International Journal for Traffic and Transport Engineering, 2018, 8(4): 513 - 527
DOI: http://dx.doi.org/10.7708/ijtte.2018.8(4).09
UDC: 629.326(549.1)
629.34(549.1)

COMPARATIVE ASSESSMENT OF ATTITUDINAL DIMENSIONS OF WAGON AND MOTORCYCLE MODES IN LAHORE

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Received 5 June 2018; accepted 29 October 2018

Abstract: The quality of public transportation modes plays significant role in the mobility of people. Their competitiveness with private transport in terms of service quality and performance is very important in making modal shift. People often tend to own and use private vehicle when they have negative perceptions regarding public transportation. Therefore, this study aims to make comparative assessment of attitudinal dimensions of wagon as public transport mode and motorcycle as private mode considering the perceptions of the people with the help of a questionnaire survey. This survey was conducted in Lahore city at suitable locations and 320 samples were collected. Analysis of results revealed that people possess negative attitudes towards wagon service whereas their attitudes are strongly positive with most of the dimensions of motorcycle. Factor analyses resulted in three latent variables both for motorcycle and wagon mode. The common factors include instrumental and service dimensions whereas specific factors are user's friendly dimensions and cost and safety dimensions for motorcycle and wagon, respectively. Mode priority selection and wagon specific attitudes are significant factors in determining the people's preference to use wagon service under different scenarios. People's positive attitudes on motorcycle dimensions have significant relationship with people tendency to use wagon service. These findings demand valuable improvements in the service quality of wagon service considering the perceptions of the local citizens.

Keywords: public transport, para-transit, motorcycle, questionnaire survey, factor analysis, attitudes.

1. Introduction

The increase in urban population and corresponding travel volume demands of a better quality transportation system. This is required for the assurance of proper mobility of masses and economic activity within the urbanized areas. The efficiency of public transportation system plays important role in shaping the cities in sustainable manner. The mobility in developing cities is mainly dependent on private transport. The increased traffic due to increase in vehicle ownership and its usage tends to increase generalized travel cost. According to Wright and Fjellstrom (2003), the choices on public transport systems are choices about the sustainable future of the cities. Public transportation systems in developing countries usually comprise of

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mass transit modes (e.g. bus rapid transit, rail mass transit, etc.) and para-transit modes. Para-transit modes include minibus, wagon, Jeepneys, auto-rickshaw, taxi and other shared modes. The definition and physical and operational characteristics of paratransit modes may vary from country to country. Different para-transit modes offer different capacity (usually 4-20 passengers) and level of service. They can provide service to the users on narrow streets with high frequency (Okamura *et al.,* 2013). These modes are much popular among users and have huge potential as they play a significant role in the urban transportation sector in developing countries (Joewono and Kubota, 2007, Shimazaki and Rahman, 1996). They also serve as feeder modes to the mass transit modes and in many cities, they carry more than half of the public transportation demand (Shimazaki and Rahman, 1996).

Researchers believe that the choice of a transportation mode is influenced by many factors such as individual's socioeconomic demographics, lifestyles and attitudes, the type of journey, situational constraints, subjective norms and perceived service quality of different available transportation modes (Javid *et al.,* 2016; Mehbub, 2009; Farag and Lyons, 2010; Beirao and Cabral, 2007). According to Tangphaisankun et al. (2010), car users in Bangkok would prefer to continue driving as they feel dissatisfaction with comfort and convenience attributes of para-transit modes in combination with other transit modes. Studies present various service quality factors that play significant role in promoting the use of transit among public such as reliability, safety, comfort, customer service and accessibility, and transfer condition at connection points between different public transport modes (Borhan *et al.,* 2017; Hu *et al.,* 2015; Imaz *et al.,* 2015). A study in Calgary shows that people give more value to reliability and convenience over comfort (Habib *et al.,* 2011). Each transport mode possesses unique set of attributes and users of different modes perceive the service quality of different modes in different ways (Ibrahim, 2003). Similarly, the people intentions to use public transport are influenced negatively by their auto-oriented attitudes whereas transit oriented attitudes have positive influence on intentions (Javid, 2017).

