

A Model Proposal for Sakarya Integrated Public Transportation System through the Analysis of Kahramanmaraş and Kayseri Applications

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Abstract

Public transportation systems of city of Sakarya are carried out by different stakeholders. Daily travel demands are met with private-public buses, paratransit mini-busses, and buses operated by municipality. Factors such as the independence of the operating systems of each operator and the provision of services without optimizing the number of trips and vehicle capacities according to travel demands cause the existing urban public transport system to result in inefficient operation as a whole. It is, therefore, necessary to integrate the different elements of the urban public transport system for creating an efficient operational system considering the integrated needs of the all available systems. In this sense, Kahramanmaraş and Kayseri applications are to be examined to propose the integrated model proposal for Sakarya province through a SWOT analysis.

Key words: Public transportation system evaluation, EN13816 measurements, service quality, SWOT analysis

1. Introduction

Today, with technological developments, the role of effective and efficient transportation of people and goods are becoming more and more important day by day. In modern societies, people face more than in the past the need to go from one place to another for various reasons. Many examples can be given to this situation under the main headings of cultural, economic, political, and social reasons. Transportation is one of the most important elements in the general management of the cities, especially with the large populations and the centers of attraction having limited areas. The time people spend to meet their mobility needs affects many decisions in their daily lives, and this is one of the main factors affecting urban life. At the same time, it is equally important for commercial enterprises in freight transportation and logistics. For these reasons, transportation systems are one of the important factors that determine the character of cities. That's why, they are frequently evaluated by professional administrations. The increase in the population density and vertical construction of the cities, along with the increase in the use of individual vehicles, causes the managers to respond to the demand created. The most appropriate solution to this problem is to reduce the number of vehicles in traffic by stimulate public transportation systems. European Union EN 138 16 which this study takes in to consideration provides guidance for service quality management in Public Transport to advance the public transport standard [1].

2. Materials and Methods

This study is basically related to the evaluation of the data to be obtained through a questionnaire. The content of the questionnaire is designed to get the detailed information regarding the applied new public transportation system of transformed multiple operators to the single operator. In this way various system providers were combined under the local authorities of the municipalities to provide much better public transportation system to release the traffic congestion problems and encourage the people to use the public transportation systems instead of using private cars in the related cities. The data obtained are to be evaluated through SWOT analysis by using SPSS program.

2.1 Performance Criteria

Within the scope of this study, EN 13816 European public transportation system norms were examined to determine the basic quality criteria of the public transportation system. EN 13816 categorises the performance criteria of the system provided for the mobility of the people in terms of the availability, accessibility, reliability, comfort, security, real time information and environmental effects. The following table summarises these main headlines and related sub-headlines.

Table 1. EN 13816 Service Criteria [2]

1.Availability	1.1 Modes	
	1.2 Network	1.2.1 Distance To B/A Point
		1.2.2 Need For Transfers
		1.2.3 Area Covered
	1.3 Operation	1.3.1 Operating Hours
		1.3.2 Frequency
		1.3.3 Vehicle Load Factor
	1.4 Suitability	
1.5 Dependability		
2.Accessibility	2.1 External Interface	2.1.1 To Pedestrians
		2.1.2 To Cyclists
		2.1.3 To Taxi Users
		2.1.4 To Private Car Users
	2.2 Internal Interface	2.2.1 Entrances / Exits

		2.2.2 Internal Movement
		2.2.3 Transfer To Other PPT Modes
	2.3 Ticket Availability	2.3.1 Acquisition On Network
		2.3.2 Acquisition Off Network
		2.3.3 Validation

