KEY DRIVERS TO THE GROWTH OF AIR CARGO DEMAND FOR COMBI-CARRIERS; BASED ON AIR NETWORK OF SRI LANKA

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Thesis submitted in fulfillment of the requirements for the degree of

Masters in Transport & Logistics Management

Department of Transport and Logistics Management

University of Moratuwa

Sri Lanka

October 2022

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The above candidate has carried out the research for the MSc degree on Transport and Logistics Management under my supervision.

Dr. Anuja Fernando

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ABSTRACT

Today air transportation is vital for implementing best international business practices, including just-in-time inventory management and build-to-order production. Regardless of the geographical location, air cargo transportation enables regions and nations to connect distant markets and sustain the global supply chain efficiently and faster. According to the IATA reports, nearly 40 percent of the value of global trade is carried by air, where more than 50 percent of the air cargo is carried on passenger flights (Moving Air Cargo Globally, 2016) (IATA, 2020). Therefore, it is essential to identify the optimum route network coupling in both passenger and cargo demand-driven networks. Cargo demand-driven networks are dynamic upon the factors that affect the cargo demand in respective destinations. This study mainly focuses on identifying the key influencing factors and industries that could affect the growth of air cargo demand in the cargo and passenger demand-driven network.

Unfortunately, most airlines focus only on passenger demand, whereas cargo demand at the destination is often neglected. However, more than 98% of air cargo trades in Sri Lanka are happening through Combi carriers. As the first step to address this issue, it is necessary to understand air cargo generation and attraction at a destination. Sri Lanka will be a best-case study to analyze the Combi carriers. Hence, this study introduces preliminary criteria on how air cargo is generated and assigned to a particular demand.

Five years of export air cargo data, including more than five hundred thousand shipment details, have been used for the cluster analysis to identify similar commodity groups based on air cargo weight and value. Before the analysis, all the export air cargo was classified into 97 commodity groups (According to HS code classification) to get clear output from the analysis. Nine distinct clusters were identified below, showing apparent differences in air cargo behavior.

Cluster Number	**HS Code**						**Cluster Number**	**HS Code**
Cluster 01	1	22	37	53	75	92	***Cluster 02***	3
	2	23	38	54	76	93		6
	4	24	39	55	78	94	***Cluster 03***	7
	5	25	40	56	79	95		8
	9	26	41	57	80	96	***Cluster 04***	14
	10	27	42	59	81	97	***Cluster 05***	21
	11	28	43	65	82			58

	12	29	44	66	83			60
	13	30	45	67	84			63
	15	31	46	68	85			64
	16	32	47	69	86		***Cluster 06***	49
	17	33	48	70	87		***Cluster 07***	61
	18	34	50	72	89		***Cluster 08***	62
	19	35	51	73	90			88
	20	36	52	74	91		***Cluster 09***	71

Identified clusters were classified into four quadrants according to high-high, high-low, low-high and low-low value to weight ratio. In addition, the social and economic impact on cargo generation, the final destinations of the cargo, sub-commodity types, and characteristics are discussed. The findings will benefit airlines in strengthening their air route network and increasing global market access & traffic growth. Likewise, a country could implement the basement to enhance the overall level of productivity. It will help to boost exports and the competition in the home market.

Many research studies have been conducted using different factors and models to forecast air cargo demand, and those did not consider demand from Combi and All-cargo carriers together. More than 30 factors were identified through literature reviews and interviews with industry experts. The independent variables for the analysis were selected, covering different areas that would affect air cargo demand growth at a destination, like an airport and airline capabilities, economic, market, environmental, and human factors. The population of a country, Population Growth, GDP, GDP Growth, Total Passenger demand, Total Cargo Demand, Hub Connectivity, Employment rate, and CO2 emission due to the aviation industry are the selected factors under-considered areas. Regression analysis was conducted for the analysis, and the Connectivity index and the air cargo demand at the destination were identified as the key influencing factors for the growth of air cargo demand at a destination for Combi carriers. These derived factors can assist in assigning flight schedules, route development, and facility improvements of airports and airlines. Hence the outcomes of this research would benefit the airlines, airports, and freight forwarders in their strategic decision-making.

Keywords – Air cargo, Cluster analysis, Regression analysis, HS code

ACKNOWLEDGEMENT

First and foremost, I would like to offer my heartfelt gratitude to my research supervisor, Senior Lecturer. Dr. Anuja Fernando. I have been fortunate to have a supervisor like her who guided me from start to the end ; in the meantime, I followed up my progress continuously and guided me with a bunch of advice in each step of the research. I am very grateful for your encouragement and continuous attention throughout the research. Further, I would like to extend my gratitude to Dr. Varuna Adikariwattage and Mr. Jagath Anuradha for their guidance and support in the analysis.

Special thanks should go to the post-graduate research coordinator Dr. T. Sivakumar for conducting research progress reviews and for the support given throughout the process.

I would like to express my profound gratitude to Senior Prof. Asoka Perera, Head of the Department of Transport and Logistics Management of the University of Moratuwa, for the opportunity created. I gratefully acknowledge the funding received towards my M.Sc. from the University of Moratuwa by the SRC grant (SRC/LT/2021/28) for "Methodology for Air Cargo Assignment".

Also, I would like to convey my gratitude to professionals from Sri Lanka Customs, Mr. Ganganath and the staff members of the ICT division, freight forwarding industry, and airline industry in different organizations and for the people who provided me with contacts in the industry for helping me to collect data and information to carry out the research project. Without their immense support, this research would not be a reality.

I am sincerely thankful to all the staff members and the non-academic staff of the Department of Transport and Logistics Management. Last but not least, I would like to thank my family members, batch mates, senior colleagues, and friends who supported me in making this research success and to everyone who supported me with mere words, encouragement, pieces of advice, and opinions when bringing this study into a reality.

LIST OF ACRONYMS

IATA	International Air Transportation Association
WTO	World Trade Organization
CTK	Cargo Tonne Kilometers
HS	Harmonized Commodity Description and Coding System
WCO	World Customs Organization
ANN	Artificial Nural Network
COP	Crude Oil Prices
UK	United Kingdom
USA	United States America
UAE	United Arab Emirates
GDP	Gross Domestic Products
GSP+	Generalised Scheme of Preferences Plus

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