According to Rahman *et al.* (2017), paratransit modes availability, vehicle speed, integration with other modes, fare collection system, vehicle travel time, travel cost and cleanliness of the vehicle comparing with other modes are imperative attributes of paratransit service quality. Punctuality and reliability and service features are found to be having significant influence on the paratransit service quality (SQ) (Rahman *et al.,* 2016). Passenger's satisfaction with paratransit modes is positively influenced with the improvement in symbolic and functional dimensions of service quality; however, any increase in cost and time attributes tends to decrease their satisfaction (Javid *et al.,* 2012). A study results reveal positive preference of users for using para-transit and possibility of shifting to this mode in the future if improvements are made in the service quality (Joewono and Kubota, 2007). Govender (2016) states that the service providers need to improve the mini-bus taxi considering the commuter's perceptions. In making improvements, it is needed to focus on specific aspects of reliability, spatial coverage of service, comfort, safety, and user's affordability.

The above mentioned studies provide the evidence of service quality attributes that play important role in mode choice behavior of people and their satisfaction and attitudes

towards various transit and private modes. Most of those studies considered car and public transport for evaluation. However, the attitudes of people are rarely considered and evaluated towards motorcycle in comparison to public transport modes. Motorcycle is a popular mode in many developed and developing countries as it offers unique service to the riders. Moreover, to make improvements in specific transit mode it is necessary to evaluate user's attitudes with its service quality attributes in comparison to other modes. In this study, wagon was selected as a paratransit mode in Lahore city for evaluation in comparison to motorcycle as a private mode. It was hypothesized that the people with same socioeconomic background prefer to use both wagon and motorcycle for commuting. In the same household of low-middle income families, some people drive to work whereas some people use public transport due to large family size. Such comparative analysis will also help in identifying the key attributes for making improvements in the service quality considering the perceptions of the people. In addition, local level case studies are very important as each city has unique socio-economic and infrastructure development characteristics. Therefore, the main objective of this study is to diagnose the attitudes of people towards wagon service and motorcycle in Lahore and identify the significant factors of wagon service quality that require improvements in the future. To achieve this objective a comprehensive questionnaire was designed and conducted at suitable locations in Lahore. The collected data was analyzed using structural equation modelling technique.

2. Study Area and Its Characteristics

Lahore was selected as case study city in this research. Lahore is the capital of Punjab province and second largest city of Pakistan. Lahore has population of almost 11 million with an area of 1792 sq.-km. This city has many educational and medical facilities and industrial zones. There is a high trend of migration from rural and suburban areas towards this city in order to get good education and medical facilities and employment opportunities. Almost 83% of the population is urban (JICA, 2012). Lahore city has experienced a lot of development of road infrastructure including flyovers, underpasses and ring roads in last two decades. There is also huge development of residential societies in the outskirt of the city in order to tackle with increased urban population. Such development has put an extra burden of traffic on urban roads as many people travel for education and jobs towards the city center. This increases the travel time and cost, and results in environmental degradation. The development of public transportation in last two decades did not get enough attention from the authorities and decision makers despite of huge demand. The only significant development is the construction and start of metro-bus (also named as bus rapid transit system (BRT)) service on one of the main artery of the city. Recently, the provincial government has started the construction of orange mass transit train and in near future its operation will start. However, still there is a big gap between travel demand and provision of efficient public transport facilities.

Local people use different modes for commuting and other travelling purposes. The most common include private car, motorcycle and public transportation modes. Private modes has major share in modal share of the city i.e. 30.8% and the share of motorcycle is 22.4% (JICA, 2012).

