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Evaluation of Senior Pedestrian's Travel Experience at Ekamara Kshetra Bhubaneswar

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Abstract

The Ekamara Kshetra Bhubaneswar is one of the prime temple/heritage sites of the eastern part of India. Millions of visitor throng to this site every year. This study aims to evaluate the travel experience of senior age pedestrians at this religious site. A stratified random sample of 120 senior respondents were selected and interviewed through a structured questionnaire in October 2017. Respondents were asked to rate the selected indicators of the built environment by using a five point Likert scale (from very satisfied to very dissatisfied). The descriptive analysis method was used to get the pattern from the respondent's experience. Principal component analysis was used to formulate common factors/components. The cluster analysis model was also used to understand the pedestrian's experiences. Result discourses that most of the indicators received average or poor ratings. Also, most of the respondents of this site have negative followed by mixed and positive walking experiences based on the selected indicators. However, the pedestrian experience of the local respondents is more positive than the visitors. The results of this study can be used in the planning by development authorities to provide an efficient walking environment at this site.

1. Introduction

Walkability is considered as one of the most economical and environment friendly mode of transportation. Several studies show the impact of the built environment on the travel behavior of the pedestrians (Adkins, Dill, Luhr, & Neal, 2012; Bagley & Mokhtarian, 2002; Baran, Rodríguez, & Khattak, 2008; Cervero & Kockelman, 1997b, 1997a; Crane & Crepeau, 1998; Ewing & Cervero, 2001, 2010; Feng, 2017; Feng, Dijst, Wissink, & Prillwitz, 2013; Gim, 2012; Handy, Boarnet, Ewing, & Killingsworth, 2002; Kockelman, 1997; Ma & Dill, 2015;

Melian, Prats, &Coromina, n.d.; Rankavat & Tiwari, 2016; Stead, 2001; Susan L. Handy, 1996; Tracy, Su, Sadek, & Wang, 2011; D. Wang & Zhou, 2017; Yang, Fan, Deng, & Cheng, 2017). As most of these studies are conducted in the developed countries so their relevance are not always applicable in the context of developing countries (Yang et al., 2017). Understanding of travel experience of the pedestrians will improve the planners and policymakers in creating inclusive planning policies (Papadimitriou, Theofilatos, & Yannis, 2013; Yannis, Yannis, Kanellaidis, Dimitropoulos, & Muhlrad, 2007). Religious sites are one of the most visited places in India (Shalini, 2001). Pilgrims of different age, sex, income groups and physical condition throng to these sites from different parts of India. But limited research has been done to understand the travel experience of pedestrians at the religious/heritage sites. This paper aims to evaluate travel experience of pedestrians in the heritage/religious site of Bhubaneswar in the context of site relevant indicators. The Ekamara Kshetra, the old city of Bhubaneswar, has been selected for this study.

Safety from traffic is one of the prime concerns for the pedestrians (Mariela, 2005; Mehta, 2014; Southworth, 2005; Talavera-Garcia & Soria-Lara, 2015). 0.15 million people die each year due to road accidents and pedestrians count 10% of these casualties (Ambesh, 2016). Presence of street lighting reduces crime in public spaces and improves the walking experience of the pedestrians (Painter, 1996). Active street edges (wall openings) make the pedestrians feel safe and increase pedestrian's activities at the site (Jacobs, 1993). The pedestrians prefer to walk on the street due to lack of segregated and well maintained pathways. Encroachment of the sidewalks by the street vendors and inappropriate positioning of signboards and electric poles are the common issues across all the Indian cities. The uneven surface of sidewalks and uncovered manholes makes a serious threat to the aged and visually impaired travellers. The barrier-free environment encourages pedestrian activities of the senior age peoples (Lavery, Davey, Woodside, & Ewart, 1996; Manley, 1996). Also, the presence of vegetation and street furniture such as chairs, toilet blocks, signboards, drinking water facilities, street lamps, etc. are essential for the pedestrian (Manley, 1996; Southworth, 2005). Shaded spaces are desirable for the pedestrians for all weather sidewalks.

Accessible sidewalks are essential for diverse pedestrian groups (Moura, Cambra, & Gonç Alves, 2016). Inclusive design elements encourage pedestrians of different age, sex and abilities. The purpose of the trip and the distance to travel are the two most essential factors which decide the pedestrian activities of the travellers (Ewing & Cervero, 2010). Accessibility of toilet is the basic need of every individual. Open urination in public spaces is one of the most common problems across all Indian cities. Lack of public toilets on the road affects the health of travelers and the hygiene of the environment (Ambesh, 2016).