3.Information	3.1 General Information	3.1.1 About Availability
		3.1.2 About Accessibility
		3.1.3 About Sources Of Information
		3.1.4 About Travelling Time
		3.1.5 About Costumer Care
		3.1.6. About Comfort
		3.1.7 About Securitiy
		3.1.8 About Environmental Impact
	3.2 Travel Information Normal Conditions	3.2.1 Street Directions
		3.2.2 B/A Point Identification
		3.2.3 Vehicle Direction Signs
		3.2.4 About Route
		3.2.5 About Time
		3.2.6 About Fare
		3.2.7 About Type Of Ticket
	3.3 Travel Information Abnormal Conditions	3.3.1 About Current/Forecast Network Status
		3.3.2 About Alternatives Available
		3.3.3 About Refund/Redress
		3.3.4 About Suggestions & Complaints
		3.3.5 About Lost Property
		4.1.1 Trip Planning
4.1.2 Access/ Egress		
4.1.3 At B/A Points And Transfer Points		
4.1.4 In Vehicle		
4.2.1 Punctuality		
4.2.2 Regularity		

4.Time	4.1 Length Of Trip Time	4.1.1 Trip Planning
		4.1.2 Access/ Egress
		4.1.3 At B/A Points And Transfer Points
		4.1.4 In Vehicle
	4.2 Adherence To Schedule	4.2.1 Punctuality
		4.2.2 Regularity

5.Customer Care	5.1 Commitment	5.1.1 Customer Orientation
		5.1.2 Innovation And Initiative
	5.2 Customer Interface	5.2.1 Enquiries
		5.2.2 Complaints
		5.2.3 Redress
	5.3 Staff	5.3.1 Availability
		5.3.2 Commercial Attitude
		5.3.3 Skills
		5.3.4 Appearance
	5.4 Assistance	5.4.1 At Service Interruptions
		5.4.2 For Customers Needing Help
	5.5 Ticketing Options	5.5.1 Flexibility
		5.5.2 Concessionary Tariffs
		5.5.3 Through Ticketing
		5.5.4 Payment Options
5.5.5 Consistent Price Calculations		

6.Comfort	6.1 Useability Of Passenger Facilities	6.1.1 At B/A Points
		6.1.2 On Vehicles
	6.2 Seating Personal Space	6.2.1 In Vehicle
		6.2.2 At B/A Points
	6.3 Ride Comfort	6.3.1 Driving
		6.3.2 Starting/ Stopping
		6.3.3 External Factors

	6.4 Ambient Conditions	6.4.1 Atmosphere
		6.4.2 Weather Protection
		6.4.3 Cleanliness
		6.4.4 Brightness
		6.4.5 Congestion
		6.4.6 Noise
		6.4.7 Other Undesired Activity
	6.5 Complementary Facilities	6.5.1 Toilets / Washign
		6.5.2 Luggage & Other Objects
		6.5.3 Communication
		6.5.4 Refreshments
		6.5.5 Commercial Services
		6.5.6 Entertainmnet
6.6 Ergonomy	6.6.1 Ease Of Movement	
	6.6.2 Furniture Design	

7.Security	7.1 Freedom From Crime	7.1.1 Preventative Design
		7.1.2 Lighting
		7.1.3 Visible Monitoring
		7.1.4 Staff/Police Presence
		7.1.5 Identified Help Points
	7.2 Freedom From Accident	7.2.1 Presence/Visibility Of Supports, E.G. Handrails
		7.2.2 Avoidance/Visibility Of Hazards
		7.2.3 Active Safeguarding By Staff
	7.3 Emergency Management	7.3.1 Facilities And Plans

8.Environmental Impact	8.1 Pollution	8.1.1 Exhaust
		8.1.2 Noise
		8.1.3 Visual Pollution
		8.1.4 Vibration
		8.1.5 Dust & Dirt
		8.1.6 Odour

		8.1.7 Waste
		8.1.8 Electromagnetic Interference
	8.2 Natural Resources	8.2.1 Energy
		8.2.2 Space
	8.3 Infrastructure	8.3.1 Effect Of Vibration
		8.3.2 Wear On Road / Rail Etc.
		8.3.3 Demands On Available Resources
		8.3.4 Disruption By Other Activities

Although each of the specified criteria is of importance separately, the degree of importance for the customers is different. Within the scope of this study, the main criteria discussed below will be determined and the necessary questions for the customer satisfaction survey will be prepared.