Motorcycle is a popular mode of travelling among local people and sometimes even used as a family mode. However, some critical issues of safety need to be addressed regarding motorcycle transport. Public transportation modes consist of bus rapid transit system (also named as metro-bus), conventional bus system, and para-transit modes. Para-transit system comprised of mini-bus, wagon, qingqi rickshaw, auto-rickshaw, and taxi service. These modes provide different level of service in terms of schedule, reliability, comfort and spatial coverage. The share of public transportation modes in modal share is around 20.1% (JICA, 2012).

Wagon is a para-transit mode and it provides service on narrow roads to the public. It also serves as a feeder service to the metro-bus service. There are 48 planned routes for this service. Some routes are not operational due to various reasons. These routes are fixed by concerned transportation authorities and schedule of wagon service is fixed by the drivers based on their mutual understanding and occupancy of the vehicle before departure. This service is operated by individually owned vehicles or fleet of vehicles owned by an individual or agency. It has been observed that some drivers are operating their vehicle on some routes without proper license and route permit. This shows the lack of management and enforcement from concerned authorities. The fare structure is planned by transportation department and it is distance based. The minimum fare is 11 PKR and maximum fare varies with the distance for different routes (Lahore Transport Company). The fare is collected manually. This wagon vehicle has sitting capacity of 12-15 passengers. Most of the wagon vehicles are non-air-conditioned that causes discomfort to the users especially when the vehicles are crowded. Sometimes during peak hours, the passengers are forced to stand in bend shape, as the vehicle height is low that also causes discomfort to the standing as well as sitting passengers. It was noticed that sometimes drivers take more time at stop/terminal in order to get more passengers that causes discomfort and inconvenience to the passengers. The reliability of the service is also questionable. A typical wagon vehicle and terminal is shown in Figure 1.

Fig. 1.
A Typical Wagon Vehicle and Terminal Facility
Source: authors

3. Research Methods

This section presents the details of methods used in this research work.

3.1. Hypothesis of Questionnaire Design

To achieve the aforementioned objectives a questionnaire was designed in this study. This questionnaire was consisted of three parts. Part 1 of the designed questionnaire was consisted of information on respondent's socio-economic demographics (SED) aspects. These information included age, gender, marital status, income, vehicle ownership, travelling mode and purpose of travelling, etc. Various attitudinal dimensions of service quality were selected of wagon and motorcycle mode and included in the part 2. These attitudinal attributes were designed seeking their opposite adjectives and included the following; expensive – cheap, dangerous – safe, uncomfortable – comfortable, uncertain – certain, inconvenient – convenient, late – punctual, unattractive - attractive, noisy – quiet, depressing – joyous, slow – fast, environmental damaging – environmental friendly, crowded – vacant, dislikeable – favorite, unreliable - reliable and busy – calm. These dimensions were evaluated using a five point semantic differential scale (i.e. strongly: 1, somewhat: 2, neutral: 3, somewhat: 4 and strongly: 5). Semantic differential scale is easy to construct and understand for the respondents and reported response can be coded on a bipolar scale. This scale also has compatibility with measured attitudes and Likert scale data. All the statements were designed considering the target groups of travel market. In part three, some statements were designed on people's priorities in mode choice, travelling attitudes and intentions to use wagon service for specific purposes. All the statements in this part were evaluated using a five-point level of agreement scale i.e. strongly disagree (1), disagree (2), neutral (3), agree (4), and strongly agree (5). Five point semantic and Likert scales were preferred in this study ensuring the reliability of data and a survey in a developing country. Along with wagon service, motorcycle was selected for evaluation considering its competiveness with para-transit modes. It was hypothesized that the low and middle income people in target population has only potential to choose either wagon or motorcycle as their travelling depending on their vehicle ownership and socio-economic status.