Quality of air affects human health and defines his/her outdoor activity duration (Abelsohn & Stieb, 2011). Air quality in big cities of India is becoming unhealthy and affecting mental and physical health conditions of the citizens (Bhanarkar et al., 2018). Air pollution is a big obstacle for the senior pedestrian group.

Cleanliness and hygiene are considered as deeply associated with spirituality. Uncleaned and unhygienic environment causes possible threat of epidemic at mass gathering at religious sites. Religious public sites remain active throughout the day and attract millions of pilgrims every year, so cleanliness is a major indicator of the built environment.

Pilgrims/tourist of different age, gender, and income group visit this religious site, so different modes of connectivity of this religious/tourist site with other parts of the city are essential. Connectivity with the major transit/ arrival points of the city such as airport, railway station and bus stand makes a tourist/religious site accessible for the travelers.

2. Methodology

2.1. Site profile

The Ekamara Kshetra Bhubaneswar is located in the eastern part of India. This site is the cultural and social centre of Bhubaneswar city. Being a heritage precinct, this site is presently abode to a total number of 199 historic structures are located at this heritage site with 23 are centrally protected monuments, and 11 are state protected monuments (UNESCO, 2014). Lingaraj temple is the most important religious shrine of this site (abode of Lord Shiva). Ekamara Kshetra shall be considered as a Heritage site as per the criteria for selection of heritage precinct set by CPWD (*Handbook of Conservation of Heritage Buildings*, 2013).Close proximities of Bhubaneswar with the other religious and tourist site as Puri and Konark form the "Golden Triangle", of the coastal Odisha. This Golden Triangle site counts nearly half of the total tourist influx of Odisha (Government of Odisha, 2015). Recently, a number of attempts were made by the Government of Odisha to make this site as a world heritage site in accordance with the UNESCO heritage site(UNESCO, 2014).

Land use map of Ekamara Kshetra with the significant temples and structures is shown in Figure-1. Lingaraj temple (number-1), the most important religious shrine of this site is located adjacent to the car (number-12) and two wheeler (number-13) parking spaces. Rath marg (Path-1) is the most active and developed route of this site. This route connects the Lingaraj temple with the Tinimundia and Mausimaa temple. This road is surrounded by mostly residential and few mixed use buildings. Bindusagar Marg (Path-2) connects the Lingaraj temple with the Kedar Gouri temple (ASI monument). This route is surrounded by the Bindusagar pond and Anant basudev temple. All these mentioned temples along with the other structures are the most significant structures of this site. Average widths of the major streets of this site (path-1 and path-2) are six meters without any median and no segregated sidewalks. The area shown within the red dotted lines on the map is the selected area for this study.

