

**A STUDY OF INTERCITY AIR TRAVEL CHARACTERISTICS
THROUGH DISCRETE CHOICE MODELS**

By

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Submitted

In fulfillment of the requirements of the degree of

DOCTOR OF PHILOSOPHY

to the



**DEPARTMENT OF CIVIL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY DELHI
HAUZ KHAS, NEW DELHI-110 016
INDIA
MARCH 2010**

CERTIFICATE

This is to certify that the thesis entitled “**A STUDY OF INTERCITY AIR TRAVEL CHARACTERISTICS THROUGH DISCRETE CHOICE MODELS**” being submitted by **Mr. Arvindkumar Munnalal Jain** to the **Indian Institute of Technology Delhi** is record of bonafide research work carried out by him under my supervision and guidance. The thesis work, in my opinion, has reached the standard, fulfilling the requirements for **DOCTOR OF PHILOSOPHY** degree. The research report and results presented in this thesis have not been submitted, in part or full, to any University or Institute for the award of any degree or diploma.

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ACKNOWLEDGEMENTS

The author truly admires from bottom of his hearts Dr. Kalaga Ramachandra Rao, Associate Professor, Civil Engineering Department New Delhi, India for his valuable and inspiring guidance, unfailing support, constant encouragement and deep interaction throughout the period of doctoral programme. His volunteered hours of valuable time helped me to put my best foot forward in right direction. He eased my work by his wonderful contribution with his myriad skills.

I am thankful to the SRC members - Prof. N. K. Garg (Chairman), Prof A K Gosain and Dr. Dr. S Dharmaraja - for their invaluable suggestions during different stages of my research work.

I am also thankful to Prof K G Sharma and Prof A K Nagpal – previous HODs of Civil Engineering Department and Prof A K Gosain present HOD Civil for their valuable suggestions and help in during difficult times.

My sincere thanks are due to Dr. Geetam Tiwari; Associate Professor, Civil Engineering Department, Indian Institute of Technology Delhi for her constant boost as well as encouragement during my research work.

Special thanks are due to Prof. Dinesh Mohan for his help and cooperation in getting the necessary permissions for data collection at the Delhi Airport. The thesis would not have been realized otherwise.

Thanks are due to General Manager, GMR group at Delhi International Airport Limited (DIAL) and Director General of Civil Aviation (DGCA), N. Delhi for their cooperation and permission for conducting the survey at Delhi airport on two different occasions.

I am thankful to Sri. Kausik Pahari, Junior Technical Superintendent, and Sri. Siyaram, Lab. Assistant, of Transportation Engineering Laboratory for their unconditional support in extending the facilities of the laboratory.

I have great pleasure in expressing my sincere thanks to my fellow research scholars and friends particularly Dr. Mallikarjuna, Dr Babu, Dr. Hanumanta Rao, Dr. Vadodaria, Dr. Pradhan, Ramanna Reddy, Ravi Gadepalli and Col. Sarma for the wonderful time spent together, without them I would not have enjoyed my stay at IIT Delhi.

I am also thankful to the Chairman, Principal, and HOD of Sardar Vallabhbhai Patel Institute of Technology, Vasad for their support and encouragement for deputing me to carry out this research.

I would like to record my deep sense of gratitude to my parents, sisters, mother-in-law and my brother-in-law, without whose blessings and encouragement, the thesis would not have seen the light.

Last but not least, I would like to record a word of thanks to my wife Smt. Sandhya Jain, daughter Avani Jain and son Ashish Jain, for their unrelenting support and sacrifice without which it would not have been possible for me to complete my research.

The author would like to thank all those who have rendered help directly or indirectly during the entire research work.

Arvindkumar Munnalal Jain

Abstract

In the past two decades, aviation reforms in India have dramatically changed the passenger share from conventional rail mode to air mode for the long distance journeys. Indian government's initiative of open market policy for aviation sector has encouraged different low cost carriers (LCC) as well as full service carriers (FSC) to increase their market in this scenario. Air travel potential in India is high due to rising income standard of individual. The growth of information technology (IT)/ information technology enabled services (ITeS) and service sector like finance and telecommunication are major booster for this development. The turbulent phase of Indian aviation market in early decade of this century is now slowly shifting to the transient phase. This phase of the air travel market attributed due to heavy price fluctuations of aviation turbine fuel.

In order to understand the behavioural pattern of individual in the present market scenario for the time-of-day choice, discrete choice analysis has been used in this study. For developing the discrete choice model both RP and SP survey techniques of data collection were used on two different occasions at the Delhi airport. For capturing the individual's taste preference in the selection of their time-of-day choice both quantitative and qualitative data was collected from individual passengers travelling from Delhi to different cities of India.

The revealed preference (RP) survey was carried out by intercept method in order to achieve the data set from the targeted population in cost effective way. Though RP survey has resulted in large data set (2800), the effect of time variability is not captured. The reason was, a negligible variation in the journey time to different destinations from Delhi was observed. Statistical validity for the air fare, frequency

and income parameters was achieved in modelling, which indicates the sensitivity of airfare as dominating factor for choice model developed by RP data. The RP model was further validated for the time-of-day choice model with reasonable accuracy (75%).

