



Conceptualisation of Air Cargo Sector Development to Enhance the
Success of Oman's Logistics Vision 2040

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Abstract

In recent years, the government of the Sultanate of Oman has recognised the need to diversify its economy and lower its reliance on oil, which makes up approximately 85% of government revenue. As a result, a number of developmental plans have been drafted to shift the nation to a non-oil-based economy, including ‘The Sultanate of Oman Logistics Strategy 2040’ (SOLS 2040), a plan intended to transform Oman into a world top-ten logistics centre by 2040.

A review of the literature shows that, as part of the logistics sector, the air cargo industry exhibits positive performance and trends, particularly in the Middle East, which is considered a transit point for air cargo between Asia, Africa, and Europe. The region generates approximately one-third of the total air cargo tonnage in the world, and industry experts estimate that the global air cargo industry is expected to more than double in the upcoming fifteen years. Experts also recognise that Oman’s geographical location and its geopolitical position present significant opportunities for growth in the air cargo market. However, despite these forecasts, Oman’s air cargo sector received very little attention in SOLS 2040.

Therefore, this study aimed to conceptualise the developmental direction of Oman’s air cargo sector to promote revenue generation, increase market share in the global and Middle Eastern air cargo markets, and show how enhancing this area as part of the logistics sector can help the country achieve the goals of SOLS 2040.

The study employed an exploratory, sequential mixed method research design: (1) an exploration phase to identify air cargo development strategies which need to be established to improve the air cargo sector in Oman, and (2) a confirmation phase to

confirm strategies identified in the first phase. In the exploration phase, a case study was applied, and interview questions were developed. Extensive data was then gathered from two organisations, Oman Aviation Group and ASYAD Group. A total of eighteen air cargo experts from different departments and companies handling air cargo gave in-depth interviews. This produced a holistic opinion about the required strategies to develop Oman's air cargo sector. The findings from the first phase were then analysed and used to develop a quantitative instrument (questionnaire) for collecting data in the second phase. From a targeted study population of 258 participants, 205 respondents submitted questionnaires, representing a response rate of 79.5%. This quantitative data was analysed, and strategies were confirmed.

In the first (qualitative) phase of research, eight main themes were extracted. In the second (quantitative) phase of research, six out of eight of air cargo sector development strategies were confirmed as having the potential to significantly and positively influence the development of Oman's air cargo sector: stimulating air cargo demand, establishing free trade zones, adopting a sea-to-air transportation hub, strong coordination between air cargo stakeholders, improving customs and government agencies, and the development of specialised infrastructures. Two other strategies, establishing a bonded warehouse and promotion and marketing, were not shown to significantly influence Oman's air cargo sector development (see Appendix H Summary Study Diagram).

The study recommended that the air cargo sector of Oman should strive to build its capacity and capabilities to attract clients from all over the globe, thus gaining the benefits of increased international imports and exports and a secure market share from the region. Additionally, the study advised forming an independent department to manage

the air cargo sector from a strategic point of view because, in the current situation, there is no ownership regarding air cargo sector development. An autonomous department would be responsible for prioritising the identified strategies in this study, implementing them, and selecting the right business models for air cargo development in Oman. This would consist of identifying the strengths and weaknesses of the regional market, coordinating with government agencies, developing required air cargo facilities, recognising how to attract air transporters, and supporting industries required for air cargo. Sector development would also include an extensive business growth plan to determine target customers and achieve the overall goals.

The study contributes to professional practice by providing empirical evidence for conceptualising the Oman air cargo sector's future development strategies to achieve success in SOLS 2040 and enhance Oman's logistical footprint in the region. Implementing the identified strategies will secure greater market share from the growing air cargo trade in the global and Middle East markets.

From a theoretical and academic knowledge perspective, the study's findings contribute by opening new horizons in the air cargo sector and making contributions to the existing body of knowledge and theories concerning development strategies as there are no past studies that have explicitly focused on Oman's air cargo to enhance logistics in Oman. Also, with the exception a study by Chang et al. (2007) in Taiwan, no studies on other places in the world concerning the air cargo sector development have been identified. Future researchers will apply and generalise the empirical results for exploring and explaining different associated air cargo sectors. The present study generated a conceptual model to develop the air cargo sector; future researchers can take it further to develop new theories.

Thus, the substantial findings of the study have built a logical bridge between the theoretical and practical knowledge in the field of air cargo sector development. These findings will extend the body of knowledge and uplift the level of understanding for future researchers and practitioners, who may use them to further investigate and explain various related phenomena. Therefore, this study will contribute to academic knowledge in the field of investigation.

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Chapter One: Introduction

1.1 Introduction

Oman's economy depends on the oil sector as the major gross domestic product (GDP) contributor; it constitutes over 80% of total government revenues. This leaves Oman's economy dangerously vulnerable because of fluctuation in oil prices. Therefore, the government of Oman has identified various strategies of alternative drivers for economic growth to reduce its dependence on the oil revenue and boost non-oil income. This is to diversify the economy, encourage sustainable economic development, and create a sense of financial security (Al-Wahaibi, 2019).

In 2016, Oman formed a national committee called 'The National Programme for Enhancing Economic Diversification' (Tanfeedh). Tanfeedh aims to identify resources, responsibilities, and timeframes required for implementing initiatives that drive economic diversification. The committee concluded that logistics, along with other sectors such as tourism, manufacturing, mining, and fishing, can be new sources of income for the country. Tanfeedh emphasises the need to invest in infrastructure projects such as airports, ports, and roads to enhance Oman's logistical footprint in the region, boost non-oil exports, and better integrate the Omani economy into the global trade network (TANFEEDH, 2017).

The Supreme Council for Planning initiated a task force of ten Omani executives from the government, private sectors, and academia to work alongside sixty-five logistics specialists and stakeholders to develop a national logistics strategy branded as 'The Sultanate of Oman Logistics Strategy 2040' (SOLS 2040). This is a blueprint intended to

transform Oman into a world top-ten logistics centre by 2040 with an integrated logistics system including airports, ports, infrastructure, road transportation, and sea shipping, creating Oman as a global logistics hub. The ambition is that the logistics sector will contribute to a non-oil income, employment, a global perception of Oman regarding logistics, the positioning of Oman on various logistics and industrial indices, the market share of goods flowing into the region, and overall country GDP growth (SOLS 2040, 2014).

According to Ithraa (2016), the logistics sector contributed 4.9% to Oman's GDP in 2015. Moreover, between 2010–2015, this sector's growth exceeded 8% on average (TANFEEDH, 2017). Thus, the logistics sector plays an important role in Oman's ambitious economic plans and is central to increasing inward investment, non-oil exports, and the nation's competitiveness.

The air cargo industry is an important sector belonging to the overall logistics industry (Yuan et al., 2010). Airports Council International (ACI) (2019), reported that the global share of world trade by volume of air cargo is less than 1%; on the other hand, it is nearly 35% by trade value, which is equal to 5.6 trillion dollars. One-third of the total air cargo tonnage originates or terminates in Middle Eastern countries; the region is considered a transit point for air cargo between Asia, Africa, and Europe. During 2017, the Middle East accounted for an estimated 1.3% of world revenue tonne-kilometres (TKM), 1.6% of world tonnage, and a quarter of the air cargo market in the Middle East, which included 662,000 tonnes for East Asia alone. Between 2018–2037 air cargo between Europe and the Middle East is expected to grow by 3.4% annually (Boeing, 2017). Oman, however, has just 2.1% of inbound air freight traffic in the region (TANFEEDH, 2017).

1.2 Research Aim, Objectives, Questions, and Purpose Statement

The study aims to conceptualise how future development strategies of Oman's air cargo sector should be established as part of the logistics sector. This should consequently enhance Oman's logistical footprint in the area for the purpose of boosting non-oil income and achieve the goals of SOLS 2040 by capitalising on the fast-paced developments in the region.

The main objectives of the present study are:

- 1) To identify air cargo development strategies/initiatives in Oman.
- 2) To confirm air cargo strategies/initiatives identified in the first phase.

The research questions of the present study are:

- 1) How can Oman achieve a larger air cargo market share?
- 2) In what capability and capacity can Oman develop its air cargo sector?
- 3) What advantages will the development of air cargo provide to the Omani logistics sector?
- 4) What advantages of Oman's strategic location would support its air cargo sector development?

The present research purpose statement is:

How Oman can develop its air cargo sector as part of the logistics sector to increase its market share in the growing Middle East and global markets capitalise on its strategic location to promote revenue generation and boost non-oil income.

1.3 Research Rationale

Oman is strategically located in the middle of a dominant shipping route between not only the West and East but also between Africa and Asia. The country borders Saudi

Arabia, Yemen, and the United Arab Emirates by land and Iran and Pakistan by sea, making Oman a strategic trading hub of Asia (Al-Wahaibi, 2019). Moreover, the Governorate of Musandam gives the country territorial rights on the Strait of Hormuz, which generates 30% of oil exports worldwide through shipping (Zahlan, 2016). This location between the axis of the Indian Ocean and Arabian Gulf is a strategic advantage, which can help Oman dominate the logistics industry in the import and export of products.

Despite the advantage of Oman's geographical location, the national logistics sector has not yielded its potential benefits. Although it is well placed to fulfil a logistical hub role, Oman lacks an integrated approach between logistics modes (sea, road, and air). This opportunity will not remain indefinitely, so there is a real urgency for integration between these modes (SOLS 2040, 2014). Yuan et al. (2010) highlighted that the modes of transportation, including air cargo, ought to be integrated into the entire supply chain. This wider logistics industry will then be more efficient, enabling nations to better connect to global supply chains and distant markets. Also, they argue that nations with an efficient supply chain enjoy competitive trade and production advantages over nations without this efficiency. Confirming these claims, SOLS 2040 (2014) reported that approximately 70% of Oman's air cargo imports arrive through the UAE because of unreadiness in Oman's air cargo sector. Consequently, customs receipts are reduced, Omani imports bear higher transport costs, and direct employment opportunities are lost in this sector. Furthermore, Al-Wahaibi (2019) stated that air cargo has not been part of the logistics strategy in Oman; there is also a lack of data on air logistics in the current logistic sector structure of Oman.

Yuan et al. (2010) stated that despite air cargo being a smaller business than the passenger business, the role it plays between trade and gross domestic product per capita

has caused its services to become more significant to the economy. Kupfer et al. (2017) determined that air cargo is an essential contributor to profit and cash levels and has had robust growth over the past decades. Statistics show the global share of world trade by volume of air cargo is less than 1%; on the other hand, this is nearly 35% by trade value, equal to 5.6 trillion dollars (ACI, 2019). Moreover, Lee et al. (2019) reported that total freight TKM showed a continual increase from less than 50,000 to more than 2,000,000 between 1975–2014. Also, from 2001–2012, air cargo container traffic has grown by 8.3% and, overall, 3.7% on a yearly basis. The European Business Review (2019) reported in 2018 that more than 54 million metric tonnes of products have been transported by air cargo. Furthermore, Research and Markets (2020) reported air cargo volumes grew in 2018 by 4.1% to 63.7 million metric tonnes.

Boeing (2017) forecasted that the air cargo fleet will grow by more than 70% and the traffic of air cargo will double in the next twenty years. The International Civil Aviation Organization (ICAO) and the International Air Transport Association (IATA) published optimistic forecasts through 2035 at a rate of 4.2% yearly, meaning the global air cargo industry will more than double in the upcoming fifteen years (Hajjar and Kaitouni, 2018). In addition, ACI (2019) expects 20% growth over the next five years for the overall universal air cargo industry. Supporting this expectation, Airbus (2014) cited in Chao and Li (2017) anticipates the upcoming two-decade annual increase at a rate of 4.5-5.0%. Budd and Ison (2017) reported that air freight would grow between 4–5% annually until 2034, and 2,930 freighters will be in service in 2034.

Interestingly, one-third of the entire air load tonnage terminates or originates in Middle Eastern countries as it is considered a transit point for air cargo between Asia, Africa, and Europe. Moreover, according to TANFEEDH (2017), the average growth of

the air freight sector in the Gulf Corporation Council (GCC) countries increased by 10% during the last six years. Boonekamp and Burghouwt (2017) concluded in their study that the world's largest freight hubs are mostly located in Asia and the Middle East, where there are many connection possibilities. Between 2018–2037 the overall air cargo between Europe and the Middle East will grow by a rate of 3.4% (Boeing, 2017). Oman, however, holds a very small market share of air cargo in the region, with only 2.1% (TANFEEDH, 2017).

Based on the above data, the indication is that Oman can focus on air cargo developments in future as a potential sector to boost non-oil income and diversify its economy. This is consistent with Mayer's (2016) assertion that air cargo operations are positively linked to regional economic expansion, as GDP development is highly interdependent with air cargo development.

This study aims to enhance Oman's logistics industry by focusing on air cargo development. The capacity for Oman to secure a greater market share in air cargo from the growing Middle East and global markets clearly exists. This study will also provide a blueprint for Oman's air cargo sector development opportunities and advise on an in-country integrated logistics centre (sea-to-air). Lastly, as there are no past case studies that have explicitly focused on Oman's air cargo to enhance logistics in Oman, the need for this research is evident in order to bridge the empirical gap.

1.4 Gaps in the Knowledge and Potential Contribution to Professional Practice

In a recent study published by Abdul Rahman et al. (2021), references to research in the Oman logistics sector are old and do not cover logistics sector development. Moreover, there is a notable gap between existing development in the sector and the

national logistics strategy, SOLS 2040, which is intended to integrate air, land, and sea logistics systems. In another recently concluded study regarding Oman's logistics sector, Al Abbadi et al. (2021) stated that research that focused on maximising Oman's Strategic location impact on the logistic sector to assist the national economy is scarce. Al-Wahaibi (2019) noted a lack of data on air logistics in Oman and mentioned air cargo is not included in Oman's logistics strategy development; therefore, he considered it a future research area. Ba-Awain and Daud (2018) asserted that there is a clear need for a more significant study on all logistics activities in Oman. In their study which aimed to analyse Oman's logistics sector compared to international best practices, Taderera et al. (2018) found that Oman's logistics facilities such as airports, ports, roads, and the Customs and Taxation Department required improvement. Investment is also needed to make the One-Stop-Shop fully functional and to improve the critical skills of employees in the sector.

Choi and Park (2020) mentioned there is a need for further research providing an in-depth explanation of the paradigm shift in the air cargo market from high price products to value products based on consumer preference, which significantly impacts air cargo demand; consequently, airlines and other air cargo stakeholders should improve policy, which is essential for responding appropriately for sustainable air transport. Lange (2019) noted that passenger airline business models have been changing over recent years, but studies have neglected to assess whether the airlines conduct air cargo business alongside passenger transport. Paethrangsi (2021) observed that while several researchers have acknowledged significant influencing factors of pricing and non-pricing policies in cargo airlines' operations, a gap exists in analysing the passenger airlines' performance in taking full advantage of cargo operations to boost revenue.

In addition, air cargo carriers' pricing decisions have not been explored by researchers despite their influence on demand and operational costs. According to Van Asch, et al. (2019), other factors such as the freight forwarder's role in the business and the impact of full freighters at an airport have been examined. However, no single study has been undertaken to focus on strategic factors promoting competitiveness. Gong et al. (2018) pointed out that research on air cargo is generally less developed due to data availability constraints because traffic volume data for most airlines is usually inaccessible. Moreover, Feng et al. (2015) stated that most air cargo real-world problems remain unsatisfactorily solved because of their complexities, and most of the research conducted since the 1990s concerning air cargo has been theoretical research. Gardiner et al. (2005) mentioned that there is a scarcity of existing research concerning air cargo location selection decisions and effective marketing on cargo airline choice. Furthermore, Rezaei et al. (2017) stated that a limited number of studies are available regarding the optimisation of air freight and KPIs in the air cargo industry. Yuan et al. (2010) said sea transport competitors are attracting shoppers, offering lower prices, faster ships, and innovative solutions; however, the evasiveness of cargo handling costs that vary with the seasons and cargo types has thus far limited researchers to study the service complementarity and substitution between air and sea transports. They recommend future research around how policy and regulations impact the air cargo sector.

Despite the important role of the air cargo sector as an international trade facilitator, Geloso Grosso and Shepherd (2011) say little formal research has analysed the impact of liberalisation on trade flows. Yuan et al. (2010) suggested future research for setting up distribution centres and air cargo value-added services such as cold storage, pilotage, bunkering, and warehousing within the airports to increase the air cargo sector's

attractiveness in-country and increase the flow of cargo through airports. Current research in air logistics appears to ignore airports' heterogeneity from an air cargo perspective, points out Mayer (2016). Unfortunately, air cargo has received little attention in research; although it is one of the major outputs of an airport, it plays a minor role for many of them. Some airports, however, massively rely on the cargo market. For example, at Cincinnati/Northern Kentucky International Airports, cargo airlines generate more than 50% of the aircrafts' landed weight.

Thus, the current study intends to fill the academic and practical gap. From a theoretical perspective, the study's findings will open new horizons in the air cargo sector and make contributions to existing knowledge and theories as far as development strategies are concerned. Future researchers will apply and generalise the empirical results for exploring and explaining different associated phenomena. The practical objective of this study is to provide recommendations based on the empirical evidence generated to assist the government of Oman and related stakeholders to conceptualise Oman's air cargo sector development as there are no past studies that have explicitly focused on Oman's air cargo to enhance logistics in Oman. Also, similar research in other countries has not been found, with the exception of a study by Chang et al. (2007) in Taiwan. The lack of coverage in the empirical literature regarding air cargo sector development most likely exists because air cargo is a new mode of transportation compared to sea and land transportation and has been used only recently for just-in-time commodities, worldwide trade, and e-commerce. These new business sectors have created the need for air cargo transportation over other transportation modes and created a competitive factor for specific industries, such as perishable products and e-commerce, Therefore, this study will contribute academic knowledge to this field of investigation.