2.2. Sample

Interviews and field survey are the most used tools to measure the walkability or walking experience of the selected group pedestrians (Hahm, Yoon, Jung, & Kwon, 2017; Mehta, 2008; Moura et al., 2016; Papadimitriou, Lassarre, & Yannis, 2017; Papadimitriou, Yannis, & Golias, 2009; J. Wang & Cao, 2017). A survey was done in the month of October ("Kartik month"- considered as the holiest month according to the Hindu calendar). This survey was done in both working days and weekends. Random sampling was done where a total number of 120 senior respondents (above 55 years) were selected and asked about their walking experiences on this site. Equal numbers of respondents were selected on the basis of their gender (60 each) and origin (local, other parts of Odisha and other parts of India). This questionnaire is classified into two parts such as the demographic part and an indicator part. The demographic part contains questions regarding the socioeconomic conditions of the respondents. 12 indicators were selected from the literature review and were asked to the users to understand their walking experience on this site. A five point Likert scale (from very satisfied to very dissatisfied) was used. This survey was done at the arrival point (parking areas) and at the Main Temple Junction. Appendix - 1 shows the questionnaire used for this study. Descriptive analysis was used to understand the current trend of walking behaviour among the respondents. The principal component analysis is a data reduction method. This method was used to form the component using the data received from the respondents. The cluster analysis method was also used to understand the relationship between the components and overall travel experience.
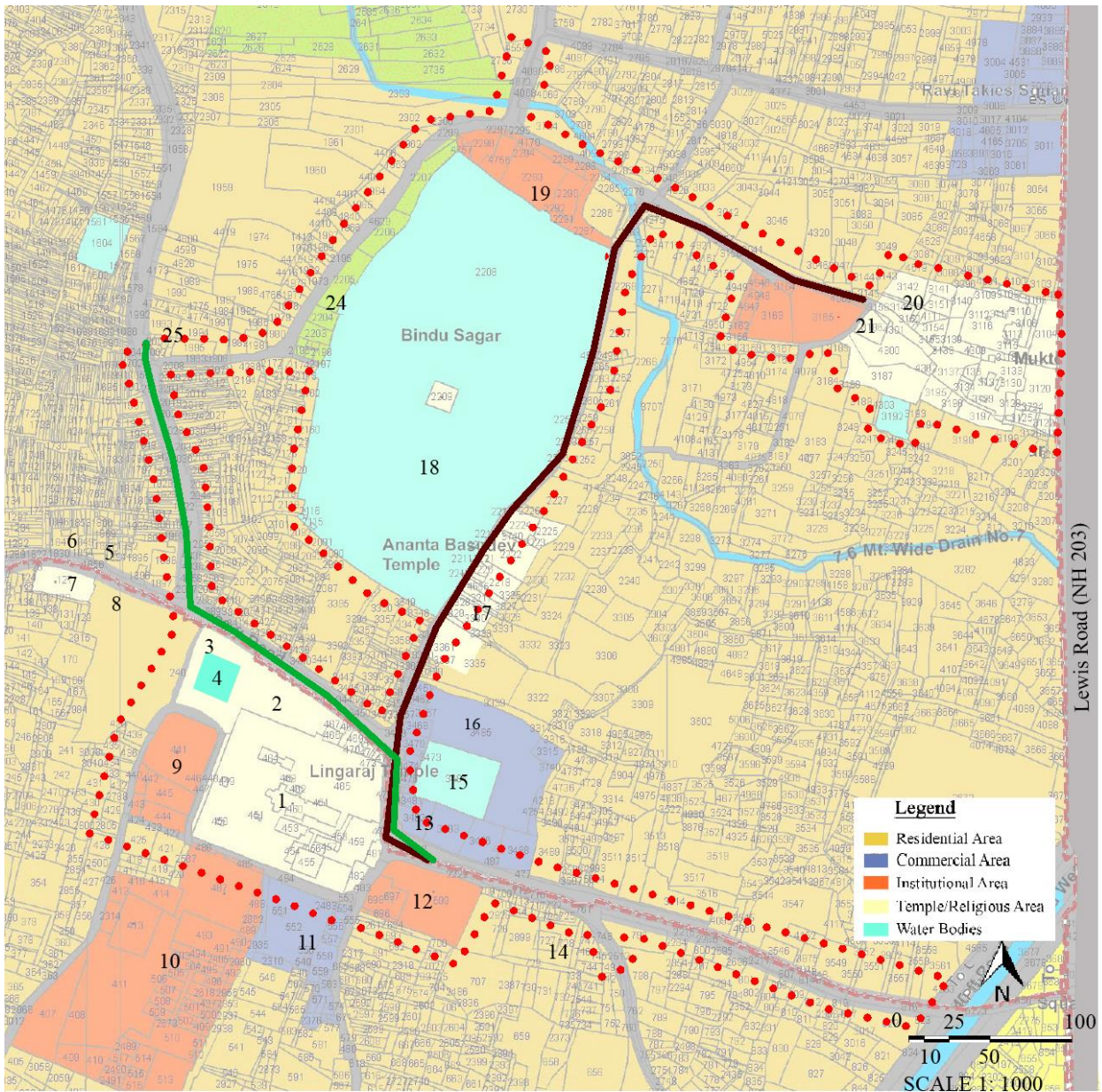
2.3. Respondent's Profile

As mentioned before, a total number of 120 senior respondents above the age 55 were selected with equal representation on the basis of their gender and origin (local, other parts of Odisha, other parts of India) are selected for this study. This equal representative was mentioned to avoid biases towards any particular group of respondents. The collected data were simplified and coded. Details of the respondent are given in table 1.A large number of respondents (53%) was walking for the pilgrimage purposes. The essential travel purpose includes travelling to

workplaces, commercial places, hospitals, etc. Most of the respondents (28%) travel more than 5 KM, and only 22% have walked 1-2 KM. Site observation reveals that most of the visitor pilgrims walk less than 2KM. An adjacent positing of the parking place and the main temple can be considered as the main cause of this. Most of the respondents of this group (50%) do not have any source of income whereas only 3% of the respondents earn more than 50000 Indian rupees (1$ = 69 Indian rupees, October 2017). Also, 5% of the respondents earn more than 25000 INR per month. This shows the diversity of economic condition of the respondents.

