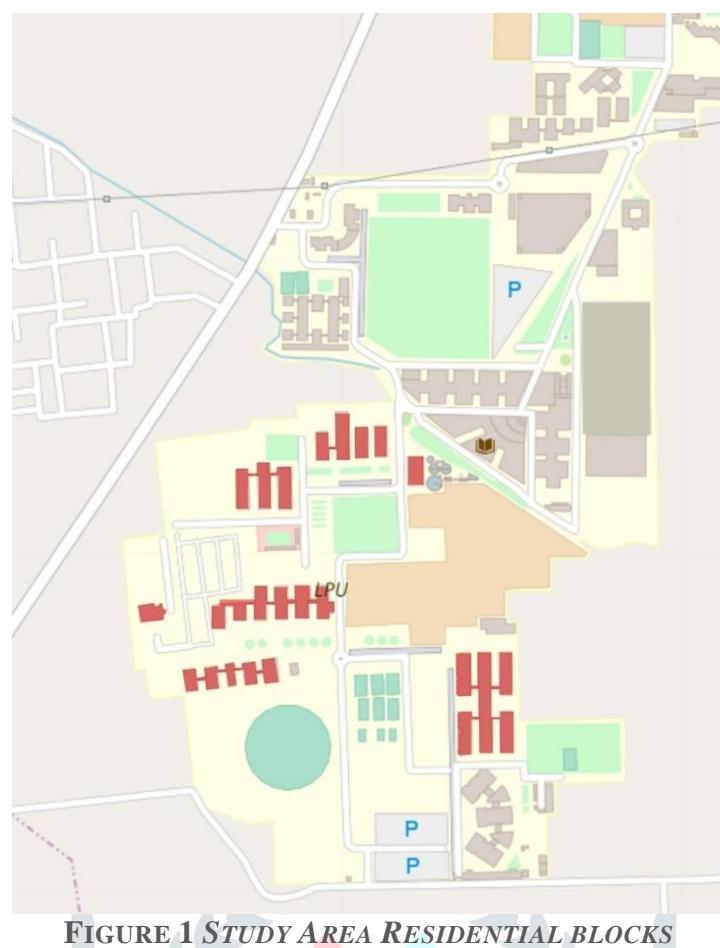


FIGURE 1 STUDY AREA RESIDENTIAL BLOCKS

Experimental Design:

Street Smart Walk Score analyses the result by mapping out the walkable routes to amenities in 9 various amenity sets. In the amenity sets where profundity of choice is important, we count multiple amenities in a given set. Sets are also calculated according to their importance (details below). The distance to a location, counts, and weights define a base score of an address, which is then normalised to a score from 0 to 100.

Based on the interpretation of current walkability analysis the weights were chosen. Nearby grocery stores, restaurants/bars, banks, and schools have found to be destinations that increase walking. [10]

RESULTS AND DISCUSSIONS

The data calculated provided the walk scores for various boys' residential blocks of LPU. These data upon normalizing to a scale of 100 provided for the total walkability between various amenities and individual boys' hostels. The walk score results are as follows:

Residential Block		COUNTS	AMMENITIES								
			Grocery	Restaurant	Shopping	Coffee	Banks	Parks	School	Library	Entertainment
BH1		3	10	5	2	1	1	1	1	1	1
Distance from Origin(in K.M.)		0.05	0.1	0.7	0.4&0.7	0.05	0.2	0.45	0.45	0.45	0.45
Walk Score Equivalent with Distance Decay Function		3	3	2	2	1	1	1	1	1	1
Walk Score Linearly Expanded		19.98	19.98	13.32	13.32	6.66	6.66	6.66	6.66	6.66	6.66
			TOTAL WALKSCORE=								
FACULTY APPARTMENT		3	10	5	2	1	1	1	1	1	1
Distance from Origin(in K.M.)		0.05	0.1	0.7	0.1&0.7	0.05	0.1	0.45	0.45	0.45	0.45
Walk Score Equivalent with Distance Decay Function		3	3	2	2	1	1	1	1	1	1
Walk Score Linearly Expanded		19.98	19.98	13.32	13.32	6.66	6.66	6.66	6.66	6.66	6.66
			TOTAL WALKSCORE=								
BH7		3	10	5	2	1	1	1	1	1	1
Distance from Origin(in K.M.)		0.05	0.1	1.2	0.6&1.2	0.05	0.1	0.7	0.7	0.7	0.7
Walk Score Equivalent with Distance Decay Function		3	3	1.7	1.8	1	1	1	1	1	1
Walk Score Linearly Expanded		19.98	19.98	11.32	11.98	6.66	6.66	6.66	6.66	6.66	6.66
			TOTAL WALKSCORE=								
BH2		3	10	5	2	1	1	1	1	1	1
Distance from Origin(in K.M.)		0.05	0.1	0.8	0.5&0.8	0.05	0.3	0.6	0.6	0.6	0.6
Walk Score Equivalent with Distance Decay Function		3	3	2	2	1	1	1	1	1	1
Walk Score Linearly Expanded		19.98	19.98	13.32	13.32	6.66	6.66	6.66	6.66	6.66	6.66
			TOTAL WALKSCORE=								
BH3		3	10	5	2	1	1	1	1	1	1
Distance from Origin(in K.M.)		0.05	0.1	1	0.6&0.1	0.05	0.2	0.66	0.66	0.66	0.66
Walk Score Equivalent with Distance Decay Function		3	3	1.8	1.9	1	1	1	1	1	1
Walk Score Linearly Expanded		19.98	19.98	11.98	12.64	6.66	6.66	6.66	6.66	6.66	6.66
			TOTAL WALKSCORE=								
BH4		3	10	5	2	1	1	1	1	1	1
Distance from Origin(in K.M.)		0.05	0.1	1	0.6&0.1	0.05	0.2	0.66	0.66	0.66	0.66
Walk Score Equivalent with Distance Decay Function		3	3	1.8	1.9	1	1	1	1	1	1
Walk Score Linearly Expanded		19.98	19.98	11.98	12.64	6.66	6.66	6.66	6.66	6.66	6.66
			TOTAL WALKSCORE=								
BH5		3	10	5	2	1	1	1	1	1	1
Distance from Origin(in K.M.)		0.05	0.1	1.2	0.8&1.2	0.05	0.2	0.8	0.8	0.8	0.8
Walk Score Equivalent with Distance Decay Function		3	3	1.7	1.8	1	1	1	1	1	1
Walk Score Linearly Expanded		19.98	19.98	11.32	11.98	6.66	6.66	6.66	6.66	6.66	6.66
			TOTAL WALKSCORE=								
BH6		3	10	5	2	1	1	1	1	1	1
Distance from Origin(in K.M.)		0.05	0.1	1.2	0.8&1.2	0.05	0.2	0.8	0.8	0.8	0.8
Walk Score Equivalent with Distance Decay Function		3	3	1.7	1.8	1	1	1	1	1	1
Walk Score Linearly Expanded		19.98	19.98	11.32	11.98	6.66	6.66	6.66	6.66	6.66	6.66
			TOTAL WALKSCORE=								
BH8		3	10	5	2	1	1	1	1	1	1
Distance from Origin(in K.M.)		0.05	0.1	0.7	0.1&0.7	0.05	0.4	0.45	0.45	0.45	0.45
Walk Score Equivalent with Distance Decay Function		3	3	2	2	1	1	1	1	1	1
Walk Score Linearly Expanded		19.98	19.98	13.32	13.32	6.66	6.66	6.66	6.66	6.66	6.66
			TOTAL WALKSCORE=								
			AVERAGE WALKSCORE=								
			98.33777778								

TABLE 1 DISTANCE TO AMENITIES AROUND THE AREA

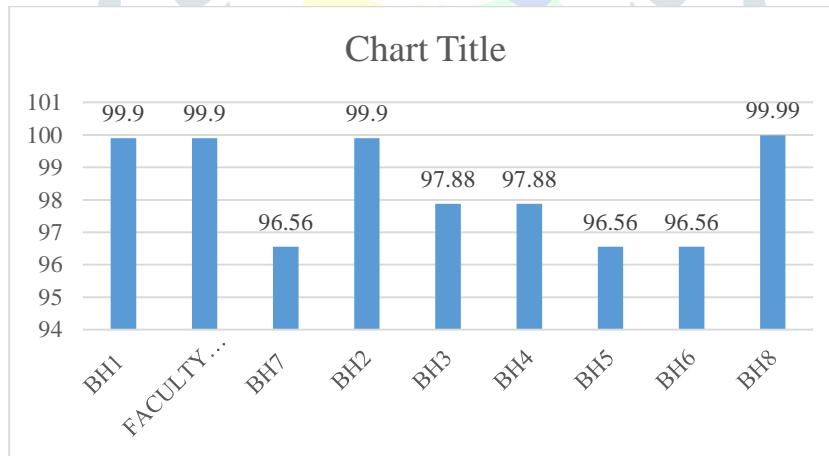


TABLE 2 COMPARISON CHART OF WALKABILITY

Walk scores for residential blocks BH1, faculty apartment, BH2 and BH8 have similar scores of 99.9 on an average. The reason for such values of scores were that these blocks were situated right next to each other. The proximity of various amenities to the origins were all seen to be within a radius 700m with shopping centres in the last edge. Walk scores for residential blocks BH3 and BH4 which are situated right next to each other had similar scores of 97.88. Playgrounds and food kiosks were all in a radius of 200m and 100m respectively. The last distant amenity was the shopping complexes with a distance from the residences of 1000m. The longer routes of travel were eased by the properly shaded pathways laid along the way. Residential block BH5 and BH6 are situated adjacent to each other hence have similar walk scores of 96.56. The shopping centre was found to be very far with a distance of 1200m thus resulting in the lesser score. Walking pathway connecting BH7 to various amenities is very long as compared to other hostel. The amenities are again located very distant to the residential block. Overall the average of all the walk scores

came out to be 98.33. This score is considered to be present in a highly walkable location. The proximity of the residential blocks in LPU to various amenities gives such a score.

CONCLUSION

Walkability by far has been the most favourable mode of commute since time immemorial. With the current rate of urbanisation, the mixed used development is seen with tremendous levels of interest. Dense land use areas are vibrant economic areas, and with a pedestrian friendly design the locality changes itself into a dense hub of economic activity. These can be achieved only if the locality has all the basic land uses in walkable distances. This research paper proves that the intersection of walkable neighbourhood and dense uses of land has better quality of life and reduces the need of vehicle dependant mode of commute.

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