3.2. Survey and Sampling

This survey was conducted at selected stops of wagon service along specific routes. Motorcycle riders were also targeted at the selection location. Before actual survey, a pilot survey was conducted in order to check appropriateness of the questionnaire items and their scales. The questionnaire items were revised after the results of pilot survey. All the respondents were chosen randomly and interviewed with the help of university students. An intercept survey and convenience sampling strategy was adopted. The respondents were explained regarding the contents and objectives of survey. Some travelers did not agree to give response citing different reasons. The people who use wagon and motorcycle generally have low education level. This causes difficulties for the respondents in understanding some of the questionnaire items involving terminologies that are more technical. However, it was assured to provide the proper information on each questionnaire item to the respondents, so that the collected response must be reliable.

During the survey, the questionnaire items were also translated in the local language for the illiterate people. Due to difficulties in conducting the survey, only 320 usable samples were collected.

3.3. Data Analysis Methods

The collected data was analyzed using factor analysis and structural equation modelling methods. Many researchers in the field of transportation have used SEM in analyzing the travel behavior patterns, acceptability of travel demand management measures, users perceptions to transit modes, driver's speeding behavior and in other aspects of transportation research (Govender, 2016; Javid *et al.,* 2012; Beirao and Cabral, 2007; Golob, 2003). Two kinds of factor analysis techniques are available i.e. exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The selection of particular method depends on the stated hypothesis in the design of questionnaire and survey conduction. In using CFA, the researchers are supposed to confirm the relationships between observed variables and their defined latent variables considering specific theory. Most of the time researchers prefer EFA as it provides flexibility in hypothesis formulation and extraction of latent variables or factors from a pool of observed variables. The extracted factors are named considering the nature of their indicators or observed variables. The indicators with higher factor loading carry more weightage in explain the corresponding factor. The extracted factors are usually combined to develop measurement models and whereas measurement models are combined to construct structural model using principles of structural equation modelling (SEM) technique. This technique has numerous merits over conventional regression analysis. It is possible to include number of observed variables in the model. It allows the interpretation of results even in the presence of multi-collinearity effect. The reliability of the structural model is checked using indices of goodness of fit parameters against their recommended values. These parameters include chi-sq. /degree of freedom, goodness of fit index (GFI), adjusted goodness of fit index (AGFI), comparative fit index (CFI), and root mean square error adjusted (RMSEA).

4. Analysis of Data

This section presents the analysis of survey results. Conventional and statistical analyses were conducted on collected data.

Descriptive Statistics of Respondent's Socio-economic Demographics (SED)

The distribution of respondent's socio-economic demographics in Table 1 shows that male respondents are more than female respondents. This gender distribution is very much consistent with trip rate of female and their share in working population (JICA 2012). It was also difficult to get proper response from female travelers considering social and religious constraints, as they did not like to interact and give response to strangers. The respondents belong to different education groups and occupation. Most of the respondents have experience of using wagon service as indicated from trip frequency. Almost 47% of the respondents own motorcycle and little percentage own car in their households.

Table 1
Respondents Socio-Economic Demographics Distribution

Characteristic	Distribution (%)
Gender	Male (79), Female (21)
Age (years)	Below 20 (13), 20-30 (29), 31-40 (20), 41-50 (21), more than 50 (17)
Education	Under matric (30), Matric (20), F.A./F.Sc. (23), Bachelor (20), Master or above (7)
Occupation	Student (21), private employee (27), Govt. employee (20), worker/labor (22), other (10)
Trip frequency with wagon	Never (6), 2-3 days/month (20), 1-2 days/week (18) 3-4 days/week (26), more than 4 days a week (30)
Income (PKR)	Under 10,000 (11), 11,000~15,000 (22), 16,000~20,000 (19), 21,000~30,000 (13), 31,000~40,000 (16), 41,000~60,000 (12), More than 60,000 (7)
Vehicle ownership	Car (Yes: 13, No: 87) & Motorcycle (Yes: 47, No: 53)