Table 1: Respondent's profile

Gander	Percentage
Male	50.00%
Female	50.00%
Origin	
Local (from this city)	33.37%
From other parts of Odisha	33.37%
Other States	33.37%
Income Group	
Up to 5000	13%
5000-10000	16%
10000-25000	13%
25000-50000	5%
50000+	3%
Not Applicable (No source of income)	50%
Purpose of Visit	
Pilgrimage	53%
Essential	47%
Distance Travelled	
Less than 1km	22%
1-2 km	25%
3-5 km	25%
5+ Km	28%

Figure 1: Land use map of the Ekamara Kshetra Bhubaneswar (area within red dot marks is the selected site for this study)

Legend

1 Lingaraj Temple	7 Yameshwar Temple	13 Car Parking Space
2 Chitakarini Temple	8 Library	14 Dakara Bivisaneswara Temple
3 Papanasini Temple	9 BMC Hospital	15 Debi Padahara Pond
4 Papanasini Pond	10 BM High School	16 Bus Parking
5 Bharati Matha	11 Vegetable Market	17 Ananta Basudev Temple
6 Bakresvara Temple	12 Old Town Police Station/ Parking Space	

Path 1

Path 2

18 Bindu Sagara Pond
19 Uttarayani Temple
20 Mukteswara Temple
21 Kedara Gouri Temple

3. Results and Discussion

3.1. Descriptive Statics

Descriptive analysis of the received data shows the current trends/ patterns of the site. Respondents rate most of the indicators as average or poor. Very few indicators were reviewed as satisfactory. Table 2 shows details of the descriptive values of the selected indicators according to the pedestrian's experiences.

Table 2: Descriptive pattern of the respondent's reviews

Indicators	Very satisfied	Satisfied	Neutral	Dissatisfied	Very dissatisfied	Mean	Standard Deviation
Ease of movement	3%	7%	28%	48%	15%	2.342	0.899
Traffic management	2%	4%	27%	49%	18%	2.217	0.848
Sidewalk quality	1%	3%	16%	44%	36%	1.892	0.845
Safety from traffic	3%	13%	38%	34%	13%	2.567	0.955
Toilet facility	3%	8%	25%	36%	28%	2.242	1.049
Air quality	5%	15%	40%	28%	13%	2.725	1.024
Cleanliness	1%	6%	30%	43%	20%	2.242	0.866
Street lighting	3%	11%	23%	37%	27%	2.258	1.045
Seating space	6%	14%	24%	41%	15%	2.550	1.087
Segregation between mortised and non-motorized movement	2%	9%	28%	40%	22%	2.292	0.961
Drinking water facility	3%	10%	36%	36%	16%	2.475	0.957
Connectivity of this site	6%	18%	31%	30%	16%	2.675	1.112

Details of the current trends are as follows:

- Site observation revealed that, absence of the proper sidewalk is a major challenge for the travellers as it causes pedestrian to walk on the street along with the vehicles. A few respondents (3%) feel very satisfied with the existing sidewalks, whereas most of the respondents (44%) feel dissatisfied. This existing quality of the sidewalk causes displeasure among the respondents. The mean value and standard deviation of the existing quality of sidewalk are 1.892 and .845 respectively. Respondents rate this indicators least value (mean value 1.892) among all the selected indicators.

- Lack of segregation between motorized and non-motorized movement is another big concern for the pedestrians. A large number of respondents (40%) are dissatisfied with the existing pattern of traffic movement. The absence of the sidewalk can be considered as the cause for this condition.

- Being a religious public place, this site attracts a large number of pilgrims throughout the year. Current public convenience facilities are insufficient to cater the requirements of the pilgrims. Few toilet blocks (2 numbers) were located near the parking areas of Lingaraj Temple, yet are mostly absent at other important structures. This uneven distribution of toilet facility is causing discomfort for the pedestrians. Female pedestrians are most affected due to this uneven positioning of toilet blocks at this site. Toilet blocks are located only near the main temple. A large number of respondents, 36% and 28%, feel the current condition of toilet facilities at this site are dissatisfied and very strongly dissatisfied respectively. Only 8% of respondents are satisfied with the current toilet condition.

- Like the toilet facilities, the uneven location of drinking water facility makes walking at this site difficult for the pedestrians. 36% of the respondents feel dissatisfied with the current drinking water facility, whereas equal number of respondents (36%) feel this as moderate. A small number of respondents (10%) feel satisfied with the existing drinking water facility.

- Efficient traffic management system is essential for the tourist sites. Most of the pedestrian rate the existing traffic management as below satisfactory for this site. For the visitor respondents, this site possesses comparatively less traffic in comparison to the main city of Bhubaneswar. However, lack of efficient traffic management system cause discomfort for the pedestrians during the busy hours (10-11 AM and 5-6 PM).

- The safety from the traffic is one of the major criteria which affect the travellers' choice to walk or not. Busy hours such as 10-11AM and 5-6PM are the difficult hours of walking at the Junction-1 and 2 as expressed by the pedestrians. Most of the respondents (38%) feel this site provides a safe environment for the pedestrians.