1.5 Research Context and Lens

The current research context is based on conceptualising Oman's air cargo sector development to advise the government to develop the sector as a source of income for the country. Air cargo development can be seen from various perspectives, such as airports seeking to attract more air cargo courier companies to increase market share, an airline company planning to maximise their cargo load, or even a freight forwarder planning to consolidate many air shipments and optimise integration between air cargo supply chains. Development could be from the standpoint of a giant e-commerce company such as Amazon, which has their own air cargo fleet but aims to develop their network coverage, cost optimisation, customer satisfaction, or penetration into a new market.

Air cargo sector development is not only concerned with improving operational perspectives, such as efficiency, attraction in the airport, or new routes for an airline or express courier, but also aspects of creating industry within the country. Developing a sector needs enablement from different facets, such as infrastructure, government policy and marketing, and coordination between different stakeholders that do not necessarily direct change in air cargo operation but have a different holistic role in, for example, the reputation of a country, trade or air freedom, and free zone and foreign investment policies. These do not involve direct air cargo development strategies; they are economy catalysts that stimulate the demand and traffic to the country in which they are applied. For instance, developing a free zone near an airport would attract manufacturers who need to transport their product by air, which then leads to air cargo carriers to be attracted. Consequently, the country's economy will eventually benefit directly or by spillover. Moreover, a free zone could encourage direct expansion in air cargo sectors by developing new infrastructures, leaner processes for customs, or incentive schemes to

attract more air cargo carriers to the country. Thus, the identified air cargo sector development strategies in this study could be linked directly or holistically with the air cargo sector development.

1.6 Brief Research Methodology

The study is based on exploratory, sequential mixed methods (the pragmatism paradigm) because of its two-phased objective: the exploration phase (induction) for air cargo sector development in Oman and the confirmation phase (deduction) of the strategies identified in the first phase.

A qualitative approach to the case study was applied to meet the first objective, and interview questions were developed. In-depth data was gathered from two organisations, i.e., (1) Oman Aviation Group Company and (2) Asyad Group. These were selected as the case studies for the qualitative research phase as the organisations cover all major aspects of managing the logistics sector and air cargo supply chain in Oman (ASYAD, 2020). Thus, to cover the full range of perspectives, to get holistic output, to deepen understanding in order to draw valid conclusions, and to achieve the current research objective, these two organisations were most suitable for the present study.

A total of eighteen air cargo experts agreed to give in-depth interviews. They are from high-level positions, e.g., CEO, COO, and GM, with a minimum of ten years of experience in the air cargo field. In addition, they are from different departments and companies handling air cargo, so they provide a holistic and comprehensive set of opinions about required strategies for the development of this sector in Oman.

QSR Nvivo Version 12 was used to apply thematic analysis to the textual data, develop different nodes, and identify different themes. Eight main themes, with a total of thirty-four sub-themes, were extracted through in-depth interviews in phase one.

The findings from the first phase (air cargo development strategies) were used for the development of a quantitative instrument for the collection of data in the second phase, with the purpose of confirming air cargo development strategies in Oman as identified in the first phase. The conversion of qualitative into quantitative was done to put qualitative data into a form amenable to statistical assimilation from what are generally conceived to be quantitative data collection procedures (e.g., survey). The data was then analysed statistically to test the responses' outcome; thus, confirmation of the strategies to develop Oman's air cargo sector were identified from the qualitative themes in the first phase.

The quantitative instrument was developed as a result of the first phase of qualitative (i.e., exploratory) research. The air cargo sector development strategies in Oman obtained from interviews (qualitative research phase) were mapped to develop the survey instrument. The instrument was designed for surveying the second phase for confirmatory purposes.

Pre-testing of the instrument was then conducted before circulating it for the field survey. After that, the researcher visited most air cargo related companies in Oman to obtain potential participants' contact information. This included email addresses from air cargo management companies, airports, airlines, aviation management (passenger/cargo) and ground handling, air cargo regulators, logistics academics, shippers, integrators, forwarders, clearing agents, and air cargo users to get respondents' unbiased answers in a comprehensive questionnaire and confirm required strategies identified in the first stage of the research methodology for developing Oman's air cargo sector. A total of 258

respondents were the targeted population for the study, with 205 respondents returning the questionnaires, representing a response rate of 79.5%. MS Excel was employed to draw demographic information figures. Smart PLS was used to test the measurement and path models. In the relationship model, the path coefficient beta values (b), t-statistics, and p-values were used to test the relationships of each independent construct/major categories strategy with the dependent variable of ‘developing Oman’s air cargo sector’. Based on the findings from the relationship model, we confirmed that air cargo strategies (i.e., independent constructs/variables) influence the air cargo sector development (i.e., dependent variable). Six out of eight main themes (air cargo strategies) were confirmed, and two were rejected.

1.7 The Organisation of the Study

The research project will be split into six main chapters: an Introduction chapter to set the scene and outline the main study issues and agenda; a Literature Review chapter to review existing literature focused on air cargo to present a theme and pattern in the information and support answers in the present research objectives; a Methodology chapter to cover the details of the methodology, data collection, and analytical methods used to generate key empirical findings based on the conceptual framework of the dissertation; a Results chapter to present findings from the collected data through the application of the proposed methodology; a Discussions and Conclusions chapter to interpret and explain the current research results, show how they are related to the research objectives and other scholars’ views concerning air cargo sector development, and draw conclusions by making a summary of the study’s findings; and a Contributions to Professional Practice and Academic Knowledge chapter to list the study’s academic

and professional contributions and limitations and provide recommendations for future investigation and improvement.

Chapter Two: Literature Review

2.1 The Literature Review Search Strategy

The primary objective of the literature review (LR) chapter for the present study is to review existing literature focused on air cargo sector development in order to identify themes and patterns which may support achieving the present research aim and help conceptualise how future development strategies of Oman's air cargo sector should be established as part of the logistics sector.

As the study is exploratory in nature, the literature has been approached inductively via developing themes and categories with no predetermined variables or areas. These themes and categories include the following:

- Understanding the depth of the air cargo sector, including air cargo and economic development; the link between air cargo and other logistic pillars; factors influencing the development and success of the air cargo sector; and the various outcomes of air cargo development.
- Determining what research has already been done in the study area.
- Justifying the research topic, including research rationale; highlight gaps in knowledge; and shape the study's aims, objectives, and questions.
- Unearthing various theoretical, methodological, and contextual gaps in the literature
- Identifying suitable methodologies for data collection and analysis
- Highlighting detailed studies that emphasise the role of theory in guiding and designing an effective supply chain

- Describing, clarifying, and integrating the contents of the previous research.
- Developing the interview questions.
- Identifying research containing other scholars' perspectives on air cargo sector development to compare with the current study's findings

To fulfil the objectives mentioned above, the following steps have been taken:

Step Number	Steps	Strategy
1	Frame the target literature	<p>To specify and frame the target literature, the following steps have been taken:</p> <ul style="list-style-type: none"> -The topic/research title was selected, i.e., “The Conceptualisation of Air Cargo Sector Development to Enhance the Success of Oman’s Logistics Vision 2040.” - The main objectives of the present study were set, i.e., "To identify air cargo sector development strategies/initiatives in Oman". -The research purpose statement was developed, i.e., "How Oman can develop its air cargo sector as part of the logistics sector to increase its market share in the growing Middle East and global markets and capitalise on its strategic location to

		<p>promote revenue generation and boost non-oil income."</p> <p>- Based on the research purpose statement, the research questions were developed, i.e.,</p> <ol style="list-style-type: none"> 1) How can Oman achieve a larger air cargo market share? 2) In what capability and capacity can Oman develop its air cargo sector? 3) What advantages will the development of air cargo provide to the Omani logistics sector? 4) What advantages of Oman's strategic location would support its air cargo sector development? <p>The research title, objectives, questions and purpose statement were used as search keywords to specify and frame the target literature and to draw the line on what was included in the literature review.</p>
2	Search the literature	<p>In searching for various research articles, different databases were explored, e.g., Elsevier (Scimedirect), Emerald, Jstor, Springer, Taylor and Francis, and John Wiley and Sons. Various search engines were used as every engine has its</p>

		<p>own algorithm, i.e., Google Scholar, NELSON, and semantic scholar. Google Scholar supports a simple way to search for scholarly literature broadly across many disciplines and sources: articles, theses, books, abstracts, and court opinions. Semantic Scholar is an artificial-intelligence-backed search engine for academic publications. NELSON (Northampton's Electronic Library Search Online) searches library resources available to download.</p> <p>The major search topics included the following: air cargo, air cargo sector development, the link between air cargo with other logistic pillars, air cargo market share, air cargo growth trends, Air cargo and economic development, factors influencing the development and success of the air cargo sector, Oman's logistic sector, Oman's strategic location, capability required to develop the air cargo sector, academic theories in the logistics and supply chain field, air cargo and COVID- 19 impact.</p>
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		<p>Initially, on the bases of scanning and skimming techniques identified by and McEvoy (2016), 153 papers were shortlisted along with more than 12 reports from air cargo leader organisations such as Airbus, Airports Council International (ACI), Boeing, the International Air Transport Association (IATA), and the International Civil Aviation Organization (ICAO). Five government reports related to air cargo in Oman were selected: The Sultanate of Oman Logistics Strategy 2040 (SOLS 2040), Althraa, The Supreme Council for Planning, National Program for Enhancing Economic Diversification (TANFEEDH), and the Implementation Support And Follow-up Unit (ISFU). Finally, five theses in the area of air cargo were also included.</p> <p>Note: the amount of literature increased after the process mentioned above as this step took place in the five month period from September 2019 to January 2020. However, throughout the rest of the study, other literature was added.</p>
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3	Catalogue the data	<p>All literature found during the search was categorised and saved in folders. A literature review table was developed containing multiple columns: author, title and publication, objectives of the study and the related variables, research design, data collection and analytical methods, instrument, sample, results, and research gaps.</p>
4	Thematic review of the literature	<p>The presented literature was subjected to a thematic review which subdivided the literature review into smaller sections. These sections discussed the different topics organised around air cargo to cover most aspects of the study topic holistically, thus providing a comprehensive review that supports the study objectives.</p> <p>The thematic analysis of literature involves reading, understanding and organising the data according to themes, patterns, and background information. A theme includes a group of sentences or paragraphs from literature in the same context.</p>

		<p>The researcher in the current study used Writer's Blocks software for this step. Writer's Blocks software can arrange and organise the data by letting users collect and store all information, references and literature in one place to create one theme in a column. The column can include many subthemes. The themes can be a few sentences or a few pages of text, keeping each idea in a discrete container.</p>
5	<p>Compose the literature review chapter</p>	<p>After the thematic literature review step, the researcher proceeded to write up the literature review chapter, which involved building bridges between related ideas and information on the same theme, integrating what other scholars have done and said, and identifying the central issues in air cargo sector development. This step also included synthesis and paraphrasing to build a clear picture of existing air cargo sector development research.</p>

2.2 Air Cargo within the Logistics/Supply Chain

Air cargo or air freight refers to the shipment of goods through air carriers, such as aeroplanes. Air cargo has become the most valuable form of transport, particularly in transporting or shipping goods quickly worldwide. The industry's growth has been steady, pointing to the development of industrialisation and trade worldwide. Industrialisation is

the key driver for the air cargo industry as factors such as demand for goods and services across borders grow with increasing trade between countries and regions. Fu and Oum (2014) point out the growth of transport liberalisation and its impacts on air transport growth from the international perspective. Addepalli et al. (2018) also highlight the emergence of the civil aviation industry as a significant phenomenon that gave birth to air freight and passenger services globally. Civil aviation regulations and frameworks shaped the air industry and separated the passenger and cargo sections within the air industry for convenient transportation.

Logistics and supply chain management are old traditions within the business and trade industry. Szymonik (2012) considers logistics an important aspect in human societies' practice since the 5th century B.C. According to Szymonik (2012), logistics denotes transportation, accommodation, and the supply of goods and services. The same sentiments are developed by Islam et al. (2013), who opine that strict principles and policies across borders guide logistics practice. The doctrines and procedures of logistics and supply chain management are obtainable by discussing basics related to air cargo and other relevant transportation practices and services. Islam et al.'s (2013) observations are supported through findings presented by Yu (2016). The findings indicate the importance of key logistics principles by highlighting storage, warehousing, packaging, and material handling elements.

Further, Yu (2016) extends the focus to the emergence of e-commerce and how it has changed the logistic and supply chain practices and services in the air cargo industry. E-commerce has also changed logistics policies and common practices by introducing electronic networks that handle business transactions. The emergence of new technologies is important in designing supply chain channels that fit into the market

needs. Moreover, electronic modes, such as blockchain technology, provide a system of procedures that highlight common logistical and supply chain elements such as transportation, warehousing and storage, inventory management, and distribution of goods and services. Koh et al. (2020) hold that blockchain, also known as a distributed ledger, has revolutionised data and the management of transactions and made air cargo processes suitable for the logistics/supply chain discipline. The blockchain transportation system allows air cargo transportation to adopt a frictionless supply chain system where goods and services flow across borders. The processes fit into the supply chain discipline, involving the transportation and distribution of goods and services across different channels. ACI (2019) asserted that emerging technology, such as blockchain and drones, are air cargo drivers. This accords with Suryani et al. (2012), who say that developing high technology industries make a huge contribution to air cargo volume.

The setting of global geographical factors of production plays a key role in restructuring transportation and distribution networks. Rodrigue (2012) points out the distinct geography of global supply chains. The study underlines the importance of geography in the air transport industry in revealing patterns and structures involved in outsourcing and distribution. Airfreight involves a complex supply chain that rests on interdependent concepts. Global production networks serve as the main driver for the air cargo supply chain field. Roh et al. (2013) agree with Rodrigue (2012) by highlighting the importance of logistics in sophisticated supply chains such as the air cargo supply chain. The availability of warehouses proximal to airports creates convenience in the air cargo business since warehouses serve as storage facilities for goods ready to be transported through the air.

2.3 Academic Theories in the Logistics and Supply Chain Field

One element of examining the literature is determining what theories might be used to investigate the questions in a scholarly study. In a quantitative study, researchers usually test hypotheses originating from a theory. The theory becomes a framework for the entire study—an organising model for the research hypotheses or questions and for the data collection strategy. In a qualitative study, the researcher may aim to develop a theory as the outcome of a study. However, the case can be made that no qualitative research begins from pure observation and that a prior conceptual structure composed of theory and method provides the starting point for all observations. In essence, the inquirer uses the theory in a qualitative study to describe the broader explanations used or developed in their studies or return to the theory at the end of the study to review how it informed the results and the findings. In a mixed-methods study, researchers may both develop theories and test them. (Creswell and Creswell, 2017).

The current study has no explicit theoretical perspectives, orientation, or lenses. It aims to identify air cargo development strategies in Oman and thereby develop a theory, not to test, explain, verify, or predict using an existing theory. The researcher attempted to build upon the experience of the participants to construct a rich, detailed description of air cargo sector development in Oman. However, a part of the literature review objectives is to identify various established theories in the study area and include what could support the study's objective of developing the air cargo industry and to inform the findings and the results.

The physical distribution of goods and services, logistics, and supply chain management are well researched and theorised areas in literature. According to Wellenbrock (2013), the conceptualisation of numerous supply chain concepts has led to

various theories. Each theory is vital to the logistics processes and supply chains as they provide strategies to overcome the complexity of global supply networks. Halldórsson et al. (2015) stated that the theories provide a helpful understanding of how to structure a supply chain and manage a supply chain structure. Simangunsong et al. (2012) acknowledge the importance of theory as a foundation for research on relevant issues in the dynamic global supply chains. Halldórsson et al. (2015) add that theories guide researchers toward important questions, extend knowledge in a discipline, and inspire management. Creswell and Creswell (2017) stated that theories are used as a broad explanation for attitudes and behaviour and provide a scientific basis for prediction. Usually, researchers present theories as part of a literature review to help to explain what the researcher expects to find in a study.

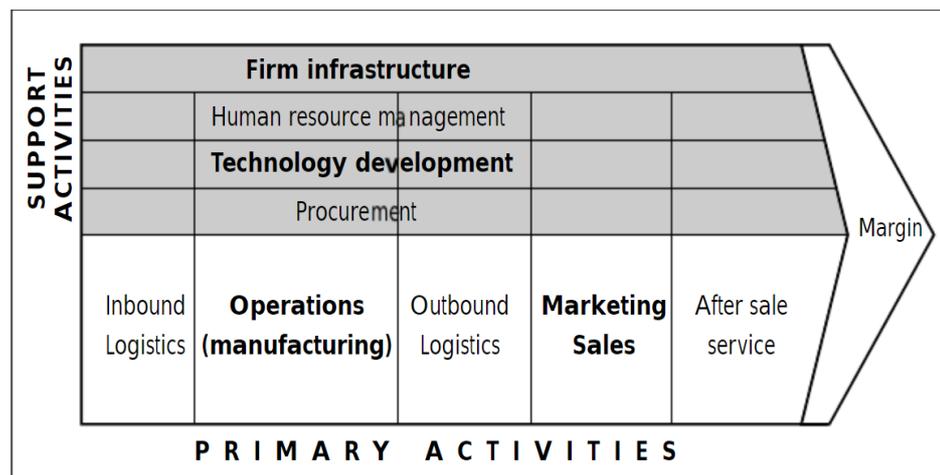
2.3.1 Porter's Value Chain Model

A unique tool for assessing the value chain is Porter's value chain model. Mintzberg et al. (2020) describe Porter's value chain model as methodical approach to examining a company's performance and interaction with other companies and markets. Chaffey et al. (2019) add that Porter's value chain model is well-established and can manage the key activities within an organisation and add value for customers. Weske (2007) explain that the value chain model allows organizations to manage high-level business activities by relating them to each other to understand how an enterprise works internally. Sahaf (2009) asserted that value chain analysis enhances the product by reviewing the activities of its creation and determining the opportunities to add more value at each stage. A company engages in several activities to transform inputs into outputs that add value at each stage, thus creating the value (Kuratko and Hoskinson, 2016). Koc and Bozdog (2017) define the value chain as a set of activities executed to

develop, create, market, deliver, and support the product during the product's life cycle to create value for their clients. Porter's model categorises value chain activities into two main streams: primary activities and support activities.