4.2. Average Response and Factor Analysis

Factor analyzes were conducted on attitudinal dimensions of wagon and motorcycle using principle component analysis and varimax rotation with Kaiser Normalization approach. These factor analyses resulted in three factors both for motorcycle and wagon mode. These results are presented in Table 2 and 3 with average response of respondents on each attributes. A factor analysis was also conducted on respondent's priorities in mode choice and travelling attitudes. A cut-of-point of 0.500 values was used in factor analyses; therefore, any variable with factor loading less than 0.5 were not considered and presented in the Tables. Cronbach's alpha (α) values were calculated in order to check reliability of the data and extracted factors. A higher value of Cronbach's alpha indicates high internal consistency among respondents in evaluating the questionnaire items.

4.2.1. Rotated Factors of Motorcycle

An EFA resulted in three factors on attitudinal dimensions of motorcycle. These three factors include instrumental dimensions, service dimensions and user's friendly dimensions. Some of the observed variables did not form significant relationship with extracted factors or their factor loading was less than 0.5; therefore, are not presented in Table 2. Average response on bipolar scale (strongly:-2, somewhat: -1, neutral: 0, somewhat: 1 and strongly: 2) is also presented in Table 2. This average response is positive for all the attributes that show that respondents possess positive attitudes towards motorcycle. The highest mean score is for convenient, punctual, quiet and attractive attributes. It implies that users feel motorcycle is a convenient and punctual mode and people prefer to use it. The first factor of instrumental dimensions shows that most of the people feel that motorcycle is a cheap, comfortable, safe and convenient mode of transport in Lahore. Second factor of service dimensions depicts that people use motorcycle as they consider its service punctual, quiet and attractive. Similarly, results of 3rd factor shows that motorcycle is a use friendly mode in the context of Lahore city. The values of Cronbach's alpha show high internal consistency among respondents in evaluating the observed variables of the extracted factors.

Table 2
Rotated Factor Loadings for Motorcycle

Attitudinal observed variables	Mean	Factors		
		Instrumental Dimensions	Service dimensions	User's Friendly Dimensions
Expensive - cheap	0.458	.822		
Dangerous - safe	0.212	.742		
Uncomfortable – comfortable	0.735	.652		
Uncertain – certain	0.694	.627		
Inconvenient – convenient	1.000	.540		
Late - punctual	1.176		.764	
Unattractive – attractive	0.976		.716	
Noisy – quiet	1.035		.655	
Depressing – Joyous	0.853		.598	
Slow – fast	0.900			.775
Environmental damaging – environmental friendly	0.717			.665
Crowded – vacant	0.953			.570
Busy - calm	0.735			.534
Cronbach's alpha (α)		0.786	0.775	0.773

4.2.2. Rotated Factors of Wagon

Three factors were extracted for attitudinal dimensions of Wagon service using EFA technique. Two factors were named as same as for motorcycle whereas third factor was named differently considering the nature of its associated observed variables. These three factors include service dimensions, instrumental dimensions and cost and safety dimensions as presented in Table 3. The indicators with factor loading less than 0.5 were not considered to form relationship with any of the extracted factor. The average response on bipolar scale shows that respondents have negative attitudes with most of the attributes of wagon service. Only few attributes were secured positive attitudes as shown in Table 3. First factor of service dimensions shows that most of the respondents feel that the wagon service is crowded, uncertain, depressing, and not punctual. Second factor shows that this service is uncomfortable, dislikeable and not environmental friendly. This is, because the seats in wagon vehicle are congested and vehicles are non-air-conditioned. In addition, the vehicles are old and not maintained properly in order to ensure their fitness. Such facts make this service uncomfortable and depressing for the people. Factor loadings and average response in third factor depict that wagon service is cheap, fast and safe. The calculated values of Cronbach's alpha are more than 0.5 that determines the reasonable mutual consistency among respondents in evaluation.