- Cleanliness is another important factor which affects thepedestrian's travel experience. Most of the respondents (43%) are dissatisfied with the cleanliness of this site. Defecation of street animals (cows/oxen) makes the street dirty and unhygienic for the pedestrians. Lack of efficient solid waste management causes an unpleasant walking environment for the pedestrians. Open defecation of animals on the street cause unhygienic environment for the pedestrians. Open drains on the Bindusagar marg also makes a difficult environment for pedestrians.

  • The air quality is pretty decent at this site. 40% of the respondents are satisfied with the air quality of this site. This indicator got the maximum mean value (2.725) among all the selected indicators. However, only 13% of the respondents are completely dissatisfied with the air quality of this site.

  • Ease of movement is essential for the senior age pedestrians. Haphazard parking, encroachment by vendors, lack of defined pedestrian pathways, and the presence of animals and absence of signage causes movement at this site difficult for the pedestrians. 28% of respondents feel the site provides an average environment for smooth movement, whereas a large number of respondents (48%) feel the easiness of movement very unsatisfactory for this site.

  • Good Street lighting (illumination) increases the sense of security among the pedestrians. However, 37% of the respondents feel the existing street lighting condition as poor. Only 14% of the respondents (3% + 11%) are satisfied with the existing street lighting condition. Site observation reviles the current street lighting, inefficient as most of the stretches (including main parking areas) of this site remains dark. This causes less pedestrian activities at these stretches of this site.

  • This site is located in the five kilometres distance radius from the Bhubaneswar railway centre, airport and bus stand. Also, close proximity to the NH-5 makes this site accessible for the visitors. However, inefficient public transportation system (public buses) increases dependency on private vehicles, shared taxies and auto rickshaws. According to this survey, 31% of the respondents feel the connectivity of this site is good, and 18% feel excellent. However, 30% of the respondents are dissatisfied with the connectivity of this site, and 16% of the respondents are completely dissatisfied. Visitors respondents (mostly lower income group) feel the connectivity of this site is inefficient.

  • Presence of street furniture such as seating spaces is essential for senior age travelers. Good seating facilities are provided at few stretches (Bindusagar marg); while no seating facilities are provided on the Rath marg. 14% of the respondents are satisfied with the current seating facility, whereas 41% of the respondents are dissatisfied.

3.2. Principal Component Analysis

The principal component analysis was used to classify variables into a similar type of groups. The standard ratio for a sample size to variables is 1:5, 1:10 or 1:20 (Hair, Black, Babin, & Anderson, 2010). We adopted a 1:10 ratio for this study. The Kaiser-Meyer-Olkin (KMO), used to measure sampling adequacy, value above 0.8 is considered as good (Hair et al., 2010). The minimum eigenvalues for the selection of components is 1.0.

As mentioned before, 12 variables were used for this study. The KMO value of .808 and Bartlett's test value .000 shows that this study is suitable for PCA. Three components show the variance of 62.64%. The eigenvalues of all the three components are above 1. As, first two components count 53.843% variance so for this study we selected two components. The minimum communalities value of this study is 0.5. Table-3 shows the details of the two components or dimensions and their properties. The minimum loading value is 0.40. Details of components are as follows:

Component 1- This component is comprised of elements related to the surrounding environment of the pedestrians such as: air quality, street lighting, drinking water facilities, toilet facility and cleanliness and street furniture (seating spaces). The Cronbach alpha value of reliability of this component is 0.826, which is considered as a good value (Hair et al., 2010).

Component 2- This component is comprised of elements related to accessibility of the pedestrians related to walking. These elements are as such: quality of sidewalk, ease of movement, traffic management, safety from traffic and site connective and safety from traffic. The Cronbach alpha value of this component is 0.790, which is considered as acceptable (Hair et al., 2010).

Table 3: Factor values of indicators

Component	Factor loading	Eigen value	Explained variance (%)	Cumulative Variance (%)	Reliability Alpha (%)
Component -1					
Drinking Water Facilities	.788	4.997	41.645	41.645	.826
Air Quality	.769				
Toilet Facility	.737				
Street Lighting	.711				
Cleanliness	.626				
Seating Space	.489				
Component-2					
Quality of Sidewalk	.744	1.464	12.198	53.843	.790
Ease of Movement	.735				
Site Connectivity	.717				
Traffic Management	.671				
Safety from Traffic	.606				
Segregation between mortised and non-motorized movement	.455				