Primary activities are concerned with the physical development of the product, its sale and transfer to the customer, and after-sale service. They consist of inbound logistics, manufacturing, outbound logistics, marketing and sales, and after-sale service to handle the ongoing production.

Support activities consist of purchasing, information technology, human resource management, and infrastructure. Figure 2.1 illustrates Porter's value chain model.



*Figure 2.1 Porter's Value Chain Model
Adapted from de Mozota (1998)*

McPhee and Wheeler (2006) asserted that the value chain model has changed over the last two decades because of globalisation and the greater involvement of international partners. Successful businesses are now shifting the focus from internal strategy development to a broader view of the company as a part of the world around it. Thus, the value chain should consider those activities to create value via external relationships with entities such as governments, other firms, communities, civic organisations, educational

institutions, and customers. This would provide an opportunity to co-create unique value as Porter's value chain focuses on the firm's value chain and is kept distinctly separate from the external value chain.

2.3.2 The Network Perspective Theory

Whereas the main focus of Porter's value chain model looks at a firm's activities within an organisation, the network perspective theory looks at the relationship between a company and its external partners, which is the advice given by McPhee and Wheeler (2006): firms should shift the focus from internal strategy development only to a broader view as a part of the world around it due to new market needs and globalisation.

Wellenbrock (2010) posits that the network perspective theory effectively describes the relationship between firms, customers, suppliers, and buyers. Halldórsson et al. (2015) asserted that the theory gives a thoughtful overview of the inter-organisational relationship between partners. Galaskiewicz (2011) notes that the partners within the network aim to convey information, develop products, and coordinate their operation. Halldórsson et al. (2015) add that the theory gives a clear picture of relationship rules among companions and how to manage and structure the supply chain as the theory influences information sharing or transfer among different entities in the supply chain. Halldórsson et al. (2015) further argue that networks offer a learning platform for companies as they play a significant role in ensuring that information is efficiently shared among companies. Wellenbrock (2010) argues that strategic networks are critical since they enable firms to access resources, information, markets, and technologies, hence achieving their strategic objectives. Therefore, the key variable of the network perspective theory is the position or location of a firm within the network that is presumed to influence the firms' performance and its competitiveness. Lavassani et al. (2008) also

add that the theory can increase a firm's capacity and capability within the network through alignment strategies.

Wellenbrock (2010) postulates that one of the main hypotheses of the network perspective theory is built on the fact that a company can achieve a competitive advantage to outperform its competitors. Kim et al. (2011) argued that it is crucial to consider the supply chain as a network for firms to gain operational efficiencies, enhanced performance, and ultimately sustainable competitiveness. Thus, the network perspective theory is very efficient in guiding organisations on how they can adjust their operations within a particular network to enhance their relationships with suppliers and other organisations' key stakeholders through their supply chains.

Wellenbrock (2010) states that the theory entails relatively new supply management concepts. Further research is needed to determine best practices and managerial approaches for several types of networks to ensure the proper application of this theory. In Wellenbrock's (2010) opinion, the development of solid organisational networks simplifies the resource allocation process, making businesses stay strong even during tough economic times. Notably, Halldórsson et al. (2015) maintain that since a network is defined by the close relationship between firms and their suppliers, the implementation of proper networks decreases the risk of resource shortages, as explained in the network perspective theory. McPhee and Wheeler (2006) explain networks as activities related to the management and interaction of external networks such as governments, other firms, communities, civic organisations, educational institutions, and customers, which gives an opportunity to co-create unique value. The key point is that firms must select activities that will allow them to build value from their external networks.

Therefore, the network perspective theory is an important tool for achieving the current study's objective. It enables the air cargo stakeholders in Oman to access resources, information, markets, and technologies easily, hence achieving their laid-down strategic goals and facilitating connections between all levels in supply management. The key variable of the network perspective theory is the position or location that is presumed to influence the sector's performance and competitiveness, which is the main advantage for Oman to develop its air cargo sector.

2.3.3 Channel Coordination Model

Channel coordination model aims at facilitating the performance and optimisation of the supply chain channels. The model, developed by Ananta Subramania Kumar in 1992, focuses on aligning the plans and objectives of an enterprise to improve the performance of a supply chain. Panda et al. (2015) highlight the importance of the 'channel coordination model' in a complex supply chain channel such as a three-level supply chain where the manufacturer, distributor, and retailer are involved. Modak et al. (2016) agree with Panda et al. (2015) by stating that the channel coordination model is effective in a multiple-layered supply chain, decides channel conflicts, and provides a win-win result for all stakeholders. The model allows logistic companies to realign their channels to meet the objectives of multiple customers. Wang et al. (2016) hold a differing opinion on the effectiveness of the channel coordination model in logistic management processes. The researchers opine that the channel coordination model determines the fairest revenue-sharing coefficient in a particular contract. Fairness concerns are significant in a supply chain as they tend to affect channel coordination in a dyadic channel under direct demand. Zheng et al. (2020) also support the sentiments of Wang et

al. (2016) by affirming that channel coordination in a three-layered supply chain holds significant fairness concerns.

Regardless of the concerns above, the theory will—from the view of aspect plans alignment—increase supply chain responsiveness and efficiency, which is considered a competitive advantage. Moreover, we can mitigate fairness concerns by signing an agreement to preserve the rights of all parties. The channel coordination theory would support the present study's aim by aligning plans and objectives of Oman's air cargo sector stakeholders. Air cargo transport consists of several entities, situations, and processes. It must organise all the various stakeholders, such as shippers, forwarders, airlines, air cargo stations, customs, banks, and clearinghouses to deliver each part of the air cargo services and provide a clear interface and handover process between them.

2.3.4 Material Flow Theory

Supply chain management can be analysed and examined using the material flow theory. Hou et al. (2017) examine the development of physical material supply to logistics and supply chain management. The material flow theory expands the elements of logistics to the organisation of key factors, such as society, economy, and the environment. Hou et al. (2017) emphasise the theory as a model representing all processes and progress in a supply chain, including transportation, inventory management, raw materials, and final products. The study concludes that the material flow theory is ideal for dealing with the complex flow of materials in 21st century supply chain management. Wang et al. (2018) concur with Hou et al. (2017) by holding that the theory is relevant for addressing and managing a proactive and holistic supply chain network. According to Wang et al. (2018), the emerging needs in supply chain management caused by rising demand and disruptions require a proactive approach. However, Li et al. (2021) contrastingly state the

vulnerability of the material flow model, particularly on the interruption and propagation of the supply chain likely to influence the supply chain network. Material flow might experience a ripple effect caused by concurrent and successive supply and demand interferences. Indeed, we need to take into consideration the disruption between demand and supply. However, the theory is still valid as a foundation for setting up the supply chain as it covers all the logic sequences, processes, and stages required in the supply chain. Material flow theory can be the model for the current study as it gives direction to set up Oman's air cargo sector based on building the capability and capacity required to allow the flow of material since, in this case, it will be the air freighter and the hub which will be handling the transshipment and storage services.

2.3.5 Summary of Academic Theories in the Logistics and Supply Chain Field

This literature review examined detailed studies and emphasised the role of theory in guiding and designing effective supply chain channels and informing the development of up-to-date strategies to address emerging air cargo sector development. For example, it demonstrated that Porter's value chain model is a methodical approach to examining the internal alignment in a company and illustrating how an enterprise works to transform inputs into outputs. Whereas the main focus of Porter's value chain model looks at a firm's activities within an organisation, the network perspective theory examines the relationship with external partners; thus, the network perspective theory is an important tool to achieve the current study's objective as it enables the air cargo sector to access resources, information, markets, and technologies easily, hence achieving their laid-down strategic goals and facilitating connections between all levels in the sector. The key variable of the network perspective theory is the position or location that is presumed to influence a business's performance and competitiveness, which is the main advantage for

Oman to develop its air cargo sector. Moreover, the channel coordination model supports the present study's aim by aligning the plans and objectives for developing the sector between Oman's air cargo sector stakeholders. Air cargo transport consists of several entities, situations, and processes. It must organise all the stakeholders to enable each one to deliver their part of the air cargo services and provide a clear interface and handover process between different air cargo entities. Finally, the material flow theory can be a model for the current study as it gives direction to set up Oman's air cargo sector based on building the capability and capacity required to facilitate the flow of materials and expanding the elements of logistics to include the organisation of key factors, such as society, economy, and the environment.

2.4 Historical Background

Historically, the first air cargo flight took place in November 1910 in the US. It flew over a distance of 105 kilometres, carrying 200 pounds of silk to open a store (ACI, 2019; Allaz, 2005). In 1911, the postal movement started, and by 1914 regular air service began in the US. On 7 October 1925, the first contract airmail routes were issued. In Germany, official airmail flights began in 1912, and by 1925 a comprehensive airmail service was available. Between 1942–1945 large-scale movements of air cargo were carried out between southern China and India, and between 1948–1949 the largest airlift air cargo shipment delivered to the blockaded city of Berlin, Germany, following World War II. In 1969 Hillblom, Lynn, and Dalsey established DHL, and in 1971 Fred Smith started Federal Express. The 1970s marked the beginning of the express package and door-to-door services (ACI, 2019). Additionally, in the 1970s, the wide-bodied jet aircraft were introduced (Budd and Ison, 2017). The deregulation of air cargo in 1978 led to

economic growth in the 1990s and encouraged free trade in air cargo services (Hajjar and Kaitouni, 2018). By 2018, 1,870 freighters were in operation worldwide, and this figure is expected to increase to 3,260 by 2037 (ACI, 2019; Boeing, 2017).

2.5 Air Cargo and Economics

On a global perspective, air cargo is a crucial component of international trade since it facilitates the movement of goods for imports and exports across many countries in the world. De Lima et al. (2007) specified that air cargo is a major driver in industrial expansion and fostering imports and exports; accordingly, an increase in revenue from the air cargo industry, consistent with Mayer's evidence (2016), supports the idea that air cargo sector operations are positively and closely linked to regional economic development. This is also in line with Yuan et al. (2010), who assert that air cargo is a key cause and facilitator of economic growth because it creates employment and adds value to an economy. Because of the role that air cargo plays with trade and GDP, its services are becoming more significant for economies as air cargo creates greater connections in the global market, enhancing links between businesses and attracting foreign capital investments. Likewise, Lakew and Tok (2015) concluded, in their study of relationships between regional economies and air cargo traffic, that there is a positive relationship between air cargo traffic and demographic makeup in urban areas' employment and wages.

ACI (2019) mentioned that the total North American GDP supported by aviation in 2017 was USD 844 billion, comprised 19.2 million metric tonnes of air cargo. Moreover, Research and Markets (2020) reported that air cargo volumes grew by 4.1% to 63.7 million metric tonnes, and overall air cargo incomes reached USD 116.1 billion

in 2019, from USD 109.8 billion in 2018. Kupfer et al. (2017) stated that air cargo is an essential contributor to profit and cash levels and air cargo between 1980 and 2000 for ninety-five nations showed a positive correlation with GDP. The significant increase came from the emergence of the supply chain business. As an example of air cargo's impact on the economy, in 2009, Kia Automobiles opened a new car plant near Hartsfield-Jackson Atlanta International Airport in Georgia, USA, to offer just-in-time shipments to their customers. As a result, the state of Georgia accrued USD 4 billion as an economic impact. The Atlanta market added new cargo capacity to meet additional demand and daily cargo flight services by Korean Airlines and others (ACI, 2019).

The literature has confirmed the positive relationship between the economy and air cargo business because of the revolution of industrialisation, globalisation, increased competition, and a new paradigm of the transportation market to shipping goods quickly worldwide. This gives confidence to the current study, which aims to conceptualise ways in which future development strategies of Oman's air cargo sector can be established to reduce Oman dependence on the oil revenue, diversify its economy, and create employment. Air cargo is a pillar of economic development which attracts foreign capital investments, creates employment opportunities, and contributes to world prosperity; hence, it is a vital element of the global supply chain and international trade.

2.6 Air Cargo Industry Market Indication

Previous studies have highlighted the air cargo industry's direction. Kupfer et al. (2017) conveyed that air cargo has had healthy growth over the past decades, and Lee et al. (2019) supported this argument by reporting that the total freight TKM showed a continual increase from less than 50,000 to more than 2,000,000 between 1975–2014.

Also, from 2001–2012, air cargo container traffic has grown by 8.3% and, overall, 3.7% annually. Moreover, The European business review (2019) reported that more than 54 million metric tonnes of products had been transported by air cargo in 2018. Furthermore, Boeing (2017) forecast that the air cargo world freighter fleet will grow by more than 70%, and the traffic of air cargo will double from the current 1,870 to 3,260 aeroplanes in the next twenty years; this forecast is consistent with that of the ICAO (2017) and the IATA (2019) where they published optimistic forecasts about air cargo growth through 2035 at a rate of 4.2% yearly; that means air cargo industry in the world will be more than double in the upcoming fifteen years (Hajjar and Kaitouni, 2018). This also accords with ACI's (2019) forecast of 20% growth over the next five years for the overall global air cargo industry. Supporting ACI's (2019) expectation, Airbus (2014) cited in Chao and Li (2017) forecasted an upcoming two-decade increase at a rate of 4.5% to 5% in the air cargo business. Moreover, Budd and Ison (2017) reported that air freight would grow between 4% and 5% per year until 2034, and 2,930 freighters will be in service in 2034.

These studies show the air cargo industry's upward trend and indicate an opportunity Oman needs to exploit by being ready for the future changes taking place in the industry and the new direction of trade. By building capability and capacity to develop its air cargo sector, Oman can achieve a larger air cargo market share, thus securing a new way of income.

2.7 Factors Impacting the Air Cargo Industry

Air cargo depends on economic activity, especially trade in high-value goods and world trade (Kupfer et al., 2017). Further supporting this idea, Kim and Park (2012) stated that air cargo is linked to the larger patterns of physical trade, and Wong et al. (2016) said

that air cargo markets are driven by the demand of global supply chain operations, the capacity of air cargo, and connectivity.

Economic considerations are key drivers for air cargo demand growth according to Yuan et al. (2010). A fact confirming that the global economic situation drives air cargo is reported by the ICAO (2017), which said the total cargo tonne-kilometres was 9.5% during 2017, higher than in 2016 by 3.6% because of the increase in global trade. The IATA (2019) reported that, for the first time since 2012, air cargo declined by 3.3% in 2019 because of weak growth in the global goods trade. Therefore, there is an association between air cargo industry performance and global goods trade. That is supported by Hsu et al. (2009) who advised that air cargo carriers may achieve a larger market share if supply attributes match the product characteristics and industrial structure, an essential factor Oman needs to consider when it is developing the air cargo sector as it is linked to specific industries and commodities. Agreeing with this assessment, Kupfer et al. (2016) stated that the government could play an important role in making a country attractive for air cargo carriers by stimulating the expansion of industries reliant on-air cargo, thus guaranteeing sufficient future capacity and a stable regulatory environment.

The World Customs Organization (WCO) mentioned that the rapid development of air cargo transport was stimulated by e-commerce (WCO, 2014). Moreover, Research and Markets (2020) stated that the demand for air cargo services had increased significantly because of growing e-commerce trends in North American, as well as in other regions. The ICAO reported that 87% of business-to-consumer e-commerce packages are currently shipped by air cargo. Also, from 2010–2015, the e-commerce shares of scheduled international mail tonne-kilometres (MTKs) grew from 16% to 74% and is expected to grow to 91% by 2025 (ICAO, 2017). Thus, the e-commerce business

benefits air cargo as it is the main transportation method used. Because e-commerce requires fast delivery to compete with the traditional market, Oman should attract e-commerce companies to operate in Oman or use Oman as a transit point to benefit air cargo traffic.

Hsu et al. (2009) stated that due to the attack on 11 September 2001, global air traffic, including air cargo, slowed down from 13% growth in 2000 to 3% in 2001. During the worldwide recession in 2008, air cargo declined due to a significant reduction in international trade (Mayer and Scholz, 2012). Conversely, e-commerce, life science, and agriculture have done well during the COVID-19 pandemic (Macola, 2020). Also, due to the cancellation of passenger flights in world lockdowns, there was a noticeable shift from the traditional carriers to full freight carriers for transporting cargo. Obviously, the air cargo industry can be driven by global crises and situations, so air cargo industry strategists in Oman should consider global issues accordingly.

Suwanwong et al. (2018) list the factors affecting overall air cargo as airport operations, government policies, connectivity, and the skillset and education of air cargo staff. Arkadiy (2016) identified the factors affecting the productivity of the Russian air cargo transportation service from the perspectives of challenges and the current market trend, where the high cost of ground handling, overall economic conditions, and increased fee rates of airports were revealed as major challenges. In a mixed method study conducted by Chang et al. (2007) in Taiwan, eighteen development strategies were identified and then categorised into six main areas based on the development goals. The first phase of the study was based on the identification of the air cargo strategies from workshops and interviews. The second phase was conducted to assess the importance of

air cargo development strategies identified in the first phase using a quantitative analytic.

Figure 2.1 below shows the eighteen air cargo sector development strategies.