2.1.1 Availability

Availability is described in EN 13816 as the extent of the service offered, in terms of geography, time frequency, and transport mode. Availability is one of the necessary conditions in choosing a public transport system. A public transport system that does not approach the destination, a bus that cannot be boarded due to insufficient capacity, and a bus stop that cannot be reached from the travel starting point will not serve the customer in a desired way.

2.1.2 Accessibility

Accessibility is described in EN 13816 as access to the public passenger transport system including interface with other public passenger transport modes. Again, accessibility can be considered as one of the necessary conditions of the public transportation system. The more transportation modes have access to a bus stops, the more customers will prefer the public transportation system.

2.1.3 Information

Information described in EN 18316 is a systematic provision of knowledge about a public passenger transport system to assist the planning and execution of journeys. Although the information provided public transport system is an important criterion that determines the journey time for its customers, it may not be said as a must condition.

2.1.4 Time

Time is one of the most important elements of our lives. Especially in big cities, people have great responsibilities in working life. The time that people spare for themselves is limited. For this reason, the time allocated to transportation in big cities is of great importance. The increase in transportation time means a decrease in the time people can spare for themselves. In many survey studies, it has been revealed that time comes before comfort for customers.

2.1.5 Customer Care

Customer care is described as service elements introduced to effect the closest practicable match between the standard service and requirements of any individual customer.

2.1.6 Comfort

Comfort is one of the most important reasons why the public transportation system is preferred over other types. Especially those who own a car or have the opportunity to travel by taxi have higher comfort expectations than others. For this reason, a public transportation system that reduces travel time in a comfortable way will push the preference of vehicle owners to use the public transportation system.

2.1.7 Security

Security is also another one of the necessary conditions of public transport systems. Although it is not possible to have a security guard to ensure security at all times in public transport systems, the presence of emergency help buttons is among the practices that are controlled by the security guards of the stops and stations. Thanks to adequate lighting, developing technologies, and live camera systems, live control is possible at any time and meets the security needs of customers.

2.1.8 Environmental Impact

When public transportation systems are evaluated as having an environmental impact, it is a known fact that the damage to the environment is much less than individual vehicle use. Damage caused to the environment, the noise pollution created in the traffic, and the capacity of the infrastructure needed will be much less than private cars. Especially in these recent times, where the effects of climate change have increased visibly, all humanity has great individual duties. While we try to change our habits and reduce the use of individual vehicles, managers have to do their best in order to raise the above-mentioned quality criteria in cities to provide better quality and preferred public transportation systems.

According to EN 13816, there are two types of viewpoints for public transport system measurements.

The first is the customer perspective to measure the customer satisfaction. The second is the service

