Walkability Measurement of Vadodara city

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Abstract
Walkability is a well-known count of how conducive an area is to walking to and from chosen destinations. Calculation of a walk score is widely used in accessibility studies to determine the ease or difficulty of travel by foot between one point and another. In recent years there has been a renewed emphasis toward improving pedestrian facilities and operational characteristics to help reduce, congestion, improve safety and improve to populous' general quality of life. Walkability provides a foundation for a sustainable city. Walkability increase the physical activity and show that health is improving of people due to physical activity. Neighborhood walkability has been associated with physical activity in several studies. However, as environmental correlates of physical activity may be context specific, walkability parameters need to be investigated separately in various countries and contexts. Furthermore, the mechanisms by which walkability affects physical activity have been less investigated.

I. Introduction

In recent years there has been a renewed emphasis toward improving pedestrian facilities and operational characteristics to help reduce, congestion, improve safety and improve to populous' general quality of life .With regard to this quality of life,found that, given a safeand comfortable walking environment, people have a sense of belonging that has a significant effect on the overall satisfaction of the urban populous. In contrast to the more global perspective of walkability, engineers have usedtraditional measurement techniques in an attempt to establish some quantitative assessment of what might constitute a pedestrian-friendly walking environment in terms of pedestrian comfort and measures of congestion. In the Highway Capacity Manual (2010), this is primarily done with of the urban populous. There has also been progress toward measuring the quality-of-life benefits of pedestrian facilities and what can be generally termed as walkability. To explain walking propensity or frequency, empirical studies have generally used two sets of explanatory variables, namely, socio-demographic variables and built environment variables. They have generally shown that both socio-demographic characteristics and built environment characteristics are associated with walking propensity.

An important construct among the physical environmental correlates is neighborhood "walkability". Neighborhoods considered walkable are characterized by mixed land use, well-connected streets and high residential density. These elements are synergistic and can be objectively determined using Geographic Information Systems (GIS) software. The research intothe relationship between neighborhood walkability and physical activity has only recently been extended to young people and the current empirical evidence is not consistent. The review of Ding et al established that in only 20% of the studies that investigated the association between objectively determined neighborhood walkability and objectively determined physical activity among adolescents, a positive association was found. Ding et al. stated that when investigating the association between neighborhood environment and youth physical activity, conclusions based on objectively measured environmental attributes seem more credible because of the lower measurement error associated with objective measures. Further more, it was stated that self reported physical activity that captures specific domains of activity allow for tests of association between conceptually matched environmental and physical activity variables

II. Methodology

2.1 Aims
❖ This study's aims is to design sustainable transport in terms of non-motor vehicle for a city that promises a better world for future generations.
❖ It provides strategies to change the choice of transport modes to road users of motor vehicles to non-motor vehicles through integration of land use by improving pedestrian path and to increase non-motorized travel and reduce motor vehicles travel.
❖ The use of non-motorized transportation such as cycling and walking is not only to reduce carbon but also healthy lifestyle and a physical activity.

2.2 Objectives
(1) To develop the parameters for walkability.
(2) To set priorities of all the identified parameters of walkability.

(3) To Develop Methodology to assess sidewalk facilities considering the type and effect of different obstructions on Indian roads.

(4) To develop a methodology for evaluating walking facilities for a road where pedestrians walk on a carriage way even in the presence of sidewalks.

My study area is the Vadodara city. Vadodara is the big city & it is divided in to 12 Administrative wards. The area of the Vadodara city is 159.95 sq.kms (Approx) & Population of the Vadodara city is 1.5 million (Approx).

2.3 Methodology

- Identify the parameters of walkability
- Divide the vadodara city in 12 ward as per V.M.C. and select the location in each ward.
- Select the different land use like Residential, Industrial, Commercial, Residential, and Recreational.
- Set weights for parameters by using A.H.P(Analytical Hierarchy Process) method after taking expert opinions of 10 to 15 persons.
- To carry out respondent survey with questionnaire in all identified location in vadodara city.
- Compare the walkability in different areas of the city.

Table-1 Ward detail

ADMINISTRATIVE WARD NO.	ADDRESS	Location	Population above 18Cencus (2011)	Area In SQ KM	Density
1	Laheripura, Near Nyay Mandir,	Kuber Bhavan	75990	4.43	17153.50
2	Nr. Sawad Community Hall, Harni-Warasia Road, Near Shweta Park Char Rasta,	Sangam Char Rasta	124719	16.68	7477.16
3	B/h. Prarambh Complex, Nr. Mahesh Complex,Waghodia Road	Vrundawan Circle	124989	15.49	8069.01
4	Sindhwai Mata Road, PratapNagar,	Cinemarc	132464	28.67	4620.30
5	Tambe no Waado, Raopura Municipal School Building, Sanshtha Vasahat Road, Raopura, Vadodara	Sursagar lake	63618	6.78	9383.19
6	Near Sahajanand Apartment, Off Old Padra Road, Akota, Vadodara	O.P road	126497	10.65	11877.65
7	Old Octroi Bldg., Fatehgunj,	7 seas mall	138118	18.66	7401.82
8	Nr. Loksatta Press, Opp. Bhathiji Mandir, Bahucharaji Road, Nagarwada, Tin Rasta,	Nagarwada four Road	137764	22.12	6228.03
9	Near Post Office, Navjivan, Ajwa Road,	Earth Icon	68216	5.34	12774.53
10	Near VMC Atithi Gruh, High Tension Line Road, ShubhanPura, Vadodara	Natu bhai circle	136191	13.68	9955.48
11	Opp. New Sindhi Market, Isckon-Vasna Road,	Vasna bhayali road	73779	6.84	10786.40
12	G.I.D.C. Industrial Estate, Makarpura, Vadodara	G.I.D.C Makarpura	67553	9.3	7263.76
			1269898	158.64	8004.90

III.RESULT

- **This table shows the Final Score's of the ward 1 to 12. Rank shows the lower level to higher level**
- **Ward 7 has a lowest walkability and Ward 2 has a highest Walkability**

Table-2 Rank of Ward

Ward Number	Rank
Ward 7	3086.94
Ward 12	3236.34
Ward 1	3292.1
Ward 3	3299.77
Ward 11	3313.07
Ward 10	3319.04
Ward 6	3364.58
Ward 9	3393.13
Ward 4	3398.24
Ward 8	3406.04
Ward 5	3456.65
Ward 2	3457.36

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