Development Goal	Development strategy
S ₁ Promoting airport competitiveness	S ₁₁ Enhancing airport capacity
	S ₁₂ Applying competitive airport charges
	S ₁₃ Improving operational efficiency
	S ₁₄ Enhancing airport management systems
	S ₁₅ Enhancing airport transit functions
S ₂ Enhancing integration of transportation and logistics systems	S ₂₁ Improving inland transportation and logistics infrastructure
	S ₂₂ Establishing information exchange platform among transportation and logistics systems
S ₃ Expanding air cargo routes	S ₃₁ Applying flexible route allocation
	S ₃₂ Lifting carriers' restrictions on the choice of air cargo routes
S ₄ Improving air cargo management systems	S ₄₁ Amplifying air cargo related rules and regulations
	S ₄₂ Strengthening management of hazardous goods
	S ₄₃ Encouraging regional strategic alliance among carriers
S ₅ Developing air cargo operation center	S ₅₁ Expediting the establishment of free trade zones
	S ₅₂ Promoting computerization of air cargo logistics services
	S ₅₃ Fostering internationally qualified professionals
S ₆ Expediting direct air cargo links between Taiwan and China	S ₆₁ Planning facility requirements of direct air cargo services
	S ₆₂ Coordinating technical issues of direct air cargo services, including route planning
	S ₆₃ Reviewing and establishing rules and regulations of direct air cargo services

Figure 2.1 Developmental Strategies Identified by Chang et al. (2007)

Another study by Stamolampros and Korfiatis (2019) uncovered the influence on the United States' airline service performance by certain economic factors, such as interest rate, fuel prices, and market concentration. Riwo-Abudho et al. (2013) identified

further challenges and then found key success factors to overcoming those challenges by reviewing existing empirical studies. The challenges faced by the industry players were product innovation by suppliers, fragility in reputation, powerful customers, intense competition, and increased costs in labour, fuel, and security measures. Key success factors included organisational structure and culture, strategic alliances, planning and forecasting, technology, marketing, branding, and outsourcing.

Shiao and Hwang (2013) indicated the factors affecting the decision to enter a market for all-cargo and combination airlines are air passenger travel demand, the operation scale of all-cargo carriers, the availability of time slots at the airports, and air cargo demand in the market. Suwanwong et al. (2018) also mentioned several factors affecting air cargo, such as the number of transits/transhipments, minimum connecting time, maximum allowance-connecting time, shipping cost versus connecting time, air cargo commodity, and aircraft type.

ACI (2019) mention other non-value factors which affect air cargo and have become more significant determinants, such as product value, time-sensitivity (perishables or products with less predictable demand), and geographic market transportation factors, such as infrastructure, lengthy customs processes, poor security controls, long brokerage cycles, distance from airports, seaports, or railroads, and finally, air cargo origin and destination.

In their study of elements attracting air cargo logistics, Larrodé et al. (2018) conclude that these are handling costs, airport charges, overheads such as accommodation and cost of services, infrastructure (including airport and ground infrastructure), air cargo facilities, and ease of processes including those related to customs and air cargo. In Coetzee and Swanepoel's study (2017), the conclusion was made that there is a strong

relationship between the choice of air cargo carriers to operate and the travel time and distance between the air cargo terminal and the airport, along with the prevalence of air cargo-related development in the surrounding industrial areas. There is a desire to select a suitable air cargo hub as a base for the operation, which reduces time and distance. Other desirable factors are air cargo flight frequency, route distribution, and competition between national and foreign carriers (Wong et al., 2016).

Another major study by Kupfer et al. (2016) found that airlines serving main airports with the presence of forwarders at the airport is a key driver in the choice of airport. In the regional airports, the market size of the area and night-time flights are influencers. However, it was also found that infrastructure such as warehouse facilities, runways, parking spaces, ramps, terminal area, and capacity (including runway capacity) are the most important features for airlines and forwarders selecting an air cargo hub or origin-destination airport. From an operational viewpoint, custom clearance times, turnaround time, congestion, market access, airport charges, and labour and fuel costs can feature in hub selection. Climate conditions like heavy snow, strong winds, and thick fog can also affect choice (Kupfer et al., 2016). In addition to this, Lo et al. (2015) stated that air cargo traffic and internet service accessibility contribute to an increase in air cargo demand at a hub or airport, along with the cost of transport service in that hub. The top cost components are fuel, route expenses, land, parking, and workforce cost. Furthermore, Gardiner and Ison (2008) mentioned financial incentives would attract air cargo, such as flying time/cost and airport charges, airport reputation and advertising, origin-destination demand, location of competitors, presence of partner airlines, and freight forwarders.

Factors influencing the decisions of air freight forwarders in choosing air cargo carriers are identified by Chu (2014) as ensuring a low rate of lost/damaged cargo,

efficient customs clearance and cargo handling services, freight-forwarding services perform in a manner consistent with the agreements, and offers of shipping discounts for high volume. Similarly, Yoon and Park (2015) investigated the competitive service factors for air cargo carriers, which include price, promptness, reliability, and convenience. Price seemed the most significant service factor for main export routes in the Korean airline cargo market. In the same market, Park et al. (2009) explored the relative importance of factors affecting choice of air express delivery service and evaluated the competitiveness of air cargo carriers. The analysis showed that, from the perspective of service users, price, again, is the most important factor, followed by promptness and accuracy.

From a customer viewpoint, Huang and Hsu (2016) listed the service-required attributes for air cargo as stable flights, adequate shipping spaces and flight spots, precise cargo delivery, special cargo delivery, and knowledgeable staff. Meng et al. (2010) stated that four key air cargo customer satisfaction factors are flexibility, agility, reliability, and customisation. Moreover, empirical evidence supports five key service criteria factors of importance influencing the choice of air cargo service providers: performance satisfaction value, delivery value, value-added service, information value, and knowledge innovation value. A significant relationship between client satisfaction and the service criteria of air cargo logistics providers is also identified.

In this theme, the literature has thoroughly highlighted the factors impacting the air cargo industry such as economic considerations, trade, supply attributes that match the product characteristics and industrial structure, e-commerce, global crises, government policies, handling costs, airport charges, infrastructure custom clearance times, and fuel costs; thus, the air cargo sector is affected by various factors and depends on the

performance of other industries. It is therefore important for decision-makers in Oman to consider these factors in order to develop the sector and generate income for the country. Also, those factors can shape Oman's air cargo sector as Oman can use them as incentives to attract different stakeholders and investors to develop its air cargo sector.

2.8 Air Cargo Models

According to the Airport Cooperative Research Programme (ACRP) (2020), there are different models of air cargo carriers; the first type of air cargo carrier is the integrated carriers (dedicated freighters) such as DHL, FedEx, and UPS. Typically, they provide door-to-door service, next-day delivery, and deferred, time-definite delivery as they operate a large fleet of scheduled aircraft, couriers, and trucks. The second type of air cargo carrier is non-integrated cargo airlines that use the belly of an airplane to move cargo. This depends on the aircraft's cargo space availability after passenger luggage because this type of carrier is driven by passenger requirements more than cargo. Another model for air cargo carriers is the freighter airline, or wide-body aircraft, which is the same as a passenger airline but with a high cargo capacity so it can handle both the needs of passengers and cargo.

ACI (2019), Kupfer et al. (2016), and Onghena et al. (2014) classified air cargo models as integrator, all-cargo carriers, and combination carriers. The all-cargo and combination carriers must cooperate with other logistics players, such as trucks and airplanes, to deliver air freight services from the sender to the receiver. In contrast, the integrator carriers such as DHL, UPS, and FedEx provide door-to-door services from shippers to a receiver and own all assets, including physical assets such as airplanes and

trucks. Lastly, combination carriers transport cargo in the belly of a passenger aircraft along with the passengers' luggage.

Huang and Hsu (2016) described airfreight as integrated carriers, conventional all-cargo airlines, and combination air cargo carriers. The combination air cargo carrier takes shipments from air freight forwarders, which are considered main customers. For the conventional all-cargo airlines and integrated carriers, shipments may come directly from shippers or air freight forwarders.

A large proportion of air cargo is delivered using non-integrated cargo airplanes, which favour the requirements of passenger transportation over cargo transportation and cannot meet the accelerated development of air cargo transportation (Lee et al., 2019). Chao and Li (2017) reinforce this, saying that cargo space in non-integrated cargo airlines has greater uncertainty in terms of demand allocation as space is prioritised for passenger luggage. Furthermore, Yuen et al. (2017) claimed that most major airports and airlines are designed to meet the needs of passengers first, then air cargo, and that causes insufficient economy of scale for the cargo in the airplane belly. Approximately 56% of global revenue tonne-kilometres (RTKs) are flown by dedicated freighter aircraft, and the remaining 44% is moved by belly freighter, according to Budd and Ison (2017).

Lee et al. (2019) discussed the current flight routes and passenger transportation networks, saying they need adjusting to meet the latest air cargo transportation requirements because cargo and passenger management are different. For example, passengers are more time-sensitive and prefer direct flights; in contrast, air cargo can be transhipped multiple times as long as delivery is on time. A further example is that the hub selection of air cargo is flexible, whereas the hub selection of passenger service networks usually involves long-term planning.

Boeing (2017) believes that integrator cargo carriers will maintain a market share advantage over non-integrated airlines because of direct routing, controlled transport reliability, and capacity. Moreover, Macola (2020) noticed a shift of market shares from belly flights to integrated or fully freight carriers during the COVID-19 pandemic due to the cancellation of passenger flights as a result of worldwide lockdown measures. This is consistent with Diamond (2020), who stated that belly flights must seek alternative sources of revenue because of COVID-19 as the passenger revenue will be insufficient. He suggested carrying cargo in the passenger seats or removing the seats entirely because cargo is unaffected by social distancing or other health-related restrictions. Moreover, e-commerce demand has skyrocketed during the COVID-19 period, with online sales growing 20% globally in the first quarter of 2020, compared to 12% in the first quarter of 2019.

A large amount of literature in this study explains different models of air cargo carriers such as integrator, all-cargo, and combination carriers and their driving factors for every type such as passenger or cargo or both. Thus, air cargo sector developers should consider types of air cargo carriers and required factors to attract every type to select Oman as a hub; consequently, this will lead to more revenue and increased jobs and earnings in the country and overall GDP. The kind of air cargo carriers to be attracted in Oman is a potential area for future research.

2.9 Characteristics of Commodities Which Transport by Air Cargo

According to Hsu et al. (2009), there is a consensus in the literature that air cargo plays an important role in transporting goods requiring just-in-time delivery and high-value sensitive goods requiring security and reliability. Air cargo is used for delivering

commodities that have a short marketing life, such as cell phones, computers, perishable products, pharmaceuticals, and chemicals because it offers reliability, speed, and security (Hajjar and Kaitouni, 2019; ICAO, 2020; Suryani et al., 2012; Yuan et al., 2010). ACI (2019) adds the characteristic that high-value products mainly move by air because of small shipment size, time sensitivity, required security, and cost of capital and inventory. As much as 80–90% of high-value, light-weight goods are transported by air, such as pharmaceuticals, microelectronics, jewellery, perishables, seasonal toys, fashion clothing, and even footwear (Yuan et al., 2010). Pharmaceuticals, live animals, and perishable goods are examples of air cargo commodities given by Suwanwong et al. (2018). Biotech industries also rely on air cargo (Kupfer et al., 2016). Rezaei et al. (2017) confirm the products required for air cargo transport are products needing speed, such as perishable goods or goods that require next morning delivery (e.g., newspapers) and high-value, time-sensitive goods.

The studies show a variety of goods that require air cargo to transport. Therefore, the demand for air cargo will depend on such features. In stimulating the expansion of industries reliant on air cargo to achieve a larger market share, the literature in this section outlines all the information required for Oman to select suitable commodities and industries needed to create demand for the air cargo sector.

2.10 Air Cargo Supply Chain and Stakeholder Coordination

The air cargo supply chain comprises many stakeholders. Chao and Li (2017) mentioned that air cargo participants include air freight forwarders, shippers, customs brokers, ground handling services, and cargo terminals. Feng et al. (2015) add that air cargo transport, from source to destination, involves many players to move cargo through

to a recipient: an exporter, a forwarder, a road transporter, and an air carrier. Moreover, this is inter-linked with the airport, air freight, airlines' air cargo buildings, banks, customs, and clearinghouse agents. As detailed by Rezaei et al. (2017), the air cargo transport chain involves a forwarder, third-party logistics (3PL), contracted trucker, airport, air carrier, destination airport, forwarder at the destination, and consignee. Air cargo also involves various players, such as an outstation, road carrier, hub, air carrier, and consignee.

Moreover, Rezaei et al. (2017) describe the sequence of air cargo chain handling stages as starting with the shipper or consignor, then leading through forwarders and the carrier towards the receiver or consignee. This is reinforced by Boonekamp and Burghouwt (2017), who stated that the air cargo supply chain consists of three major players: shippers, forwarders, and carriers. The forwarder takes care of all necessary documentation and arranges the door-to-door transportation of the shipment, the shipper is the party that wants to have goods shipped from one place to another, and the carrier is responsible for the airport-to-airport shipment.

Chu (2014) describes a freight forwarder as an intermediary between shippers and air carriers. Freight forwarders consolidate products of individual shippers into large quantities of freight, then book cargo space with air cargo carriers for a more efficient and economical shipment. They also offer multiple services, such as import and export documents for customs clearance, cargo insurance, warehousing, packaging, intermodal transportation, and door-to-door service arrangement. Forwarders store goods in warehouses, where they are consolidated based on their destinations, then generate flight plans according to reserved space, available flights, and any other client requirements. After that, shipments are transported to airport cargo terminals for export via designated

flights. Subsequently, the airlines move shipments to the required airports, where overseas forwarders pick them up for delivery to their destinations. In contrast, the integrated carriers offer door-to-door services from shippers to a receiver and own all assets, including physical assets, such as airplanes and trucks (Onghena et al., 2014).

The International Civil Aviation Organization (ICAO) asserted that air cargo managed properly will benefit consumers, businesses, and end-users by supporting the global supply chain. This chain depends on stakeholder coordination between air cargo regulatory framework developers to facilitate the growth of the air cargo sector (ICAO, 2020). Air cargo transport consists of several entities, stakeholders, and processes, which must be aligned and managed to develop the sector. Also, enhancement is required in information-sharing, the collaboration between air cargo stakeholders, and the revision of processes, regulations, and rules that hinder the benefits of this sector. Thus, coordination between air cargo stakeholders will ease the business, reducing the time and cost and thereby attracting foreign manufacturers, e-commerce businesses, and air cargo carriers to operate in the Oman air cargo sector. This agrees with channel coordination theory, which seeks to align plans and objectives between supply chain entities. (Modak et al., 2016; Panda et al., 2015).

2.11 Location Relation with Air Cargo

Air cargo facility location plays an important role in affecting the market size, service quality, and costs (Niine et al., 2017). The location of business activities in air cargo operations is fundamentally based on the geographical characteristics of the situation and site. The situation concerns the location's connectivity while the site relates to the features of a particular location, such as infrastructure and business characteristics.

Mayer (2016) points out that air cargo needs access to major roads; for example, in the second-largest cargo airport in the United Kingdom, East Midlands Airport benefits from easy access to the M1 motorway that links the Northeast of England with London. Oktal and Ozger (2013) stated that aircraft types and costs of airline movements are the main factors affecting the selection of air cargo carriers for hub locations, along with trip cost, runway availability, and cargo traffic continuity.

Air cargo airport location often depends on the manufacturing base, geographic position, and airlines operating at the airport (Mayer, 2016). Integrators usually prefer secondary airports, characterised by little congestion and low passenger numbers, creating regional hubs near major cities. On the other hand, non-integrated carriers combining passenger and cargo operations prefer main airports, aiming for collocation. Concerning air cargo airport location, Yuen et al. (2017) stated that air cargo companies and manufacturers relocate from the main (gateway) airport to a hinterland airport because of costs at the gateway airport, consequently affecting efficient and timely delivery of goods because of the growing distance between the gateway airport and the manufacturing base. Because of the emphasis on cargo at hinterland airports, most airlines use dedicated aircraft for cargo, which shifts the focus to cargo more than passengers. In turn, this may lose some connectivity of the passenger network.

Therefore, air cargo facilities' location, accessibility, attributes of the site, and airport locations are essential factors contributing to the success of the air cargo business and should be considered when developing the sector. This suggests that Oman should leverage its geostrategic location as a logical distribution hub for East Africa, the Red Sea, and the Indian subcontinent. Acting as a gateway for the Gulf, Oman would be a catalyst for exponential growth in air cargo volumes, stimulating additional traffic as

demand increased and, consequently, attracting air cargo carriers such as integrator, all-cargo carriers, and combination carriers to operate from Oman, resulting in increased import and export activities.

2.12 Air Cargo Infrastructures and Processes

Air cargo comprises many infrastructures. The American Planning Association (2006) gives details of these. Examples of the facilities from the airside include terminal buildings, hangars, air cargo buildings, fixed-base operators (FPOs), freight and parcel facilities, and warehouses. Landside facilities, to which the public has access, include office buildings and public and employee parking. Kupfer et al. (2016) also detailed air cargo infrastructures and mentioned that air cargo infrastructures are most important for airlines and forwarders in selecting the air cargo hub or origin-destination airport. The trend of major cargo airports' infrastructure and facilities tends towards free-trade zones, hubs, and cargo villages (Coetzee and Swanepoel, 2017).

From the air cargo process perspective, Drljača (2017) explained it is a complex process for various reasons. First, cargo-handling activities run simultaneously at arrival and departure and include several sub-processes for both receipt and dispatch. Also, the air cargo process at landside and airside run concurrently, in addition to documentary receipt, dispatch activities, and physical receipt running simultaneously. Dos Santos Vieira et al. (2016) indicate that there are service-specific processes according to product type: perishable, dry, hazardous, or refrigerated, as well as kind of product packaging, such as bulk, containers, full load, or less-than-truckload. Furthermore, the market served, e.g., worldwide or domestic, also needs specific processes, such as customised clearance. Traditionally, the air cargo handling process requires many manual actions; for example,

upon the shipment arrival at an air cargo warehouse, information is often updated manually, thus leading to errors and delays (Chan et al., 2012). Another example of a manual air cargo handling process is that flight planning tasks are performed by hand, which means determining how cargo items should be consolidated is based on trial and error. However, nowadays, proposals have been put forward to automate the process. This is an ideal interpretation of material flow theory, which represents all processes, capabilities and capacity required to set up the logistic industry, such as transportation, inventory management, raw materials, and final products. It supports the current study objective by giving a clear conception for setting up the air cargo sector, identifying what infrastructure is currently available in Oman, and then recommending what is required to develop it to facilitate air cargo sector operation, thus attracting foreign manufacturers, e-commerce business and air cargo carriers.