Extraction Method: principal Component Analysis

Rotation Method: Varimax with Kaiser

Normalization, a Rotation converged in 3 iteration

3.3. Cluster Analysis

Cluster analysis method is a similar analysis method as PCA, but here in this method, cases (individuals) rather than variables are formed as group cases (Hair et al., 2010). Cluster analysis is one of the most used statistical tools to segregate data into meaningful groups (Tan, Steinbach, & Kumar, 2005). There are three types of clustering methods; Hierarchical, Two Step and K-means clustering. K-means method has used to form clusters among the respondents for this study. K-means cluster algorithm forms close-fitting clusters. Also, K-means cluster requires pre-defined cluster numbers. As the total number of respondents is more than hundred, so this cluster method is applicable for this study. Agglomeration Schedule shows the relationship between the cluster stages and their individual coefficient values. Elbow method is used to determine the number of relevant clusters (Kodinariya & Makwana, 2013). Table 4 shows the agglomeration schedule of the clusters formed by Hierarchical cluster method. Significant difference has been observed at stage 117, from 3.359 to 5.130, (table-4). Hierarchical cluster method conforms three clusters through the Elbow method (figure -2) for this study.

Component scores calculated from PCA were used for clustering. Component scores are converted into a standardized format (Z-scores) for better result (Kodinariya & Makwana, 2013).The respondent's distribution of the three clusters are as follows: 25% in cluster 1, 46% in cluster 2 and 29% in cluster 3. Table-4 shows the initial and final cluster centres, which are the Euclidean distances between the centers of the clusters. Significant distance between the cluster centers indicates distinctions with in the algorithm. The ANOVA test (table-5) validates the significance of these clusters (p =.000). Figure -3 shows the attributes of the three clusters. Detailed descriptions of three clusters are as follows:

Cluster 1: This group has higher positive values for components 1 and 2 (figure -3). This results indicate that respondents of this group are satisfied with the different variables (positive values (Papadimitriou et al., 2017, 2013), table-5) of the two components. So, characteristics analysis of this group shows the positive response of the respondents. This cluster counts of 30 respondents, which is least among all the clusters. Most of the respondents of cluster 1, are male (77%) and belong to the other parts of Odisha. Most of the respondents of this group have walked less than 1 km mostly for religious walking purposes.

Cluster 2: This group has negative values for components 1 and 2. This results indicate that respondents of this cluster are least dissatisfied with the different variables (negative values (Papadimitriou et al., 2017, 2013), table-5) of the two components. So, characteristics analysis of this group shows the negative response of the respondents. This cluster counts maximum number of the respondents (46%). Most of the respondents of this cluster are female (71%) and belong to the other states of India. Pilgrimage counts 67% respondent of this cluster. Also, travel distance of 1-2 KM counts 55% of the total respondents of this cluster.

Cluster 3: This group has negative value of component 1 and positive value of component 2. This shows respondents of this group have mixed travel experience at this religious site. So, characteristics analysis of this group shows the average response of the respondents. This cluster counts 29% of the respondents. Most of the respondents of this cluster are male (60%) and are local residents (54%) of this site. Pilgrimage purpose of travelling counts 60% respondent of this cluster. Least number of respondents of this cluster has walked more than 5 KM.

Most of the respondents of cluster 1(positive walking experience) are male (77%) whereas female travelers count 71% of the total respondents of cluster -2 (negative walking experience). Local respondents, mostly male (60% of cluster -3) has mixed (average) walking experience. Familiarities with the site context can be considered as the possible reason for this difference in walking experience among the pedestrian groups.

Walking experience

K means cluster analysis established a relationship between the walking distance and the positive travel experience of the respondents. Most of the respondents (40%) who have walked less than 1 KM (mostly visitors with religious walking purpose) have positive walking experiences. Close proximities between the parking places and destination enables less walking distance and cause positive walking experience. This satisfied group (cluster-1) counts only 23% of the total respondents from other states of India. Also, only 20% of the respondents of the cluster 1 (positive experience) have walked more than 5KM. Most of the respondents (47%) from other states of India have negative walking experience at this site and had walked more than 5 KM (36%). This study shows that pilgrims (religious walking purposes) have positive walking experiences in all the three clusters. Also, most of respondents, who have walked more than 2 KM, from other states of India have negative walking experience. Respondents of higher income groups have more positive walking experience as 19% of the respondents of cluster 1 earn more than 25000 per month. Also, 38% of the respondents of cluster 2 earn less than 10000 per month. Henceforth, income variable shows direct relationship with the walking experience of the pedestrians. Table - 6 shows the different travel experience of the respondents.

Ease of movement, air quality and safety from traffic provides positive walking experiences to the respondents. Amenities such as availability seating space, existing street lighting condition, cleanliness, sidewalk condition, toilet and drinking water facility provide negative walking experience to the respondents. Table -7 shows the different travel experience according to the selected variables.

