DEVELOPMENT OF SERVICE PERFORMANCE INDEX FOR EXCLUSIVE MOTORCYCLE LANES IN MALAYSIA

SEYED FARZIN FAEZI

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DEVELOPMENT OF SERVICE PERFORMANCE INDEX FOR EXCLUSIVE MOTORCYCLE LANES IN MALAYSIA

By

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Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

SEP 2011
DEDICATION

This work passionately dedicated to my beloved wife and my parents.
Abstract of thesis presented to the Senate of University Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

DEVELOPMENT OF SERVICE PERFORMANCE INDEX FOR EXCLUSIVE MOTORCYCLE LANES IN MALAYSIA

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SEPTEMBER 2011

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Evaluation of a particular facility in management and operation of land transportation system is very important. Measures of performance are quite complex and used in a wide variety of designing, planning and policy analysis of transportation systems and new explicit performance measures of transportation system. Currently, there are many studies available on evaluating the service performance of transportation amenities such as bicycle lanes, highways or even pedestrian walkways. However, there is a lack of information on assessing the service performance related to motorcycle lanes. Hence, this research intends to develop the service performance index model for exclusive motorcycle lanes.
One of the important measures of performance in analyses of transportation facilities is Level-Of-Service (LOS). Level-of-service measures also characterize a set of all other measures of performance essential for transportation analysis and replicate mainly the attributes of the system that shape the user perception of the quality of service. The present dissertation describes the development of a methodology to determine service performance index under ideal conditions based on user perceptions of road performance metrics such as motorcycles speed, motorcycles volume, pavement quality, total lane width. At the same time, a comprehensive model has been developed, which presents the service performance model including level-of-service for exclusive motorcycle lane. Also all data were collected in three sites (Federal Highway F02, Putra Jaya Highway and Subang Jaya).

Two hundred fourteen motorcycle riders contributed in a survey and rated the performance of 500-metre segment of exclusive motorcycle lane as filmed on videotapes depicting scenes from the rider’s perspective. First, ten video clips were presented to 47 participants. Then, participants were asked for their opinion regarding the factors affecting the road performance after watching video clips (pre test). In another test (test two) participants were asked to rate (using predefined scores) the performance or service quality of clips on six-point scale ranging from excellent to very poor after watching video clips. Totally fifty video clips were captured illustrating motorcycle ride along the existing exclusive motorcycle lanes in Malaysia. In addition, backgrounds of the survey participants were also asked and collected.
The results revealed four factors as the significant to road performance: motorcycle volume, surface pavement quality, traffic speed and the total lane width. Also the following parameters mention by participants but they are not significant important on road performance: signboard, lighting, shelter, drainage, maintenance road, pavement marking, available sight distance, access frequency point, horizontal and vertical curve and rest station. The data of these surveys were analyzed using ordered linear regression and logistic regression model to predict the performance level rating of exclusive motorcycle lanes. The linear regression and logistic regression results were then compared to each other and also compared to the scores of surveys collected from questionnaires. These two models have good correlation to each other. Result shows Logistic regression was a better predictor of the observations compare to linear regression (0.76 vs 0.75).

The outcome provides guideline for engineers and transportation planners to evaluate different design options by changing the independent variables to find the best combination of factors to achieve the desired road performance. Also existing roadways can be evaluated to determine the present motorcycle performance level or level-of-service on all segments. On the other hand, this study is also seen as filling the existing knowledge gap between the various types of land transportation amenities and facilities such as pedestrians, bicycles, and vehicles which provides the state service performance index or level-of-service (LOS) of motorcycle facilities.
PERKEMBANGAN INDEKS PRESTASI PERKHIDMATAN TERHADAP LORONG EKSKLUSIF MOTOSIKAL DI MALAYSIA

Oleh
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Penilaian bagi beberapa kemudahan tertentu dalam sistem pengurusan dan operasi pengangkutan darat sangat penting. Pengukuran prestasinya sangat kompleks dan memerlukan berbagai reka bentuk penilaian, banyak agensi pengangkutan telah memperkenalkan perancangan dan analisis dasar prestasi sistem pengangkutan, salah satu langkah penting ialah Level-Of-Service (LOS). Pengukuran Level-of-service ini dapat mencirikan set pengukuran prestasi yang lain dan penting untuk analisis pengangkutan serta digunakan bagi membuat tanggapan terhadap kualiti perkhidmatan kepada pengguna. Pada masa ini banyak kajian yang dilakukan untuk menilai prestasi kemudahan perkhidmatan pengangkutan seperti lorong sikal, lebuh raya bahkan lorong pejalan kaki. Namun demikian
terdapat kekurangnya maklumat menilai menilai prestasi perkhidmatan lorong motosikal. Kajian ini bertujuan untuk mengembangkan model indeks prestasi perkhidmatan lorong eksklusif motorsikal.