2.13 Air Freedoms, Deregulation/Liberalisation, Regulatory Framework

Kim and Park (2012) noticed that air freight transport has experienced notable adjustments since the general trend towards market liberalisation began in the late 1970s. ACI (2019) perceived that liberalisation agreements, such as the Open Skies Agreement and Free Trade Agreement (NAFTA) are air cargo drivers, alongside changes to international trade agreements, which impact on the air cargo industry. An ongoing example is between the European Union and the United Kingdom over Brexit. Agreeing with ACI (2019), ICAO (2017) stated air cargo is negatively affected by trade protectionism, regulatory restrictions, and international conflict. Additionally, Kupfer et al. (2016) declared that traffic rights and bilateral agreements could be restrictive factors for air cargo. One study by Geloso Grosso and Shepherd (2011) found that air cargo

transport policies affect some sectors more than others, for example trade in manufactured goods, parts, and components; this sector is the most sensitive to aviation liberalisation. More liberal air service policies are significantly and positively associated with higher bilateral trade in merchandise, and economies could greatly benefit from a more liberal aviation policy regime by integration in international production networks. For the same reason, the Sixth Worldwide Air Transport Conference endorsed, in the 39th Assembly, that air cargo needs business-oriented treatment, liberalisation, and commercial freedom of air cargo services (ICAO, 2020).

Chen et al. (2017) said the factors that affect air cargo were customs regulations, government policies, and route costs and connectivity. Hwang and Shiao (2011) determined that the key factors in the policy of international air cargo flow to/from Taiwan are regulation, liberalisation, the Open Skies Agreement, and regional economics, including air cargo rates and population. Furthermore, Budd and Ison (2017) showed that strict environmental standards concerning emissions and noise are considered a challenge facing air cargo.

Geloso Grosso and Shepherd (2011) revealed that the existing air cargo services regulatory framework, outlined in the Chicago Conference of 1944, is under increasing pressure to keep pace with economic and worldwide trade expansion. The current international regulatory framework leads to network optimisation and flexible service design by different air cargo providers but prevents free route development.

Air cargo was deregulated in 1978 when the Open Skies Agreement was applied, which allowed carriers of two (or more) nations to be routed between the two countries without restrictions on frequency, capacity, or price; this led to international air cargo's gradual liberalisation, which stimulated economic growth from the mid-1990s and played

an essential role in the emergence of the large free trade area in air cargo services (Hajjar and Kaitouni, 2018).

The Nine Freedoms of the Air, as explained by ACI (2019), are a set of rights granting one country's commercial flight airlines the privilege to access and land in another country's airspace. They were formed to give the right to operate international air services within the scope of the bilateral or multilateral agreements and avoid disagreements over the extent of aviation liberalisation. Geloso Grosso and Shepherd (2011) stated that two of the rights, the fifth and seventh, are particularly significant as these rights take better account of air cargo flows by improving return traffic and allowing for triangular operations. Also, the ability of air cargo to operate charters represents a significant source of flexibility for the industry in responding to seasonal peak loads. We can comfortably conclude that air cargo is linked to the globalisation of goods. Thus, the international regulatory framework impacts the air cargo industry. An example of those regulations is Air Freedoms and Deregulation/Liberalisation. Therefore, if Oman desires to transform the air cargo sector and increase attraction, it should be open and in alignment with those regulatory frameworks.

2.14 Air Cargo Hub Types

Sheffi (2012) defines an air cargo logistics hub as 'full-fledged logistics activity clusters or a centre, such as an airport, including logistics services, like a store, segregation, coordination, distribution and organisation of goods for international and national transit' (p.57). Notteboom and Rodrigue (2009) described a hub as a centre for value-added services such as assembly, customising, labelling, and light manufacturing. Moreover, the hub is considered a base for many logistic players such as transporters,

brokers, shipping agents, e-commerce and packing companies. Cargo hubs are defined by Coetzee and Swanepoel (2017) as geographic clusters of interconnected companies competing and cooperating, which creates a platform for collaborating. Hubs empower the expansion of transport networks and efficiency, adding value as an element of coordination and delivery of larger distribution systems (Notteboom and Rodrigue, 2009).

Furthermore, hubs increase the interaction and alliance between cargo carriers by providing logistics services, allowing them to benefit from value-adding and synergy while still competing against each other (Jurásková and Macurová, 2013). An Air cargo hub fulfils the objective of the network perspective theory by linking multiple entities in the supply chain and boosting collaboration to develop stronger relationships with suppliers or other firms and create a more established network. Hubs thus influence information sharing or transfer among different entities in the supply chain and offer a learning platform for companies, and they enable firms to access resources, information, markets, and technologies thereby increasing performance and competitiveness. Moreover, the hub concept satisfies channel coordination theory by aligning plans and goals between supply chain entities such as manufactures, distributors, and retailers to promote the performance and optimisation of all stakeholders as all of them operate in the same place (Modak et al., 2016; Panda et al., 2015,).

Dos Santos Vieira et al. (2016) state that setting up an air cargo hub is directly linked to specific characteristics of the supply chain(s) it services, the volume of goods handled, and flows that go through the facility. Classification of cargo hub types could be linked to the market served, the point of the supply chain where the hub is located, and the features of product flows. For example, industrial hubs are facilities dedicated to the connection of product flows between different levels of manufacturing. In many cases,

industrial manufacturers can be found next to the hub or even integrated into its structure. Such a hub is usually linked to global trade, although it can also handle cargo from national trade to be transported by sea or rail. Other types of hubs include distribution hubs and urban hubs.

Mayer (2016) stated that air cargo is classified based on the air cargo hub functional role, utilisation, geographic position, size of airports (including cargo tonnage), nature of traffic and technical characteristics, ownership, and network position. Descriptions were given regarding different types of hubs, such as cargo-dependent, cargo primaries, cargo secondaries, international primary, international secondary, international passenger dominant, and domestic passenger dominant. The type of air cargo hub keeps up with material flow theory as it promotes building the capability and capacity required to set up the logistics industry. A hub design is based on product flows between different entities, utilisation, and hub functional role, thus following the same material flow theory logic as linked to specific supply chain characteristics.

2.15 Air Cargo New Market Context and Trends after the COVID-19 Pandemic

The current study was conducted during the COVID-19 pandemic; thus, it is necessary to understand air cargo's new market context and trends after the COVID-19 pandemic to suggest directions for Oman's air cargo sector for the future. The occurrence of a global pandemic had a significant impact on the aviation industry, including air cargo services. While the pandemic presented both health and humanitarian crises, it also came as an economic shock to the world's shipping industry (Weiss et al., 2021). With each country imposing border lockdowns and closing its airports, this sector was largely damaged (Murray, 2020). The year 2020 presented a challenge to the air cargo services

as emergent restrictions from the pandemic lasted nearly a year; they are still present in one form or another. The industry has yet to recover fully from the losses incurred over the past year. Compared with 2019 shipments, the International Air Transport Association states that international cargo witnessed a 7.7% decline as of November 2020 (Willis Towers Watson, 2021).

Earlier predictions in the transportation of pharmaceuticals pointed to a declining number of air passengers and increased air freight demand. The COVID-19 pandemic and its impacts are expected to continue past 2021 (Hyde, 2021). The pandemic has triggered a divergence between air cargo and passenger services. The air cargo sector, accounting for nearly 35% of world trade by value, has not only been challenged by the pandemic, but COVID-19 has equally revealed the resilience of the sector, its value generation, and how quickly the industry has been able to adapt to a fast-changing situation (eTrade for All, 2021).

There was already a downturn trend in the number of flight passengers in the months preceding the pandemic. The crunch capacity of the crisis arose because of a drop in passenger flights, and the urgent need to transport pandemic payloads resulted in the use of several passenger planes as freighters. These planes would then be referred to as freighters (Hyde, 2021). The Portuguese airline Hi-Fly initiated this trend by converting the A380 from flight to freights and removing several passenger seats to create room for more cargo (Hyde, 2021). The grounding of passenger flights significantly reduced the cargo capacity that initially went into these aircraft. Consequently, most planes were converted to freighters to keep up with the growing demand for pharmaceutical supplies, medical equipment, and donations to less developed countries. The prevalence of freighters is projected to keep pace throughout 2021 (Hyde, 2021).

Faced with the current situation of a radical fall in passenger flights, which reduces cargo capacity, the preservation of cargo operations in the face of COVID-19 remains critical (Lioutov, 2020). Cargo carriage is critical not only to facilitate the timely and efficient transport of pharmaceuticals and medical equipment but also to transport food and other essentials needed by people for their daily lives.

Macola (2020) stated that due to the cancellation of passenger flights during the COVID-19 pandemic, a shift from the traditional carrier to full freight carriers to transport cargo was noticed. Consequently, some of the market share from passenger flights went to full freight carriers. In contrast, e-commerce, life science, and agriculture have done well during the COVID-19 pandemic, providing evidence that the global situation influenced the aviation industry. Therefore, the Oman air cargo sector should study the global situation of the COVID-19 pandemic by considering the merits of a strategy that relies on creating a highly flexible air cargo sector in the region. Attracting and nurturing passenger-to-freight conversion (P2F), operating dual-purpose aircraft, and developing transloading for smaller potential destinations indicate a need for flexibility. Supporting this argument, Koigi (2020) mentioned many passenger airlines removing seats from passenger planes, thereby optimising capacity for freight; despite the decline in capacity, demand for air cargo, such as medical supplies, which often arrived on short notice, remains high. Therefore, a flexible air cargo sector strategy should consider the current operational challenges in its entire value chain, e.g., airports, cargo handlers, processes, customs, clearance, and so on. Accordingly, air cargo in Oman can be a highly flexible air cargo sector in the region for providing air cargo carriers with an agile hub between Asia, Africa, and Europe.

2.16 Air Cargo in the Digital Era and the Paradigm Shift to E-commerce.

Online business platforms offer safer ways of doing business. With the pandemic forcing people to adopt the new normal of maintaining social distance, online platforms for transacting business could be the way to go (Ungerer and Portugal, 2020). By doing business through electronic platforms, such as e-commerce, physical contact has been greatly minimised.

The pandemic has also brought the need for improvements. The COVID-19 crisis has been a critical wake-up call for the air cargo industry to digitise its operations. The general public will expect health and safety provisions; other requirements like sustainability, ethics, safety, and border and customs procedures will change more frequently, and transparency shall be the key to speeding up processes and avoiding blockades (Majeres, 2020).

Air cargo boasts of speed as its greatest asset. For the air cargo industry to remain competitive, there is a need to move processes and documentation into the digital era (Majeres, 2020). The goal is to encourage partnership among all parties in the supply chain; the most important thing is to blend digitally. Data sharing will ensure proper planning and promise timely delivery by the multiple door-to-door actors in the transportation process and facilitate the development of contingency plans in case of any deviations (Majeres, 2020).

E-commerce implies the purchase and sales of commodities and services over the internet (Bloomenthal, 2020). Due to the outbreak of the coronavirus pandemic, consumers are encouraged to follow the COVID-19 containment regulations of avoiding crowded places and staying home unless there is an absolute urgency to leave (World Health Organization, 2020). As a result, many consumers have shifted away from

traditional retail and have opted for online shopping. There has also been a considerable increase in demand for products relating to entertainment, medical supplies, and, more particularly, personal protective equipment (Majeres, 2020).

When the crisis finally comes to an end, many more people will sufficiently understand how easy it is to purchase goods and order services online. Majeres (2020) stated that there is sufficient evidence to believe that consumers purchasing items or ordering services online during the quarantine are more likely to continue with the trend after the restrictions are over. Similarly, new e-commerce consumers are more likely to continue online shopping even after the COVID-19 crisis (Majeres, 2020).

Airfreight and e-commerce will benefit from each other's business operations. While air cargo is expected to play a vital role in facilitating worldwide trade driven by electronic commerce, the latter equally plays a critical part in bridging the gap created by coronavirus restrictions between the suppliers and their consumers (Majeres, 2020). For that, the IATA has laid down a worldwide engagement plan to hold a comprehensive dialogue with the air cargo industry by capitalising on its e-commerce business (Majeres, 2020). According to the IATA (2020), consumers of e-commerce are usually in favour of fast deliveries. This is in line with the main advantage of air cargo for ensuring speedy delivery of goods. The opportunities presented by e-commerce are clear. It offers a platform for small businesses to reach the global market, thereby causing diversification of market competition and creating new job opportunities (Majeres, 2020). According to Boeing (2020), e-commerce is forecast to increase from USD 3 trillion in 2019 to USD 6.5 trillion in 2023. An accelerated increase in e-commerce is expected to expand air cargo growth; thus, e-commerce is revolutionising the air cargo business. Hence, there is a need for the air freight to adapt daily operations of cargo handlers and airlines to handle

the surging cargo volumes efficiently and ensure that set international rules are strictly followed by the new players in the market, particularly the rules of product safety and security, while also making sure that business is done in an ethical manner (Majeres, 2020). Thus, Oman can develop its air cargo sector because of new market contexts and trends that are driven by the COVID-19 pandemic. The paradigm shift to increased demand for e-commerce should attract e-commerce businesses to hubs in Oman and, consequently, air cargo demand in Oman will increase, too.

2.17 Summary

The literature has confirmed the positive relationship between economy and air cargo that gives confidence to the current study, which aims to conceptualise ways in which future development strategies of Oman's air cargo sector can be established to reduce Oman's dependence on oil revenue, diversify its economy, and create employment. Air cargo is a pillar of economic development which attracts foreign capital investments, creates employment opportunities, and contributes to world prosperity; hence, it is a vital element of the global supply chain and international trade. Moreover, the previous studies have shown the air cargo industry's upward trend, which is an opportunity Oman needs to exploit by being ready for the future and responsive to the changes taking place in the industry. By building capability and capacity to develop its air cargo sector, Oman can achieve a larger air cargo market share, thus securing a new way of income.

A large amount of the literature in this study explains different models of air cargo carriers such as integrator, all-cargo, and combination carriers and their driving factors for both passenger and cargo airlines. Thus, developers of the air cargo sector should

consider types of air cargo carriers and required factors to attract every type to select Oman as a hub; consequently, this will lead to more revenue, increased jobs, and overall GDP growth.

In addition, the literature highlighted the factors impacting the air cargo industry such as economic considerations, trade, supply attributes that match the product characteristics and industrial structure, e-commerce, technology, global crises, government policies, handling costs, airport charges, infrastructure custom clearance times, and fuel costs. The studies mentioned also identify the types of goods that require air cargo to transport, such as goods requiring just-in-time delivery, high-value goods, commodities with short marketing, pharmaceuticals, live animals, and perishables. Thus, the air cargo sector is affected by various factors and depends on the performance of other industries which are required to keep it in the minds of the decision-makers in Oman and assistant to develop the sector and generate income for the country.

Finally, the literature emphasises that the air cargo, infrastructure, entities, types, stakeholders, and processes must be aligned and managed to develop the sector. Furthermore, air cargo facilities' location, accessibility, attributes of the site, and airport locations are essential factors contributing to the success of the air cargo business and should be considered when developing the sector. The current literature study has explained the link between air cargo, globalisation, and international regulatory frameworks such as Air Freedoms and Deregulation/Liberalisation.

Figure 2.1 exhibits the initial conceptual framework for air cargo sector development requirements taken from the literature.