Table 3
Rotated Factor Loadings for Wagon

Attitudinal observed variables	Mean	Factors		
		Service Dimensions	Instrumental Dimensions	Cost and Safety Dimensions
Busy - calm	-0.271	.821		
Crowded – vacant	-0.647	.760		
Late - punctual	-0.294	.702		
Uncertain – certain	-0.076	.684		
Depressing – Joyous	-0.300	.644		
Noisy – quiet	0.047	.598		
Unattractive – attractive	-0.182	.551		
Inconvenient – convenient	0.253		.823	
Uncomfortable – comfortable	-0.029		.811	
Unreliable – reliable	0.047		.795	
Dislikeable - favorite	-0.118		.697	
Environmental damaging – environmental friendly	-0.300		.528	
Slow – fast	0.423			.697
Dangerous - safe	0.329			.650
Expensive - cheap	0.212			.518
Cronbach's alpha (α)		.865	.871	.534

4.2.3. Rotated Factors of Travelling Attitudes and Priorities

Table 4 shows the average response on various travelling attitudes and priorities and people attitudes towards wagon service. This response shows that people tend to use wagon service for short distance trips but do not for long distance trips. People also feel that this service is insecure and uncomfortable as they reported not to use it considering these aspects. An EFA on general travelling attitudes and attitudes with wagon service resulted in two factors as shown in Table 5. These two factors were named considering the nature of their observed variables i.e. mode selection priority attitudes and wagon specific attitudes. First factor of model selection priority attitudes show that safety, reliability and low fare are the main service attributes in choosing a particular mode as indicated from high factor loadings and Cronbach's alpha value. Such response is much consistent with the target respondents as most of them belong to low-middle income category and for them fare is a big concern along with safety and reliability in travelling. Results of second factor depict that people have moderate level of preference to use wagon for short distance trips and with less waiting time. It means people would prefer to use this service if it has more spatial coverage with high comfort level.

Table 4

Average Response on Travelling Attitudes and Priorities

Sr. #	Descriptions	Mean
1.	I prefer to use wagon if it offers shorter walking time to stop.	2.98
2.	Cheaper fare is the priority of mode of transportation.	3.71
3.	Reliability is the priority of mode of transportation.	3.94
4.	Safety is the priority of mode of transportation.	3.93
5.	It is difficult for me to use wagon in extreme weather conditions.	3.49
6.	I prefer to use wagon for short distance trips	3.02
7.	I use wagon service in some cases even if I have a motorcycle.	1.85
8.	I feel good while traveling on wagon.	2.24
9.	For long trips, I try to use air-conditioned transportation mode.	3.76
10.	I try to avoid being near to unfamiliar people.	3.10
11.	At night, I avoid to use wagon service.	3.26
12.	I avoid using wagon because it is uncomfortable.	3.66
13.	I avoid using wagon because I have to wait for long time at stop	3.14
14.	If I can, I would avoid using wagon in any case.	3.25

Table 5

Factor Loadings for Travelling Attitudes and Priorities

Observed variables	Factor	
	Mode Selection Priority Attitudes	Wagon specific attitudes
Safety is the priority of mode of transportation.	.914	
Reliability is the priority of mode of transportation.	.895	
Cheaper fare is the priority of mode of transportation.	.790	
I prefer to use wagon if it offers shorter walking time to stop.		.527
I prefer to use wagon for short distance trips.		.505
I feel good while traveling on wagon.		.501
Cronbach's alpha (α)	0.910	0.618

4.3. Structural Equation Modelling

Using the results of factor analysis of travelling attitudes structural models were developed for people intentions to use wagon service under different scenarios. Figure 2 shows a typical path diagram of the structural models. The results of structural models are presented in Table 6. Discussion is provided on each model separately.