Disertasi ini menjelaskan perkembangan metodologi untuk menentukan indeks prestasi perkhidmatan berdasarkan persepsi pengguna terhadap kelajuan motosikal, kelantangan bunyi, kualiti turapan permukaan lorong, dan lebar lorong. Sementara itu, sebuah model komprehensif dibentuk, untuk mengukur prestasi perkhidmatan termasuk Level-Of-Service (LOS) untuk lorong eksklusif motorsikal.

Dua ratus enam puluh satu penunggang motosikal dijadikan sampel kajian dan purata sejauh 500 meter lorong eksklusif motorsikal bagi satu segmen dirakam video untuk mendapat pandangan daripada penunggang motosikal. Lima puluh klip video telah dirakam di beberapa lokasi lorong eksklusif motorsikal yang terdapat di Malaysia. Sepuluh klip disajikan secara rawak bagi setiap peserta. Peserta diminta menyatakan pendapat mereka mengenai faktor yang mempengaruhi prestasi lorong selepas menonton klip video (ujian satu). Dalam ujian lain (ujian dua) peserta diminta memberikan penilaian (menggunakan skor yang telah ditentukan) kualiti prestasi atau perkhidmatan klip pada skala enam mata bermula dari sangat baik kepada sangat buruk selepas menonton 10 segmen video. Selain itu, latar belakang peserta juga dikumpulkan.

Keputusan kajian menunjukkan empat faktor yang paling signifikan terhadap prestasi lorong: Kelantangan bunyi motosikal, Turapan permukaan jalan, vii
kelajuan lalu lintas dan lebar lorong. Data kajian ini dianalisis dengan menggunakan kaedah regresi linier dan model regresi logistik untuk menentukan tahap prestasi lorong eksklusif motosikal. Kemudian dibuat perbandingan antara hasil Regresi linier dan hasil regresi logistik kemudian dibandingkan dengan skor tinjauan dikumpulkan dari peserta sebelumnya. Kedua-dua model didapati mempunyai korelasi yang jelas antara satu sama lain. Kajian ini juga mendapati regresi logistik adalah prediktor yang lebih baik daripada pemerhatian menggunakan metod regresi linier (0.76 vs 0.75).

Hasil kajian ini dapat menyediakan pedoman asas bagi keperluan pembangunan reka bentuk penilaian bagi negara-negara yang banyak menggunakan motosikal. Selain itu, kajian ini juga dapat memenuhi lowongan pengetahuan terhadap penilaian pelbagai jenis kemudahan pengangkutan darat dan kemudahan keperluan lain seperti lorong pejalan kaki, lorong sikal, dan kenderaan lain mengenai indeks prestasi perkhidmatan atau kemudahan level-of-service (LOS) motosikal.
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I have long dreamed of a day when I could reach a point in my journey of life-to be honoured with degree of doctor of philosophy. Indeed, there have been many people who, with their love and kindness, helped and supported in making this dream a reality.

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I certify that a Thesis Examination Committee has met on 13 September 2011 to conduct the final examination of Seyed Faezin Faezi on his thesis entitle “Development of Service Performance Index for Exclusive Motorcycle Lanes in Malaysia” in accordance with the Universities and University Colleges Act 1971 and Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Doctor of Philosophy.

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DECLARATION

I declare that the thesis is my original work except for quotation and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at Universiti Putra Malaysia or at any other institution.

Seyed Farzin Faezi  
Date: 13 SEPTEMBER
TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEDICATION</td>
<td>ii</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>iii</td>
</tr>
<tr>
<td>ABSTRAK</td>
<td>vi</td>
</tr>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>ix</td>
</tr>
<tr>
<td>APPROVAL</td>
<td>xi</td>
</tr>
<tr>
<td>DECLARATION</td>
<td>xiii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>xviii</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xx</td>
</tr>
<tr>
<td>LIST OF ABBREVIATIONS</td>
<td>xxiii</td>
</tr>
</tbody>
</table>