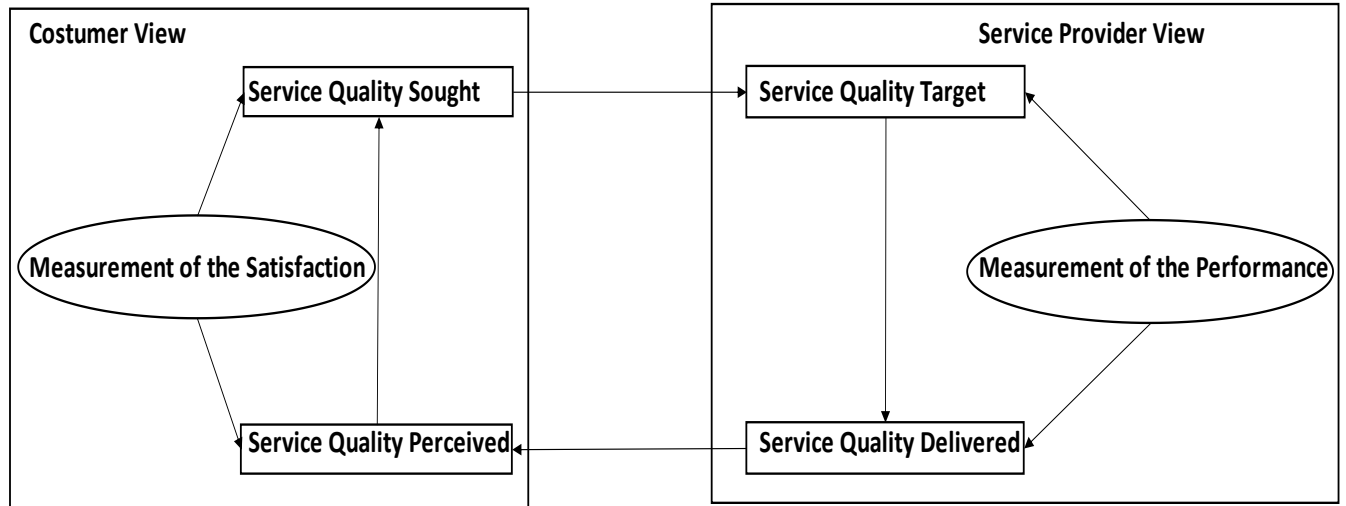


Figure 1. Layers of customer and service provider's performance criteria.[2]

provider perspective to evaluate system performance as far as operators are concerned. Within the scope of this study, the evaluation will be made from the perspective of both the customer and the system providers in the provinces of Kayseri and Kahramanmaraş.

The figure below expresses this two-way assessment of the public transportation system, which is considered for the swot analysis of this research. As can be seen there are the analysis process of both perspectives to get the whole picture so that the most effective operational management of public transportation model to be proposed for Sakarya Municipality can be attained.

2.2 SWOT Analysis

The reason for employing the SWOT analysis technique for this study is that it is a technique providing the individual characteristics, opportunities and threats to determine the strengths and weaknesses of the present operators, environmental nature of the geographical region to determine the best investment and management aspects of the model to be proposed. It should also be noted that SWOT analysis has emerged as a technique frequently used by both academicians and practitioners in the solution of strategic planning and some organizational problems in recent year. [3]. SWOT analysis will be used to compare the present system and the system proposed for city of Sakarya to analyse the risks and opportunities. The following figure illustrates the general structure and elements of the SWOT analysis.

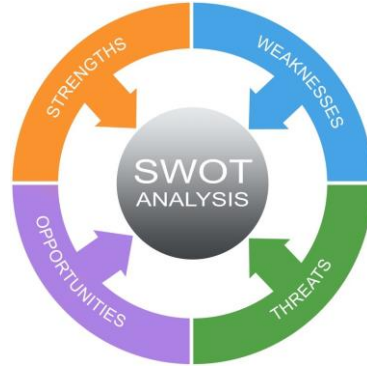


Figure 2. SWOT analysis [4]

3. Results

After carrying out the survey and related analysis it is expected that it will be determined from different perspectives that public transportation systems managed and operated by the single local authority are preferable to the current multi-service providers` operational system. The new proposed model will be aimed to reduce the negative impacts of the chaotic character of the present service providers on traffic flow by increasing the capacities of the vehicles and making existing and proposed routes more efficient by both to increase the customer satisfaction and to reduce the operational costs. In this way, this research will evaluate two different concerns of the proposed system from both customer and operator performance-oriented perspectives based on the experiences of applications gained by the local authorities of cities of Kahramanmaraş and Kayseri. For the model to be suitable for the city of Sakarya, the characteristic features of the city will surely be examined and evaluated to get applicable model.

4. Discussion

The importance of this work is undoubtedly great for city of Sakarya. Similar to the work carried in Kahramanmaraş and Kayseri by removing the pieced para-transit systems to increase the effectiveness of the public transportation systems in those cities, the public transportation system will be much more operational and effective in the city of Sakarya thanks to the model to be obtained and prosed after a rigorous analysis of this research. These developments will directly affect human life and contribute to the cultural and economic structure of the city.

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