IUWS-1: If I can, I would avoid using wagon in any case

The structural relationship is positive, significant between latent variable of mode selection priority attitudes and IUWS-1 as shown in Table 6. This predicts that those who give high priority to safety, reliability and cost in selection of travelling modes would avoid using wagon in any case. Whereas the negative and significant

relationship of 'wagon specific attitudes' latent variable with IUWS-1 indicates that people who have positive preferences with wagon service for short distance trips and less waiting time will not avoid using in some cases. This relationship predicts positive intentions of some of the respondents with wagon service.

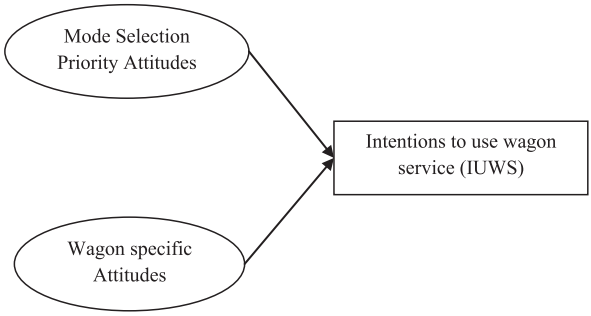

Fig. 2.
A Typical Path Diagram of Structural Model

IUWS-2: I use wagon service in some cases even if I have a motorcycle

The only significant structural relationship with IUWS-2 is of wagon specific attitudes latent variable. This positive relationship in Table 6 indicates that people who have positive attitudes with wagon service for short distance trips and less waiting time at stop would prefer to use wagon even if they own a motorcycle. It means that some people may consider wagon as their preferred mode of travelling for small trips, for example, when motorcycle facility is not available at home.

IUWS-3: I avoid using wagon because it is uncomfortable

Results in Table 6 show the significant and negative structural relationship between IUWS-3 and wagon specific attitudes variable. It depicts that people would use wagon service for short distance trips regardless of its uncomfortable nature. Other structural relationship was insignificant. It implies that people may not prefer to use this service for long distance trips, as its service is uncomfortable.

IUWS-4: I avoid using wagon because I have to wait for long time at stop

The structural relationship between wagon specific attitudes and IUWS-4 is insignificant as shown in Table 6. However, the relationship between mode selection priority attitudes and IUWS-4 is significant and positive. It shows that people who give more priority to safety, cost and reliability factors in mode selection would avoid using wagon service because they need to wait for longer at stop that increases the out-of-vehicle time for them. Also under this situation, the reliability of the service is doubtful.

IUWS-5: At night, I avoid to use wagon service

The significant and negative relationship in Table 6 between IUWS-5 and wagon specific attitudes latent variable determines that people who use wagon service for short distance trips

and believe to use it if it offers short waiting time would avoid to use wagon at night. This may be due to security reasons and especially female do not like to travel on such vehicles if there are less passengers in the vehicle. In addition, travelling in Lahore alone is not secure for female considering the local conditions.

The comparison of indices of goodness of fit parameters with their permissible values in Table 6 shows that these structural models of wagon service have acceptable level of fit in predicting the respondent's intentions to use wagon under different conditions and extracted factors.

Table 6

Estimates of Structural Relationships for Respondents Intentions to use Wagon Service

Factor	Variables of intentions to use wagon service				
	IUWS-1	IUWS-2	IUWS-3	IUWS-4	IUWS-5
Mode selection priority attitudes	0.83***	-0.06	-0.04	0.28***	0.03
Wagon specific attitudes	-0.41***	0.44***	-0.18**	0.03	-0.38***
Indices of goodness of fit parameters of each model					
Chi-sq./DOF	3.337	3.448	2.714	4.266	4.5
GFI	0.969	0.968	0.975	0.961	0.959
AGFI	0.927	0.924	0.941	0.910	0.905
CFI	0.974	0.970	0.978	0.960	0.958
RMSEA	0.083	0.085	0.071	0.098	0.102

Note:

**** Significant at 1%, and ** significant at 5%*

IUWS-1: If I can, I would avoid using wagon in any case.

IUWS-2: I use wagon service in some cases even if I have a motorcycle.