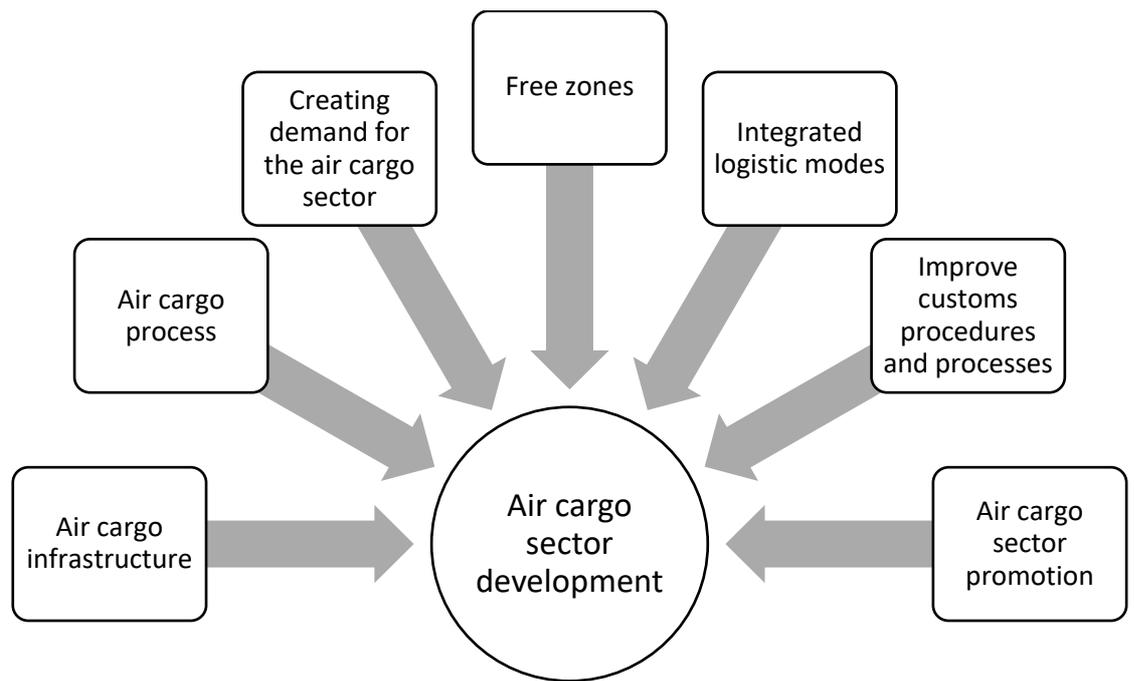
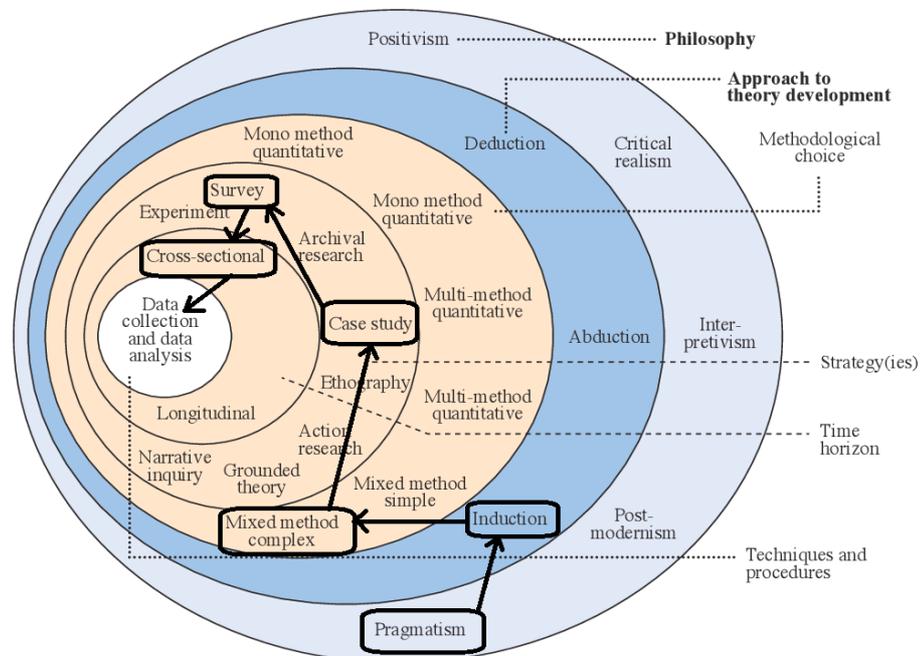


Figure 2.1 Initial Conceptual Framework for Air Cargo Sector Development Requirements Taken from the Literature

Chapter Three: Methodology

3.1 Introduction

This chapter covers the details of the methodology and the related data collection and analytical methods used to generate key empirical findings based on the conceptual framework of the dissertation. In this thesis, a mixed methods research design was applied; therefore, the details about both qualitative and quantitative data collection and analysis methods are part of this chapter. The beginning of this chapter outlines the philosophical assumptions and introduces the research methodology employed to address the key objectives of the thesis. The angle of discussion then moves on to the different data collection and analytical methods used, along with the tools employed for the qualitative and quantitative data analysis.



Figure

3.1 Research Onion. Adapted from Saunders et al. (2019)

The present study followed the multi-layer research onion by Saunders et al. (2009) in the following sequence:

1. Research Philosophy
2. Research Approaches
3. Research Strategy
4. Method Choices
5. Time Horizon
6. Data Collection and Data Analysis

These sequential steps started in the research philosophy and ended in the data collection and analysis methods. Figure 3.1 shows the research onion model, along with the indication of different choices in different sequential layers. The research philosophy for the present study is pragmatism, while the approach to develop the theory in the next layer is inductive because of the exploratory nature of the present study, which leads to the mixed methods design. The mixed methods design then leads to the two different research strategies: (1) case study and (2) survey design. In the next layer, the time horizon is cross-sectional, leading to the present study's various data collection and analysis methods.

Saunders and colleagues developed the research onion model in 2007 and later clarified and improved it periodically (Saunders et al., 2016). There are multiple reasons for applying the research onion in the present study. Firstly, it is a famous multi-layer or multi-stage roadmap that allows researchers to formulate an effective methodology step by step. Secondly, it is a very comprehensive work plan to guide researchers in taking the right decisions for selecting the best research philosophy, research approach, research strategy, time horizon, and data collection method that is most suitable to the study.

Thirdly, it bounds the researcher to define both the scope of the research plan and its execution. Fourthly, it illustrates the complete picture in front of the readers and policymakers to understand the complete methodology of the study from point A to point Z.

3.2 Philosophical Assumptions

In a universal dialogue, research is conducted to find a ‘reality’; this reality may be a solution to a particular problem in the form of a model, or it may be the different types of relationships between variables. Different paradigms and schools of thought make different claims on the nature of reality and ways to reach it; therefore, there are different belief systems and philosophies on this. Most researchers and methodologists classify paradigms into three major categories: positivism (quantitative), interpretivism (qualitative), and pragmatism (a mix of both qualitative and quantitative). We compare these paradigms based on different philosophical assumptions, e.g., ontology (assumption on the nature of reality), epistemology (assumption on the knowledge about reality), and methodology. Ontological and epistemological assumptions directly influence the nature of strategy in how a researcher conducts a particular study, i.e., methodology (Creswell, 2011).

3.2.1 Ontological Assumption

Ontological assumption deals with the nature of reality according to different paradigms to show what is real and what is not (Petty et al., 2012). The positivism worldview accepts that reality has a singular meaning that is objective and fundamental. In contrast, the interpretivism worldview is totally against the positivist paradigm and claims that reality has multiple meanings and has numerous implications. Reality is a

socially constructed phenomenon that is predictable through human imaginations. So, people who believe in the interpretivism paradigm challenge the existing theories and develop new theories.

On the other hand, the pragmatism worldview accepts the claims of both extreme paradigms (i.e., positivism and interpretivism). The people who believe in pragmatism paradigms are known as pragmatists and they believe that reality has both subjective and objective meanings. Therefore, they test the existing theory and also develop new theories (Clark and Creswell, 2008).

The present study reflects the pragmatism paradigm because of its objectives for exploration (qualitative/interpretivism) and the confirmation (quantitative/positivism) of Oman's air cargo development strategies.

3.2.2 Epistemological Assumption

Ontological assumption debates *what* we may know, whereas epistemological assumption discusses *how* we come to know what we know. Epistemology is the theory of knowledge: the relationship between the researcher and what is being researched, and these relationships may have closeness or remoteness (Clark and Creswell, 2008). Epistemology is the resultant assumption of the ontological stance of the researcher, which gives the best direction for inquiring about the reality in question. Proponents of positivism believe in surface knowledge and inquire about reality remotely, maintaining impartialness and independence. In contrast, believers in interpretivism explore knowledge about reality through closeness and immersion. They reject surface knowledge and believe in in-depth knowledge (Clark and Creswell, 2008).

The present study takes its epistemological stance in both in-depth and surface knowledge. This study made inquiries in a closed environment (through in-depth

interviews) for exploration of air cargo development strategies in Oman and a distant environment (through a questionnaire) to confirm air cargo development strategies in Oman which were identified in the closed environment, in-depth interviews in the first stage.

3.2.3 Methodological Assumptions

Methodology is the best research strategy opted for by the researcher to achieve the study objectives. Methodology is defined as the overall approach to the research process, from the theoretical underpinnings to the collection and analysis of the data (Collis and Hussey, 2013). There are three types of research methodologies:

1. Quantitative Research Methodology
2. Qualitative Research Methodology
3. Mixed Methodology or Mixed Methods Research

Positivists apply quantitative methodology; interpretivism believes in qualitative; pragmatists respect both and mix the quantitative and qualitative methodologies.

The present study applied a mixed methodology because of the nature of its research problem, which used exploration (qualitative) and the confirmation (quantitative) of air cargo development strategies.

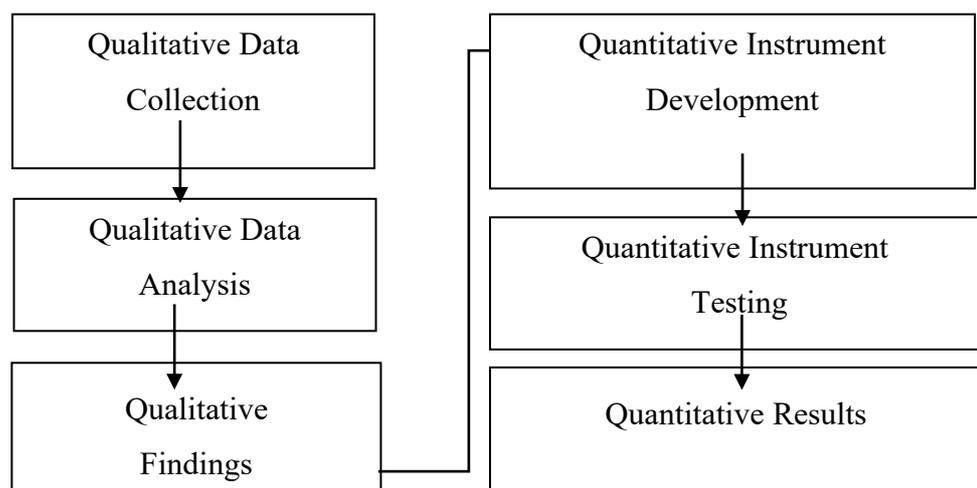
3.3 Methodology

3.3.1 Exploratory, Sequential Mixed-Methods (Mixed Methodology) Research Design

The current research adopts a mixed methods (mixed methodology) design. In their recent book *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, Creswell and Creswell (2017, Kindle Locations 4783-4785) defined exploratory sequential design in the following words:

Three-phase exploratory sequential mixed methods are a design in which the researcher first begins by exploring with qualitative data and analysis, then builds a feature to be tested (e.g., a new survey instrument, experimental procedures, a website, or new variables) and tests this feature in a quantitative phase.

Figure 3.2 shows the exploratory sequential mixed methods design developed by Creswell and Creswell (2017). This design has two phases: Phase I is a qualitative phase, where qualitative data collection and analysis is required, while Phase II begins after Phase I. Phase II involves the development of a quantitative instrument, then its testing, and finally the generation of quantitative findings.



*Figure 3.2. Exploratory Sequential Mixed Methods Design
Adapted from Creswell and Creswell (2017)*

3.3.2 Justification of Applying Exploratory Sequential Mixed Methods Design

The present study investigates how Oman can develop its air cargo sector as part of the logistics sector and become a source of income for the Oman government to diversify the economy. The study has the following objectives:

1. To identify air cargo development strategies in Oman as part of the logistics sector.
2. To confirm the air cargo strategies identified in the first phase.

The study is based on the pragmatism paradigm (mixed methodology) because of its two-phased objectives of exploration (induction) and confirmation (deduction) of air cargo development strategies as part of the logistics sector in Oman.

To meet the first objective, which identify air cargo development strategies, a qualitative approach of a case study was applied, and comprehensive data was gathered through in-depth interviews. Swedberg (2020) asserts that conducting exploratory research is better to understand an existing problem, identify in-depth issues, and focus on discovering ideas. In essence, it focuses on discovering new ideas and insights rather than on collecting accurate data statistically. Exploratory research promotes the use of open-ended questions and allows for a better understanding of the research participants (De Langhe and Schliesser, 2017).

The findings from the first phase (air cargo development strategies) were used for the development of a quantitative instrument for the collection of data in the second phase, with the purpose of confirmation of air cargo development strategies in Oman as identified in the first phase. The conversion of qualitative into quantitative was done to put qualitative data into a form amenable to statistical assimilation from what are generally conceived to be quantitative data collection procedures (e.g., survey). It was then analysed quantitatively through statistics to test the responses' outcome and thus confirm the strategies to develop Oman's air cargo sector identified from the qualitative themes in the first phase. This was done for maximum numerical precision of qualitative data and their compatibility with quantitative data, which can be seen to enhance the value of qualitative data (Sandelowski et al., 2009). Thus, the exploratory, sequential mixed methods design was the most suitable overall research design for the present study without preferring only a qualitative or quantitative, single-sided approach.

3.4 Qualitative Research: Phase I

3.4.1 Case Study Approach

The present study started from the qualitative case study phase, and the standard case study guidelines developed by Yin (2017) were applied to define the study questions, propositions, unit of analysis, linking of data to the study's objectives, and criteria for interpreting the findings.

For applying the first phase the qualitative research, two organisations, i.e., (1) Oman Aviation Group Company and (2) ASYAD Group Company, were selected as sources of information. Both companies have several subsidiaries which are responsible for managing and developing the logistics sector in Oman. Sea and road logistics are with ASYAD's subsidiaries, and Oman Aviation Group takes responsibility for air logistics, including passenger and air cargo. The following section provides the details of these two organisations:

- 1) **Oman Aviation Group Company:** a government holding tasked with enabling the Sultanate's aviation, tourism, and logistics sectors. It comprises Oman Air, Oman Airports, Oman Aviation Services, Muscat Airport City, and Meteorological Navigation Services; the group works diligently towards building an integrated aviation supercentre to lead Omani national aviation interests into the future (OAG, 2018).
- 2) **ASYAD Group Company:** established by the Omani government as part of its initiative to transform Oman into an international logistics hub. It aims to synchronise and leverage government investments in the Sultanate's ports, free zones, logistics centres, and rail, maritime, and land transport companies to achieve strategic development objectives (ASYAD, 2020).

The reason for selecting two organisations for the qualitative research case study phase was that those two organisations cover the all-major aspect of managing the logistics sector and air cargo supply chain in Oman (ASYAD, 2020). Thus, to cover the full range of perspectives, get holistic output, deepen understanding to draw valid conclusions, and achieve the current research objective in this phase, investigating both organisations was most suitable for the present study.

3.4.2 Unit of Analysis

A unit of analysis can be defined as *who* or *what* is being studied. The unit of analysis may be a person, department, group of people, team, organisation, nation, community, or country (Rubin and Babbie, 2009).

In the present research, to achieve the purpose of the study, in-depth data was collected from the strategists, experts, and top-level managers from Oman Aviation Group Company and ASYAD Group. Thus, the unit of analysis was air cargo and logistics practitioners who formulate and implement air cargo strategies.

3.5 Qualitative Methods

3.5.1 Qualitative Data Collection

For the qualitative data collection, an interview protocol (i.e., a set of open-ended questions for semi-structured interviews) was developed after an intensive review of the literature to answer research questions. The research questions were mapped against the interview questions using the initial conceptual framework for air cargo sector development requirements acquired from the literature. Table 3.1, derived from the literature, shows the broad strategies and their links to the research questions areas that include developing air cargo infrastructure, air cargo processes, free zones, sea-to-air

hubs, and customs; creating demand for air cargo; and advertising and promoting the air cargo sector. The present study identified these different strategies and initiatives to conceptualise Oman's air cargo sector development through in-depth qualitative research.

Table 3.1 Qualitative Interview Themes for the Development of Oman's Air Cargo Sector

Interview Question Topics	Sources from the Literature on Air Cargo	Link to Research Questions
Air cargo infrastructure	The American Planning Association (2006), Kupfer et al. (2016), Catapan and Luna (2016), Scholz and von Cossel (2011), Al Abbadi et al. (2021)	RQ-2) In what capability and capacity can Oman develop its air cargo sector?
Air cargo process	Drljača (2017), Dos Santos Vieira et al. (2016), Chan et al. (2012), Abdul Rahman et al. (2021)	RQ-2) In what capability and capacity can Oman develop its air cargo sector?
Creating demand for the air cargo sector	Kupfer et al. (2017), Kim and Park (2012), Wong et al. (2016), Yuan et al. (2010), ICAO (2017), Hsu et al. (2009), The World Customs Organization (2014), Boeing (2017)	RQ-1) How can Oman achieve a larger air cargo market share?
Air cargo sector promotion	Al-Balushi et al. (2013), Strydom (2005), ACI (2019)	RQ-4) What advantages of Oman's strategic location would support its air cargo sector development?
Free zones and air cargo development	Leu et al. (2009), Research and Markets (2020), Mordor Intelligence (2020), Coetzee and Swanepoel (2017), Fernandes and Rodrigues (2011), Ba-Awain and Daud (2018), Dimitrios and Sartzetaki, (2018), Kotzab and Wünsche (2015), Al Abbadi et al. (2021)	RQ-2) In what capability and capacity can Oman develop its air cargo sector? RQ-1) How can Oman achieve a larger air cargo market share?

Sea-to-air hub and air cargo development	Fernandes and Rodrigues (2011), Boeing (2017), Chen et al. (2017), Nguyen (2014), Ithraa (2016)	RQ-3) What advantages will the development of air cargo provide to the Omani logistics sector?
Air cargo customs	Yuan et al. (2010), ICAO (2017), Chen et al. (2017), Kasarda and Green (2005), ASYAD (2016), Gardiner et al. (2005), The World Customs Organisation (2019), Ba-Awain and Daud (2018), TANFEEDH (2017), Solomon (2013), Al Abbadi et al. (2021), Abdul Rahman et al. (2021)	RQ-2) In what capability and capacity can Oman develop its air cargo sector?

Based on the above table, which contains the broad categories of air cargo development strategies, the interview questions were formulated for the qualitative in-depth interviews to elicit the participants' experiences and beliefs towards the air cargo development strategies in Oman.

To improve the set of interview questions, the interview protocol was examined by an experienced air cargo expert who is working as the Air Logistics Program Manager in Oman Aviation Group.

After finalising the interview protocol (Appendix A), the study participant selection criterion for the interview was set: the study proposed that the participant should be a policymaker in logistics or air cargo management in Oman with a minimum of five years' experience. The selection criteria were set purposefully to select Oman's air cargo experts to gain in-depth, relevant, and accurate information to meet the study objectives. All the selected participants were from high-level positions, e.g., CEO, COO, GM, with

a minimum of ten years of experience in the air cargo field. Table 3.2 outlines the profiles of the interview participants of the present study.