Further, in order to investigate the travel time effects of main variable like travel time, airfare, frequency, along with reliability and comfort on the time-of-day choice model, stated preference (SP) survey has been carried out at the same location. For conducting SP survey, experiment design considering the four level of variation in main variables, travel time, travel cost, frequency, on time performance, and comfort has been designed by considering fractional factorial experiment and fulfilling orthogonal main effect plan (OMEF) for the experimental setup. The data collected from the above survey was calibrated by the freeware, BIOGEME for the multinomial model (MNL) model (as such the choice of three slots, Morning, Afternoon and Evening).

This study is an attempt, first of its kind carried out to find out the dominant factor in selection of time-of-day choice of individual. The result of SP survey fulfils the statistical validity for travel time, travel cost, on time performance, and comfort with 99% confidence level while for the frequency the confidence level varies from 50% to 80% based on the corridor. The inclusive variables like carrier, booking pattern, gender, journey frequency etc., are also investigated for their impact on the time-of-day choice of an individual.

The study leads to some important conclusions, which will provide some insights to the stakeholders like, airport developers and owners, airline operators, and regulator like Director General of Civil Aviation (DGCA), to decide on the policy and strategy for their optimum benefit at the same time satisfying the customer preference.

CONTENTS

	Page No.
CERTIFICATE	i
ACKNOWLEDGEMENTS	ii
Abstract	iv
Contents	vi
List of figures	x
List of tables	xiii
List of notations	xv
1 Introduction	
1.1 General	1
1.2 Evolution of intercity air travel in India	2
1.2.1 <i>Comparison of domestic air and rail fares</i>	5
1.2.2 <i>Potential air travel in India</i>	5
1.3 Need for the study	7
1.4 Objectives and Scope of the Study	9
1.4.1 <i>Objectives</i>	9
1.4.2 <i>Scope of the Study</i>	9
1.5 Organization of thesis	10
2 Travel Behaviour Models: An overview	
2.1 Introduction	11
2.2 Aggregate demand models	16
2.2.1 <i>Aggregate demand modeling –Multi mode approach</i>	16
2.2.2 <i>Aggregate demand modeling –mode specific (air) approach</i>	18
2.3 Disaggregate demand models	20
2.3.1 <i>Disaggregate demand modeling - General</i>	21

2.3.2	<i>Disaggregate demand modeling – Multi mode approach</i>	25
2.3.3	<i>Disaggregate demand modeling - mode specific (air) approach</i>	26
2.3.4	<i>Disaggregate demand modeling- Sample design</i>	30
2.4	Summary	32
3	Theory of Discrete Choice Analysis	
3.1	Introduction	35
3.2	General	36
3.3	Theory of individual choice behaviour	37
3.3.1	<i>General modelling assumption</i>	37
3.3.2	<i>Random Utility Models</i>	41
3.4	Multinomial Logit Model	46
3.5	Nested Logit Model	47
3.6	Cross-nested Logit Model	48
3.7	Generalized Extreme Value model	50
3.8	Multinomial Probit model	50
3.9	Hybrid Logit model	51
3.10	Latent class choice model	52
3.11	Summary	52
4	Revealed Preference (RP) Survey, Data Analysis and Modelling	
4.1	Introduction	55
4.2	Survey Methodology	57
4.2.1	<i>Survey questionnaire for data collection (RP method)</i>	58
4.2.2	<i>Study Area</i>	59
4.2.3	<i>Survey Administration</i>	62
4.3	Data analysis	63
4.3.1	<i>Socio-demographic characteristics</i>	65

4.3.2	<i>Trip characteristics</i>	66
4.4	Analysis by Route Category	68
4.4.1	<i>Demographic Characteristics</i>	70
4.4.2	<i>Trip characteristics</i>	73
4.5	Main City Pair Characteristics	79
4.5.1	<i>Demographic Characteristics of the Main city pair</i>	80
4.5.2	<i>Trip Characteristics of the Main city pair</i>	82
4.6	Summary of Data Analysis	87
4.7	Model specification and empirical result	90
4.7.1	<i>MNL model for Time schedule</i>	92
4.7.2	<i>Statistical Analysis of Time Schedule Models</i>	95
4.8	Model validation	96
4.9	Summary	97
5	Survey Design by Stated Preference (SP) Method	
5.1	Introduction	99
5.2	Implementing SP Questionnaire for Intercity Air Travel	101
5.3	Experimental design of the Study	103
5.3.1	<i>Setting of attribute levels</i>	104
5.3.2	<i>Questionnaire Design</i>	105
5.4	Data Collection Details	111
5.4.1	<i>Execution of the survey</i>	111
5.5	Summary	112
6	Stated Preference Survey and Modeling	
6.1	Introduction	115
6.2	Characteristics and summary of area	116
6.3	Data analysis	120
6.3.1	<i>Socioeconomic characteristics</i>	120

6.3.2	<i>Trip characteristics</i>	122
6.3.3	<i>Airline loyalty</i>	125
6.3.4	<i>Quality of service opinion</i>	126
6.4	Calibration of Time-of-day Choice Models	127
6.5	Summary	152
7	Summary and Conclusions	
7.1	Summary	155
7.2	Conclusions	156
7.3	Further scope	158
	References	161
	Appendix I	
I	RP Questionnaire	173
	Appendix II	
II-1	Qualitative Information about the Air Travel	175
II-2	Opinion Survey on Travel Attributes (Based on route category)	175
II-3	Opinion Survey for Main City Pairs	179
	Appendix III	
III-1	Prerequisite	185
III-2	SP Questionnaire	187
III-3	Sample card	189
	Curriculum Vitae	191