CHAPTER

1 INTRODUCTION

1.1 Land Transportation and Performance Measurement  1
1.2 What are Performance Measures?  2
1.3 Level-of-Service (LOS) and Performance Measures  4
1.4 Motorcycle Transportation System in Malaysia  5
1.5 Motorcycle Crash in Malaysia  6
1.6 Problem Statement  8
1.7 Objectives  10
1.8 Significance of Research  10
1.9 Scope of Study  11
1.10 Organization of the Thesis  12

2 LITERATURE REVIEW

2.1 Introduction  14
2.2 Level-of-Service (LOS) in Various Transportation Systems  15
2.3 Alternative Approach to Service Performance  19
   2.3.1 Vehicle Driver Performance Index  20
      2.3.1.1 Arterial Street Performance Index  21
2.3.1.2 Freeway Road Performance Index 22
2.3.1.3 Signalized Intersection Performance Index 24
2.3.2 Bicyclist Performance Index 28
2.3.2.1 Bicycle Model for Arterial 28
2.3.2.2 Bicycle Model for Rural Road 42
2.3.3 Pedestrian Performance Index 46
2.3.3.1 Intersection Crossing Studies 47
2.3.3.2 Midblock Crossing Studies 48
2.3.3.3 Sidewalk and Path Studies 50
2.3.4 Motorcycle Studies 56
2.3.4.1 Standards for Motorcycle Track Design 59
2.3.4.2 Exclusive Motorcycle Lane 60
2.4 Literature in Sample Method and Sample Size 61
2.4.1 Sample Method 62
2.4.2 Sample Size Requirements in Data Collection 63
2.5 Comparison between Various Data Collection Methods 64
2.5.1 Focus Groups 65
2.5.2 Field Surveys 66
2.5.3 Riding Simulator 67
2.5.4 Video Survey 67
2.5.5 Literature Review Summary 69

3 METHODOLOGY 71
3.1 Step One: Develop Theoretical Approach (Data Collection Methodologies) 73
3.2 Step Two: Data Collection (Identification of Key Variables and Participant Scores) 73
3.2.1 Sites Selection and Criteria 75
3.2.2 Measure Parameters and Measuring Equipment 77
3.2.2.1 Digital Video Camera Recorder 77
3.2.2.2 Manual Tally-Counter and Computer 78
3.2.2.3 Distance Ruler Measurer (Trumeter) 79
3.2.2.4 Laser Speed Detector 79
3.2.2.5 Pavement Condition Rating (PCR) Standard 81
3.2.3 Editing and Making Video Clips 84
3.2.4 Pre-Test (47 Participants) 84
3.2.5 Final Sampling (214 Participants) 87
3.2.6 Questionnaire Development 91
3.2.7 Participant Survey (Video Survey) 91
3.2.8 Participant Instructions 95
3.3 Step three: Description of the Model 96
  3.3.1 Linear Regression Model 96
  3.3.2 Logistic Regression Model 97
3.4 Summary 98

4 FACTORS AFFECTING ROAD PERFORMANCE 99
  4.1 Significant Factors that Affect Motorcyclists’ Road Perception 99
    4.1.1 Speed 100
    4.1.2 Volume 103
    4.1.3 Pavement Quality 105
    4.1.4 Lane Width 106
  4.2 Ranges of Variables Included in the Model 108
  4.3 Description of Data 110
    4.3.1 Demographic and Socioeconomic Information 111
    4.3.2 Comparison between Participant Scores and Field Data 113
    4.3.3 Impact of Gender, Experience and Age on Perception of Road Performance 116
    4.3.4 Motorcycle Volume Study 119
  4.4 Summary 121

5 RESULTS AND DISCUSSION 123
  5.1 Linear Regression Analysis 123
    5.1.1 Model Summary 126
    5.1.2 Development of Linear Regression Models 131
    5.1.3 Distribution in Linear Regression Analysis 135
  5.2 Establish Service Performance Model to Level-of-Service 141
  5.3 Multinomial Logistic Regression Analysis 149
    5.3.1 Measures of Effect Size 151
    5.3.2 Model Fitting 151
    5.3.3 Test of the Overall Model 153
    5.3.4 Regression Coefficient Evaluations 154
5.4 Comparison of the Linear Regression and Logistic Regression Results

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary 162
6.2 Conclusions 163
6.3 Applications 166
   6.3.1 Sample Calculation to Estimate SPI and LOS 167
   6.3.2 Alternatives Proposed Design 168
6.4 Recommended Further Study 171

REFERENCES 173
APPENDICES 179
BIODATA OF STUDENT 212
LIST OF PUBLICATIONS 213