After that, as per the criterion, twenty-two air cargo policymakers and practitioners were contacted for the in-depth interviews within their real-life setting, as per the set of interview questions and schedule for the interviews. A total of eighteen air cargo experts agreed to give in-depth interviews, with seven of those not allowing a voice recording. However, notes were taken during the interviews with the seven participants who were not recorded. A summary of key points was reviewed before ending the individual interviews to confirm the accuracy of the notes.

In-depth interviews of the eighteen air cargo experts were conducted as per their consent and schedule. All the participants were given unique codes, i.e., R1 to R18, per the table below.

Table 3.2 Profile of the Interview Participants

Participant Code	Designation	Type of Organisation
R1	Chief Executive Officer	Air cargo operator
R2	Chief Operating Officer	Air cargo operator
R3	Sr. Manager – Outstations	Ground handling
R4	Senior Vice President – Commercial Cargo	Airline
R5	Senior Manager – Global Cargo Sales & Marketing	Airline
R6	Senior Manager – Cargo Revenue Management	Airline
R7	Manager – Cargo service delivery	Airline
R8	Manager – Cargo products development	Airline
R9	Executive Director	Logistics company (Sea to Air) department
R10	Lead Trade Facilitation	Logistics company (Sea to Air) department
R11	Lead Trade Facilitation	Logistics company (Sea to Air) department
R12	Expert (Sea-to-Air)	Logistics company (Sea to Air) department
R13	Air Logistics Program Manager	Aviation management
R14	Sector Development and Promotion- SME	Aviation management
R15	Group Chief- Sector Development & Promotion,	Aviation management
R16	Director of Business Development and New Ventures	Aviation management
R17	Cargo Expert	Aviation management
R18	Cargo Expert	Aviation management

3.5.2 Qualitative Data Analysis

To analyse the qualitative data, QSR Nvivo Version 12 was used to apply thematic analysis on the textual data, develop different nodes, and identify different themes. This study used the six thematic analysis steps recognised by Braun and Clarke (2006):

- Step 1: Familiarisation
- Step 2: Coding

- Step 3: Generating themes
- Step 4: Reviewing themes
- Step 5: Defining and naming themes
- Step 6: Writing up

Familiarisation with data involves reading, understanding, and transcribing the qualitative data. It is the initial step in determining what was said and what was meant by what was said by the respondents and to form the bigger picture of the research participants' sentiments and views. It allows the researcher to get a holistic view and provides a basis for a deep understanding of the research participants' various perspectives of key issues tied to developing the air cargo sector in Oman. Transcription is the process of converting audio-recorded data into text (Braun and Clarke, 2006). Therefore, in the first step, the data was read, understood, and transcribed (eleven audio-recorded interviews were transcribed and converted into a textual form).

Next, all the transcripts, along with the notes from the seven interviews that were not recorded, were imported into Nvivo Software to conduct data coding. In the second step, data coding was done by reading and creating different nodes. Coding is labelling or assigning another name. So, all the statements from the transcribed interviews were coded in the different nodes, and these nodes were labelled with different names according to the pattern identified in the statements. The third step took all the relevant patterns/nodes and categorised them under potential themes. The themes (parent nodes) were reviewed by checking their relevance with the patterns (child nodes) in the fourth step. Along the same lines for step five, the names of the themes were redefined according to the collective meanings of the child nodes identified in the data. In the last step, the tree node diagrams were developed in a hierarchal shape to show both child and parent

nodes, along with their write up. All data analysis steps using Nvivo were performed as per the standard guidance by Jackson and Bazeley (2019) and Edhlund and McDougall (2019) (see Appendix B).

3.5.2.1 TreeMap Analysis

Treemaps were generated to identify the most or least critical themes according to their frequency of coding against each factor (i.e., air cargo development strategy) and show the significance of each theme according to its covered area. The map is the combination of different boxes, which are also known as hierarchical charts. It visualises the hierarchical information contents, usually inset in nested rectangles. Each rectangle shows the area of occupancy proportional to the number of coding, or coverage, in the actual data, based on the treemap algorithm. The size and colour (dark to light) of each rectangular tile are correlated in the structure of the treemap. Normally, dark colours represent the higher significance of the target theme, while light colours show less significance because of the number of coding or recurrences in the qualitative data. It is an efficient way of sorting because thousands of themes can be displayed in a single diagram according to the different areas of occupancy. In this study, the themes in the larger area represent the most significant themes, while the smaller area themes had fewer frequencies of repetition during the interviews; thus, they represent the least significant themes (Kong et al., 2010) (see Appendix C).

3.5.2.2 Word Cloud Analysis

In addition to treemap analysis, word clouds were also generated through Nvivo software. They are also known as tag clouds and show the 1000 most frequent words according to their repetition frequency in the interview transcripts (Huang et al., 2019).

In the present study, showing the high-frequency words provides additional supporting evidence used in the textual data; these words relate to the themes identified during thematic analysis, thus showing the internal validity of the textual data (see Appendix D).

3.5.2.3 Word Tree Analysis

Nvivo software likewise produces word trees (also known as a tree structure or diagram). The purpose of applying the word tree is to analyse the pattern of the respondents' speaking during the interviews, using the keyword-in-context (KWIC) method. As a visualisation tool, it shows the tree of phrases using different sizes according to their usages in the textual data (McDougall, 2014).

Nvivo software allows the user to change the context by increasing or decreasing the number of words in the phrases to understand the whole scenario in a clear picture. There are three types of word trees:

1. Prefix Word Trees
2. Suffix Word Trees
3. Double Word Trees

In prefix word trees, the root word is placed on the left side while all the words and different phrases following the root words are on the right side. However, in the suffix word trees, the condition is vice versa. In double word trees, the root word is placed in the centre, with all the words in different phrases following the root word placed on both the right and left sides (McDougall, 2014). Nvivo software produces double word trees. In the present study, ten words were set on the left and right sides of the word trees to make them clearer in terms of understanding the phrases before and after the target words (see Appendix E).

3.6 Quantitative Research: Phase II

3.6.1 Qualitative to Quantitative: (Quantizing)

Quantizing refers to the process of converting qualitative into quantitative data. The reason for converting qualitative findings into quantitative form is to statistically assimilate and, later on, analyse the responses' outcomes. Quantitative data is sensible, defensible, scientifically precise, and rigorous; it provides hard numbers on experts' opinions and representations of their views that can be used to make essential decisions, thereby enhancing the value of qualitative data by their compatibility with quantitative data (Sandelowski et al., 2009)

Non-numerical data are variously referred to as segments of text, experiences formed into words, visual displays, or something else conceived as qualitative (Sandelowski et al., 2009); in the current research, the qualitative data was collected through interviews; then the qualitative themes identified from the qualitative research were converted into quantitative structured statements to develop the structured survey questionnaire for the quantitative data collection to confirm and judge the strategies identified from the first phase. Therefore, the data provide hard numbers on experts' opinions that can be used to make essential decisions regarding air cargo sector development in Oman.

3.6.2 Instrument Design

An instrument is a tool for measurement, and there are two types of scientific instruments: (1) an instrument for quantitative variables, and (2) an instrument for qualitative variables. The instrument for quantitative variables is applied to measure the absolute values of the variation in a variable or variables. In contrast, the instrument for qualitative variables is used for measuring the qualitative variation in a construct by using

different indicators/measures (Taherdoost, 2016). To understand the instrument for qualitative or quantitative variation, an example follows. When a patient goes to the doctor and communicates his condition, the doctor collects data through interviews/questionnaires using some sets of questions/measures to conceive the qualitative variations by getting different responses against questions like *sometimes*, *agree*, or *strongly agree*. The doctor will also apply different medical devices on the body of the patient to measure quantitative variables, e.g., a stethoscope to hear the sounds made by the heart or other organs, or a thermometer to measure the temperature of the body. Both types of instruments have importance according to their need and application.

In the present study, the quantitative instrument was developed as a result of the first phase of qualitative research (i.e., exploratory research). Many steps were performed during the instrument design: writing a covering letter, dividing the instrument into different parts, choosing the appropriate scale/categories for the measurement, selecting the appropriate words for the questions, maintaining the sequence of different sections, and formatting the entire instrument as per the general guidelines by Krosnick (2018).

The instrument was divided into two major sets of questions: (1) questions regarding respondents' and their company's profiles, and (2) questions regarding their opinion on different air cargo strategies under eight different domains/dimensions. The first set of questions covered demographic information such as type of organisation, position level, gender, work experience, and educational level, which were taken into account in the first part of the questionnaire. The next part of the instrument started with instructions regarding how to give the responses to each question. A total of nine sets of questions were itemised in the second part of the questionnaire to cover the air cargo development strategies to achieve the SOLS 2040 objectives. A five-point Likert scale

was employed against each question to make the questions closed-ended, with the following values and their labels:

- Strongly disagree 1
- Disagree 2
- Neutral 3
- Agree 4
- Strongly agree 5

Low values were assigned to *strongly disagree* and *disagree* options, while high values were allotted to the *agree* and *strongly agree* choices, which is recommended for statistical analysis (Nemoto and Beglar, 2014). A covering letter was attached to the questionnaire to explain the purpose of the survey, request the questionnaire be completed, state the right to withdraw at any time, denote the expected duration for answering the questionnaire, and guarantee that the information would be kept strictly confidential and would not be used for any other purpose, under the aegis of the University of Northampton. Information about the university and doctoral candidate was also provided in the letter, allowing the respondents a contact option for any further information. At the end of the questionnaire, words of thanks were given to the respondents for their precious time and for participating in the successful conduct of the survey. The complete questionnaires were uploaded on Google Forms, a large cloud-based company for online surveys (see Appendix F).

3.7 Quantitative Methods

3.7.1 Survey Strategy and Quantitative Data Collection

Mathiyazhagan and Nandan (2010) defined survey research as ‘a method of descriptive research used for collecting primary data based on verbal or written communication with a representative sample of individuals or respondents from the target population’ (p. 34). Surveys allow the researcher to collect data from a large sample in an impartial and unbiased manner. Another advantage of the survey method is that the results from the survey may be replicated in future studies in different contexts (Rea and Parker, 2014). However, there are different challenges in the field survey approach, such as double-barrelled (compound) questions, inadequate responses, low response rate, assuming prior knowledge, and rating level inconsistencies (Brasel, 2020).

In the second phase of the current research, a field survey strategy was applied. Data was collected through a structured questionnaire based on the first qualitative research stage as data output themes, which present air cargo strategies that need to be developed for Oman’s air cargo sector. A total of eight sets of questions were itemised, with a total of thirty-four items in the quantitative survey questionnaire. Since the second objective of the present study is to confirm air cargo strategies identified in the first phase through confirmatory analysis on the data from multiple respondents, a quantitative survey was the most appropriate research strategy for the second phase.

3.7.2 Nature of Surveys and Techniques for Data Collection

Since the objective of the present study is to identify the air cargo development strategies and then confirm them, the nature of the survey was cross-sectional rather than time series or longitudinal. Real-time data was collected from the respondents by circulating the structured, self-administered questionnaire. Sekaran and Bougie (2011)

identified different types of survey questionnaires for the collection of data, including emailing or surface mailing of questionnaires, and web-based questionnaires through the circulation of a web link.

The self-administered questionnaire has many advantages over the other techniques for data collection, such as time and cost-saving. Respondents are given the assurance of confidentiality and privacy, and data can be collected from many respondents in a brief span of time. It is also free from interviewer bias, and it is straightforward to enter participants' responses in the software for data analysis (Dalati and Gómez, 2018). This research adopted a self-administered web-based questionnaire with the help of the Google Forms facility.

3.7.3 Survey Sampling, Procedure, and Response

A sample is a small size of the population which must represent the characteristics of the entire population group. Groves (2004, p. 44) stated that the 'set of units to be studied' is called a population. Sampling starts from defining the target population where the study's results may be generalised (Creswell, 2011). The target population for the present study is team members involved in the air cargo business in the organisations of Oman.

The researcher did desktop research and sought expert advice (i.e., an Air Logistics Program Manager) on the companies and entities involved in different aspects of the air cargo sector of Oman, such as strategy, operation, and regulation. A list of all the air cargo organisations in Oman (i.e., airlines, airports, shippers, customs, government agencies, civil aviation authority, integrators, forwarders, clearing agents, and air cargo users) was prepared (see Table 3.3).

The researcher then visited most of the human resources departments in person or contacted them through telephone calls to estimate the number of air cargo experts involved in the air cargo business in their respective organisations. Finally, 258 professionals were identified as the best representation of people who are involved in the air cargo business in the organisations in Oman; hence this was the total target population of the present study. Consequently, rather than going for a partial sampling technique, all the target population was approached in a census.

Fortunately, the permission letter to collect the data was approved by the CEO of Oman Aviation Group (see Appendix G). Therefore, immense support was given to the researcher in the present study to access the twenty-five out of thirty-one listed air cargo companies (see Table 3.3) which occupied Oman Air SATS Cargo LLC, the cargo services building in Muscat International Airport. Luckily, collecting data from multiple air cargo companies within the same premises increased the accessibility of respondents and the response rate in the quantitative survey (79.5%) and saved a lot of time, cost, and energy.

When approaching the HR departments for the companies to conduct the study, the researcher provided and explained the participant information sheet, which included all required information about the study. Participant consent forms were part of the questionnaire. After getting their consent, an email containing the link to the online questionnaire was sent to the HR team, along with the cover letter and instructions for participation in the survey to be sent to the participant. Later, recommendations by Fosnacht et al. (2017) were followed to increase the response rate of the survey, e.g., two to three reminders were given through follow-up telephone calls and reminder emails

requesting the respondents to complete the questionnaire. Eventually, a total of 205 out of 258 respondents gave the questionnaire back, making the study response rate 79.5%.

Table 3.3 *List of Air Cargo Carriers and Cluster of Companies in Oman*

Serial No.	Company/Cluster of Companies
1	Air cargo operator (SATS)
2	Airport (Oman Airports Company)
3	Oman Aviation Services (Ground handling)
4	Oman Air Cargo
5	Oman Logistic Centre
6	Express Mail (Oman Post)
7	Oman Logistics Association
8	Civil Aviation Authority
9	Implementation Support and Follow up Unit (ISFU) (TANFEEDH)
10	Agents/ Freight Forwarders/ Clearing Agents : DHL Global Forwarders LLC Khehne + Nagel LLC DB Schenker Airborne Shipping & Logistics LLC Aramex Muscat LLC Bader Shipping Bipin Dharamsey LLC Clarion Shipping Services LLC Comet International Freight Services Eagle Freight Express Global Corp Logistics LLC Global Logistics Gulf Agency C.LLC Inchcape Shipping Services LLC Khimji Ramdas Shipping LLC Majan Shipping & Transport LLC Millennium Shipping Services LLC Oman Freight & Trading Corporation Omani Integrated Logistics Reliance Freight Sata LLC CEVA Logistics

3.7.4 Initial Screening of the Data

Initial screening was done to allow the sets to be sorted and organised. As mentioned previously, of the 258 air cargo experts targeted, 205 respondents returned the questionnaire making the study's valid average response rate 79.5%. According to Fincham (2008), the higher the study's response rate, the more reliable the findings are. He further indicated that researchers should focus on achieving a 60% response rate as this is the acceptable level by most journals for publication purposes. Lindemann (2019), however, opined that the response rate would highly depend on the survey method used, in which case he gave examples of in-person surveys having an estimated response rate of 57%, email surveys estimated at 30%, and online surveys estimated at 29%, for purposes of being accepted by the researcher in proceeding to the analysis. Moreover, Lindemann (2019) suggested the average response rate depends on many factors, such as the nature of the survey, types of respondents, survey time framework, length of questions, the interest of respondents, and methods for creating, distributing, and collecting questionnaires. The current research met this threshold as it managed a valid response rate well above the accepted minimum; hence it is considered admissible to aid in making inferences as far as the research objectives are concerned.

3.7.5 Reliability and Validity of the Instrument

Reliability and validity of the instrument are important issues. Reliability means consistency, while validity means accuracy (Taherdoost, 2016). For example, if a doctor applies a thermometer several times and gets the same temperature results, then the instrument is reliable. On the other hand, as far as validity is concerned, a thermometer is a valid tool for the measurement of temperature. Still, it is invalid for the measurement of

blood pressure or glucose levels. Both validity and reliability are important to reduce measurement errors.

Reliability is the consistency of the measurement, so reliability analysis is conducted to test the consistency of the different items in different constructs (Taherdoost, 2016); testing reliability is an important step in quantitative data analysis (Eisinga et al., 2012). In this research, the instrument was divided into eight categories of air cargo strategies, and the Cronbach Alpha technique was applied to test each construct's reliability. A Cronbach alpha value greater than 0.60 indicates an acceptable level of reliability (George and Mallery, 2003; Ursachi et al., 2015); however, it is considered 'good' if its value is greater than 0.7; a value higher than 0.8 is considered 'very good', and a value above 0.9 is considered 'excellent' (Hair et al., 2016).

The validity of this study's instrument was tested by pre-testing the quantitative instrument survey to confirm the qualitative findings. A pre-testing of the instrument was undertaken to validate the various dimensions of air cargo development strategies to achieve SOLS 2040 objectives and their respective measures identified during the qualitative research stage. Before circulating the instrument for the field survey, it was validated by two senior air cargo experts (one from a strategic level and one from an operational level) and three logistic/aviation academicians (two from aviation and one from logistics) to gather expert opinions on various aspects, e.g., length of questionnaire, contents, sequence, relevance, criteria, and issues of response biases of the questions in the instrument.