IUWS-3: I avoid using wagon because it is uncomfortable.

IUWS-4: I avoid using wagon because I have to wait for long time at stop

IUWS-5: At night, I avoid to use wagon service.

4.3.1. Structural Equation Modelling of Motorcycle Attitudinal Factors Influence on Wagon Specific Attitudes

Figure 3 shows a structural model of influence of attitudinal dimensions of motorcycle on people wagon specific attitudes. The purpose of this model was to examine that how the people's attitudes with private modes influence their intentions towards a specific public transport mode. The wagon specific attitudes latent variable is the same variable as presented in Table 4. In this model, two structural relationships are positive and one is negative. The positive structural coefficients of 'instrumental dimensions' and 'user's friendly dimensions' with wagon specific attitudes shows that people who possess positive attitudes towards these attributes of motorcycle also have positive intentions to use wagon service for short distance trips and with short waiting time. However, the people who hold strong belief on service dimensions of motorcycle have low potential to consider wagon as a travelling mode for different purposes as indicated by their negative relationship. These results imply that service oriented attributes are more critical in mode choice behavior of the travelers.

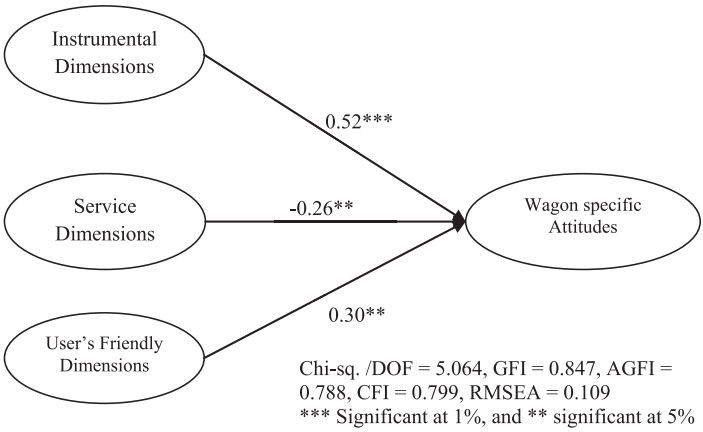

Fig. 3.
A Structural Model of Influence of Motorcycle Attitudinal Dimensions on Wagon Specific Attitudes

5. Conclusions

This paper presents a comparison between motorcycle and wagon mode through the assessment of their attitudinal dimensions. It also identifies the influence of specific travelling attitudes on people's intentions to use wagon service under specific conditions. The analysis of survey results concludes that the respondents possess highly positive and negative attitudes towards motorcycle and wagon service, respectively. For wagon service, only few attributes secured positive attitudes from respondents. Short waiting time at stop and/or terminal, short walking distance to/from stop, nighttime travelling, and uncomfortable nature of wagon are significant determinants of people's travelling intentions towards wagon service under different scenarios. Similarly, instrumental, service and user's friendly dimensions of motorcycle formed significant structural relationship with traveler's attitudes towards wagon service. These findings imply that people prefer/would prefer to use wagon service for some specific purpose and under specific travelling conditions even if they have motorcycle. Low cost and waiting time, better comfort level and more spatial coverage are key service dimensions in this regard and need to be improved in order to make this service as a viable travelling mode for the local people. Moreover, this wagon service may be restricted on small routes with high frequency and more spatial coverage. These routes can also be planned as feeder routes to the metro-bus service and other mass transit modes for better integration and convenience and comfort of the passengers. These findings are extracted from data on small sample size of a large population; therefore, they have some limitations in implications. However, these findings can provide a useful picture to the local planners and decision makers of people perceptions on wagon service in comparison to motorcycle for making improvements in its service.

Acknowledgement

This research was conducted at University of Engineering and Technology, Lahore,

Pakistan. Authors are thankful to those who helped in this study especially in conducting the survey.

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