Table 4: Agglomeration Schedule

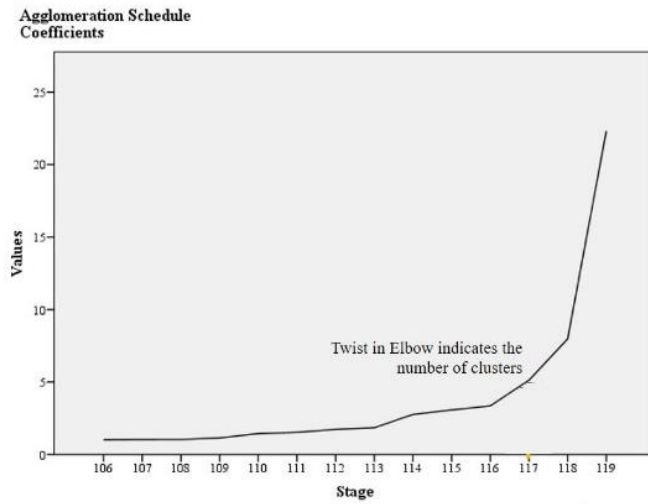| Stage	Cluster Combined		Coefficients
	Cluster 1	Cluster 2	
1	77	82	.000
2	36	39	.002
3	94	99	.002
4	11	15	.003
5	33	41	.003
.	.	.	.
.	.	.	.
.	.	.	.
	.	.	.
111	65	80	1.525
112	1	66	1.740
113	2	8	1.845
114	12	65	2.765
115	69	71	3.074
116	1	2	3.359
117	1	12	5.130
118	1	69	7.977
119	1	72	22.315

Figure 2: Elbow Criterion for k-means clustering
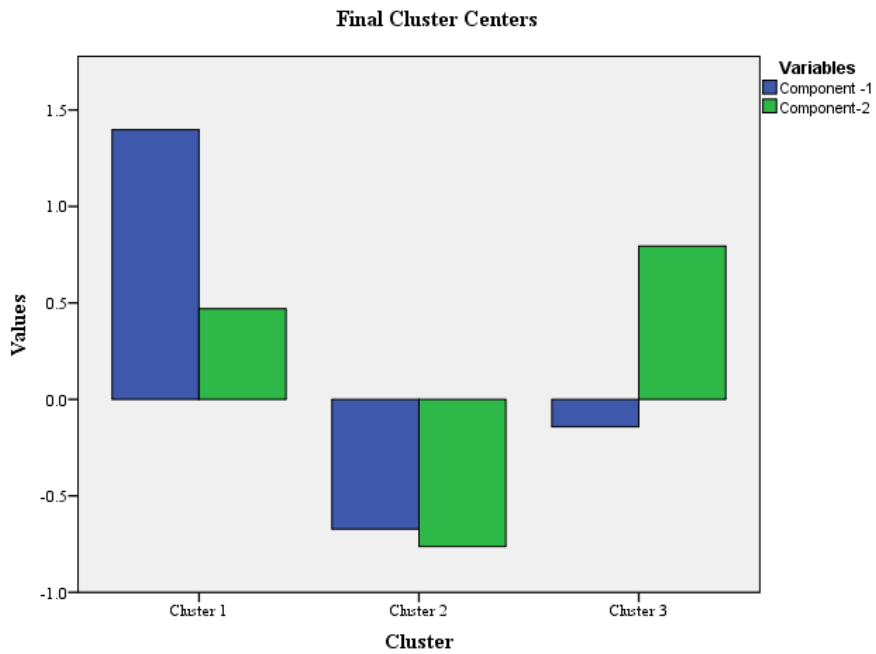
Figure 3: Cluster profiles

Table5: Initial and final cluster centres

Components	Initial			Final		
	Cluster 1	Cluster 2	Cluster 3	Cluster 1	Cluster 2	Cluster 3
Z score: Factor 1	3.267	-1.482	-.780	1.398	-.672	-.141
Z score: Factor 2	3.078	-1.784	2.245	.470	-.762	.795

Table 6: ANOVA test

Components	Cluster		Error			
	Mean Square	df	Mean Square	df	F	Sig.
Z score: Factor 1	42.057	2	.298	117	141.045	.000
Z score: Factor 2	30.348	2	.498	117	60.900	.000

Table 6: Details of the respondents according to the clusters

Respondents' Category (Percentage)	Cluster -1 Positive experience (30 respondents)	Cluster -2 Negative experience (55 respondents)	Cluster -3 Mixed experience (35 respondents)
Gender			
• Male	77	29	60
• Female	23	71	40
Origin			
• Local (from this city)	37	18	54
• From other parts of Odisha	40	35	26
• Other States	23	47	20
Economic Group			
• Up to 5000	3	20	9
• 5000 – 10000	7	18	20
• 10000 – 25000	30	2	17
• 25000 - 50000	12	0	6
• More than 50000	7	2	3
• Not applicable	40	58	46
Purpose of Visit			
• Pilgrimage	60	56	60
• Essential	40	44	40
Distance Travelled			
• Less than 1km	40	11	26
• 1-2 km	27	24	26
• 3-5 km	13	29	29
• 5+ Km	20	36	20

Table 7: Details of the variables according to the clusters

Variables (Percentage)	Level of Satisfaction	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very dissatisfied
Ease of movement	Cluster -1	7	10	23	53	7
	Cluster -2	5	13	38	43	2
	Cluster -3	3	14	40	43	0
Traffic management	Cluster -1	7	13	20	53	7
	Cluster -2	0	0	7	56	36
	Cluster -3	0	3	63	34	0
Sidewalk quality	Cluster -1	0	3	20	47	30
	Cluster -2	0	0	4	40	56
	Cluster -3	3	9	31	49	9
Safety from traffic	Cluster -1	7	23	50	20	0
	Cluster -2	0	0	22	49	29
	Cluster -3	3	23	51	23	0
Toilet facility	Cluster -1	7	33	57	3	0
	Cluster -2	4	0	16	42	38
	Cluster -3	0	0	11	54	34
Air quality	Cluster -1	20	47	30	3	0
	Cluster -2	0	2	40	38	20
	Cluster -3	0	9	49	31	11
Cleanliness	Cluster -1	3	17	63	13	3
	Cluster -2	0	0	9	53	38
	Cluster -3	0	6	34	54	6
Street lighting	Cluster -1	10	33	37	20	0
	Cluster -2	0	0	7	45	47
	Cluster -3	0	9	37	37	17
Seating space	Cluster -1	20	30	20	23	7
	Cluster -2	0	0	25	47	27
	Cluster -3	3	23	26	46	3
Segregation between mortised and non-motorized movement	Cluster -1	7	23	27	30	13
	Cluster -2	0	0	15	51	35
	Cluster -3	0	11	49	31	9

Drinking water facility	Cluster -1	10	40	43	7	0
	Cluster -2	0	0	22	45	33
	Cluster -3	0	0	51	46	3
Connectivity of this site	Cluster -1	17	40	20	17	7
	Cluster -2	0	0	22	45	31
	Cluster -3	6	23	54	17	0

4. Conclusion

This study discusses the existing condition of public spaces of the heritage site of Ekamara Kshetra. Descriptive analysis of the data shows different issues faced by the aged respondent at this religious site. The descriptive analysis shows the diversity of responses though maximum respondents rate the selected indicators as average or poor.

This study shows the impact of selected indicators (relevant to site context) on the pedestrian's walking experience. PCA shows the grouping of variables (indicators) and their impact on the respondents. Air quality, segregation between motorized and non-motorized movement and ease of movement carries maximum loading values. However, safety from traffic and site connectivity carries least loading values. The cluster analysis forms three cluster groups. These distinct clusters are identified as positive, negative and mixed experiences on the basis of their ratings. The cluster analysis reveals that most of the respondents have negative walking experience followed by mixed and positive respectively. The results of this study discourse the existing scenario of travel behavior group of pedestrians at this heritage/religious site. Religious and tourism importance of this site demands up gradation in the existing condition of physical infrastructure. Outcome of this study can be be used by the planning authorities to provide the efficient walking environment.

This study has a number of limitations. Survey sample size is small and specific. A large sample and all age target user and number of indicators can be considered for a better understanding of the travel behaviour of pedestrians. This survey was done in the month of October. In future studies, other survey time/month (other than October) can consider for a holistic understanding of pedestrian's behaviour. A small set of indicators were selected for this study. For future studies, other relevant indicators can also be considered.

Note: This study is a part of the author's ongoing PhD dissertation. All the data presented in this paper are primary data collected from the site.

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Appendix -1

Questionnaire for survey

A. **Demographic Information**

1. Name:
2. Sex: Male, Female
3. Native: Local, From other parts of Odisha, Other States of India
4. Purpose of Travel: Essential, Pilgrimage
5. Distance Travelled: 0-1 KM, 1-3 KM, 3-5 KM, 5+ KM
6. Rate your travel your experience: 1, 2, 3, 4, 5

B. **Travel Experience Information**

7. Rate the following questions on the basis of your experience

Indicators	Very satisfied	Satisfied	Neutral	Dissatisfied	Very dissatisfied
• Ease of Movement					
• Traffic Management					
• Sidewalk quality					
• Safety from traffic					
• Toilet facility					
• Air quality					
• Cleanliness					
• Street lighting					
• Seating space facility					
• Segregation between mortised and non-motorized movement					
• Drinking water facility					
• Connectivity of this site					