3.7.6 Quantitative Analysis Methods Tools

MS Excel was used to draw demographic information figures. Smart PLS was used to test the measurement and path models (relationship models); it deals with the

multiple exogenous and endogenous constructs to test the relationships among them. Firstly, an algorithm examining convergent and discriminant validity was run to test the validity and reliability of the measurement constructs. Secondly, the bootstrapping technique was used to test whether the relationship is significant. For this purpose, bootstrapping provides the three statistical parameters, i.e., coefficient value, p-value, and t-value. Third, blindfolding was run to test the model accuracy and adequacy, which is mainly comprised of Q2. Fourth, the model fit indices were examined to see whether the model is fit according to data.

3.7.7 Quantitative Data Analysis Technique

Partial least square based structure equation modelling (PLS-SEM) is a multivariate data analysis scheme that is used to test theoretical, linear, and causal models. It provides a friendly environment for advanced reporting characteristics (Hair et al., 2020; Wong, 2013). PLS-SEM handles two different types of models: (1) inner models, and (2) outer models. Inner models are also known as relationship models which demonstrate the relationship between independent and dependent latent constructs while outer models are measurement models of the latent constructs which demonstrate the relationship between latent constructs and their observed indicators (Hair et al., 2020; Richter et al., 2020; Wong, 2013). Smart PLS software provides the platform to apply the PLS-SEM technique where both convergent and discriminant validity as well as reliability of the constructs are tested through assessment of measurement models. On the other hand, path models are tested through the assessment of the path models with path coefficient β values (b), t-statistics, and p-values (Jarvis et al., 2003; Sarstedt et al., 2019).

PLS-SEM is a good alternative to the covariance-based structure equation modelling (CB-SEM) technique (Jarvis et al., 2003). Wong (2013) specified some

situations in which PLS-SEM is most appropriate: (1) when the sample size is small, (2) there is little available theory, (3) predictive accuracy is supreme, and (4) when model specifications are not ensured. PLS-SEM is deployed in many areas, e.g., marketing, behavioural science, social science, and management systems (Wong, 2013). It also provides many rigorous measures about construct reliability, convergent validity, and discriminant validity (Farrell and Rudd, 2009; Fornell and Larcker, 1981; Jarvis et al., 2003). PLS is a variance-based exploratory and non-parametric technique widely accepted as a solution with various advantages, such as developing and refining theories when the data set is not so large and non-normal (Hair et al., 2019; Sarstedt et al., 2014; Wong, 2013).

In the present study Smart PLS 3 software was applied to test both models: (1) the measurement models (validity and reliability) with AVE, factor loading, cross loading, HTMT etc. and (2) the relationship models through the path coefficient β values (b), t-statistics, and p-values to test the relationships of each independent construct/major category's strategy with the dependent variable of 'developing Oman's air cargo sector'. Based on the findings from the relationship model, we confirmed air cargo strategies (i.e., independent constructs/variables) influence the air cargo sector development (i.e., dependent variable).

Figure 3.3 below shows the overall summary of the current study's research design.

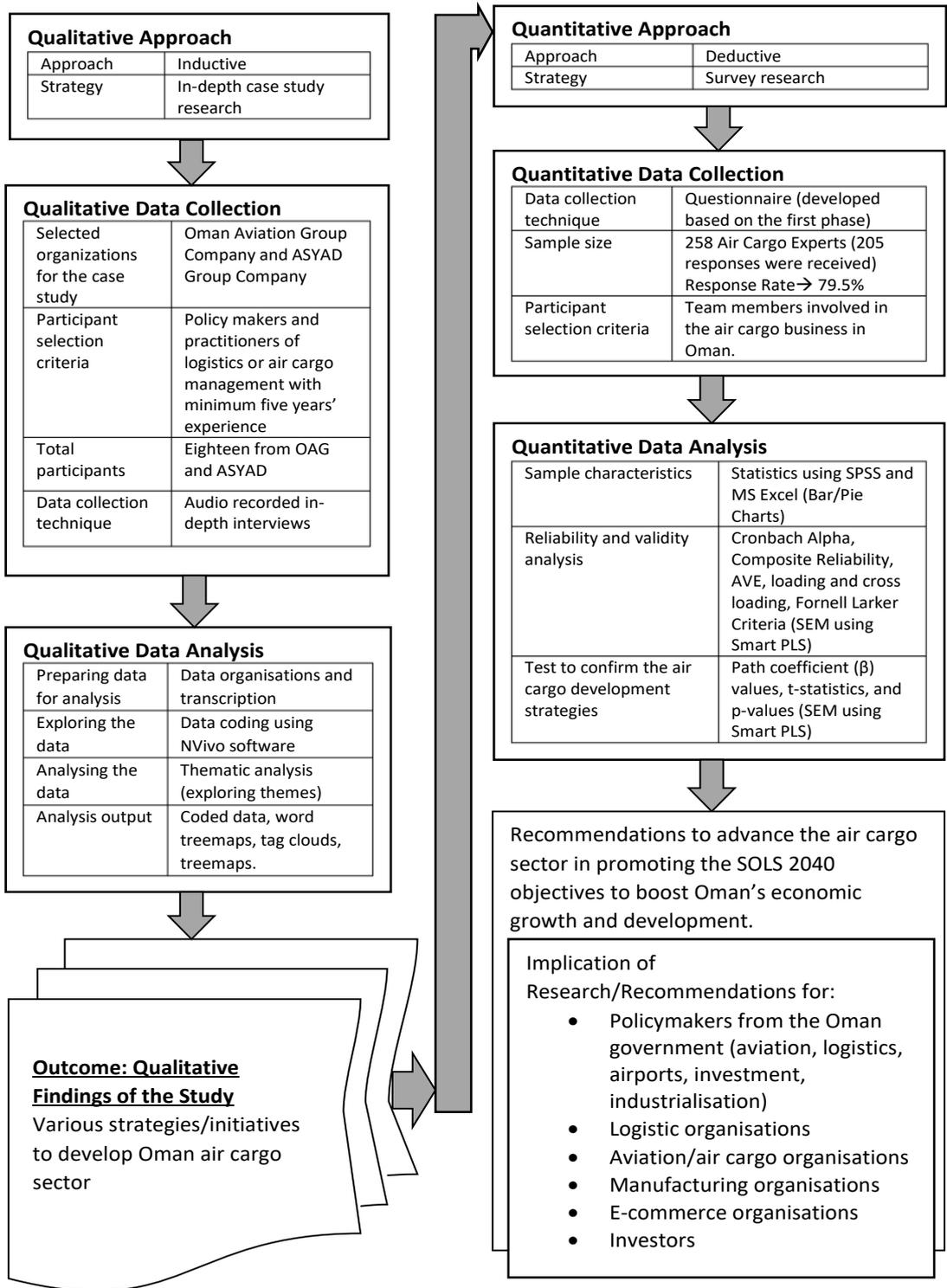


Figure 3.3 Summary of Exploratory Sequential Research Design
 Adapted from Creswell and Creswell (2017)

Chapter Four: Results

4.1 Introduction

This chapter presents findings from the collected data through the application of the proposed methodology of mixed methods. The first part of the chapter provides the results from qualitative data analysis; the second part contains the quantitative results based on the statistical analysis.

4.2 Qualitative Empirical Results

QSR Nvivo Ver 12 was used for thematic analysis of the qualitative (textual) data to develop different nodes and identify sub-themes under broad categories (see Appendix B). A treemap analysis was generated to identify themes according to their coding frequency against each factor, showing each theme's significance according to its covered area. In addition, a word cloud was generated through Nvivo software (see Appendix D) showing the high-frequency words used in the interviews; these words are related to the themes identified during thematic analysis, thereby showing the internal validity of the textual data. Finally, word trees were generated through the same software. The purpose of the word trees was to analyse the patterns of speech during the interviews regarding keywords-in-context. The tree presents the phrases in various sizes according to their usages in the interviews (see Appendix E).

Figure 4.1 shows the overall treemap of all the themes and their sub-themes identified during the in-depth, qualitative research using QSR Nvivo Ver 12. The map is a combination of different boxes, which are also known as hierarchical charts. It visualises the hierarchical information contents, usually inset in nested rectangles. Each rectangle

shows the occupancy area proportional to the number of coding or coverage in the actual data based on the treemap algorithm. The treemap structure correlated with the size and colour (dark to light) of each rectangular tile is correlated in the treemap structure. Normally, dark colours represent a higher significance of the target themes or sub-themes, while light colours show less significance. Figure 4.1 shows a total of thirty-four sub-themes identified under eight main themes: establishing free trade zones, establishing a bonded warehouse, stimulating air cargo demand, adopting a sea-to-air transportation hub, marketing and promotion, ensuring coordination between air cargo stakeholders, improving customers and government agencies, and developing specialised infrastructure.

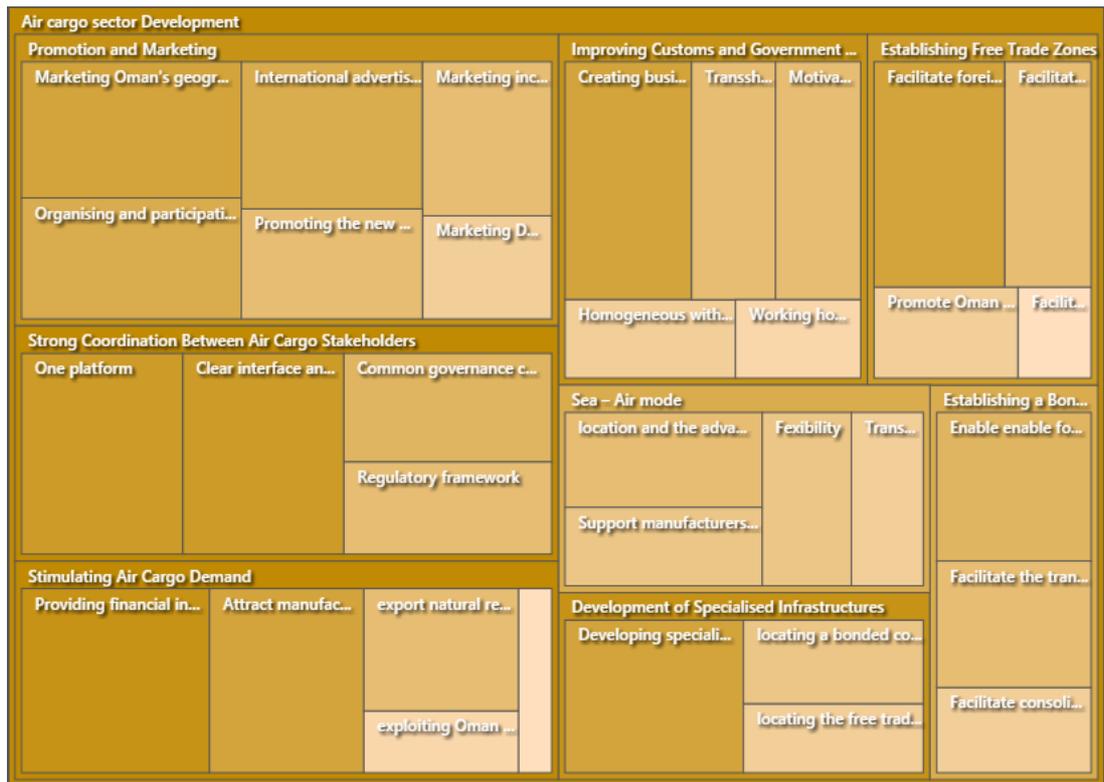


Figure 4.1 Overall Treemap for all Themes

The above-mentioned empirical evidence shows the overall treemap while the following sections provide the details of each theme individually along with their

associated sub-themes. Also, samples of direct quotes supporting the analysis of the treemap findings from the current study interviews are provided to understand what the treemap output was presenting and in what context.

4.2.1 Establishing Free Trade Zone

Figure 4.2 provides the treemap of the first theme: establishing free trade zones. A total of four sub-themes were identified during the qualitative analysis.



Figure 4.2 Treemap of Establishing Free Trade Zone

Sample quotes:

A lot of airports, international airports, which are competing for air cargo market share, developing free trade zones on airport cargo, villages, on airports... these are very important to feed cargo into the cargo terminal and to become a global player...free zones should be incentivized well enough by the government in order to attract investment. Now if without the right kind of policy, bigger companies might not be interested in investing in Oman. As a result, you've lost opportunity and they might be looking at Dubai and our biggest competitor. So, what is most important is the policies to draw business in. And second is also the tax incentives. And also, the customs regulation. Customs regulation should enable free movement of goods from the airport,

from the cargo terminal to the free trade zone without paying duty limits. If that is very seamlessly done with least paperwork, then people will see a benefit of putting up our manufacturing plans in Oman, in an airport free zone and take full advantage of the mechanism. (R2)

Free zone is a key enabler, especially for foreign players who want to use the country as a hub, because of tax holidays, and other benefits, employee, organization, et cetera. So having a free zone status land close to the terminal is very important to attract foreign investment, especially in the cargo space. So these are the two more important...free zones is a very proven and attractive value proposition in the region—the most important or proven one the Jebel Ali free zone. And the idea of a free zone that you don't pay the local taxes, you have benefits and waivers on labour law and other laws, which is very attractive. So basically companies, international companies can be based there and serve the region without bearing any tax. But also, being in close proximity to the hub, so they can serve countries in the region very quickly. And at the same time, they can get their goods from the far East or Africa or Europe, assemble them on that, add value on it in the free zone and then send the full or final product to the end-user. So it's very efficient in terms of setup. Yes, and if a consumer asks for something, literally, you can put it on a plane and send it there, especially with Muscat Airport that has good connectivity to the most regional countries. (R17)

Free zone will support the growth of the air cargo. So, it's just that you get the policies correct, you attract the right people in, fine, because nowadays everything's about speed. Now with e-commerce, with Amazon, Alibaba, everybody wants their things fast, and if they are prepared to pay a premium. So, if you can use this free zone as a storage hub, as a distribution hub, straight away anytime there's an emergency, you need to send them. (R1)

4.2.2 Establishing Bonded Warehouse

Figure 4.3 provides the treemap of the second theme: establishing a bonded warehouse. A total of three sub-themes were identified during the qualitative analysis.



Figure 4.3 Treemap of Establishing Bonded Warehouse

Sample quotes:

Makes a lot of difference when they have that to the equation, having a bonded warehouse within a free zone, where they can do light industry, large manufacturing assembly, and then all of a sudden the game changes, because that won't get customed. It goes straight from the warehouse, or the manufacturing facility, to the belly of the plane. (R15)

I talked about the bonded warehouse, right? So sometimes items that are coming here because they are bonded, they haven't left the airport, there's no tax on them. So that will encourage people to bring more cargo here, and then in and out of the country. So that again will be a big benefit to the country. (R1)

It is a direct incentive to have airport city with bonded warehouses and in order to feed the air cargo. (R2)

We also require different facilities within the airside access areas. So, any area of land that has access to the airside most probably next to or nearby the cargo terminal. So, here we're talking about different bonded warehousing facilities to expedited clearance facilities for ecommerce. (R13)

4.2.3 Stimulating Air Cargo Demand.

Figure 4.4 provides the treemap of the third theme: stimulating air cargo demand.

A total of five sub-themes were identified during the qualitative analysis.



Figure 4.4 Treemap of Stimulating Air Cargo Demand

Sample quotes:

With a higher population automatically means more demand, more supply and, as a result, the air cargo industry feeds and brings volumes automatically; here the population in Muscat city being only two million in total that there's not enough demand to drive the air cargo business, which means that you have to depend on transshipment cargo to grow...another way to bring in the capacity is to incentivize other airlines to hub here...This can happen if it maybe Oman Post tries to partner up with some companies in China, maybe Ali Express, Alibaba, et cetera, to try and bring in another hub over here. If another hub comes in over here, then possibly there is a potential to compete in the region for this industry and hopefully get a market share in this industry...Oman definitely is in a very much better position based on that graphical location. It is just that we have not taken advantage of it. (R2)

If we have an ecommerce hub in Muscat in a free zone, and link it to the Far East, then a new destination that they get for cargo can be opened. So it should be driven by key industries demand, and the routes would be justified...textile is one common or potential player, especially from India and Bangladesh. We get the textile here, manufacture the clothes, then ship them, just in time to global players wherever they are...also help local industries globalize and be shipped by air and become a regional hub with the right incentives, free zones, et cetera. If we create demand, the freighters, the integrators, the freight forwarders will come along. (R17)

4.2.4 Oman Sea-to-Air Hub

Figure 4.5 provides the treemap of the fourth theme: establishing Oman sea-to-air hub. A total of four sub-themes were identified during the qualitative analysis.



Figure 4.5 Treemap of Sea-to-Air Hub

Sample quotes:

A model of the sea-to-air comes in wherein the customer doesn't want to pay the full air freight costs but is willing to pay a little bit more for one sector and to connect to air and still make the goods arrive on destination on time. So being a cost-sensitive product. (R2)

Air-to-sea also is possible, and you can also do lot more value-added services on an airport where the cargo can be redocked, send out to another country as Muscat originating cargo, or value-added services can be added to the product and then you are selling a more superior product to the end customer. (R2)

For the sea-to-air to work, we need to find goods that come from the East by ship to Oman in a bonded free zone status, they are value add made on them, and then the final product, which is a value-adding product is carried by air, which will arrive at the end-user quick in Europe. So, and typically, textile is one common or potential play, especially from India and Bangladesh. So we get the textile here, we manufacture the clothes or whatever, then ship them in time, just in time to global players wherever they are. (R17)

4.2.5 Promotion and Marketing

Figure 4.6 provides the treemap of the fifth theme: promotion and marketing. A total of six sub-themes were identified during the qualitative analysis.



Figure 4.6 Treemap of Promotion and Marketing

Sample quotes:

A lot of money being spent on promoting Oman as a tourism sector, right? But then, from my understanding, I've not seen too much visibility of the air cargo was given outside Oman itself. Now when I travel across to certain places, and then they ask me, 'Where you come from?' When I say, 'I'm from Oman,' Not too many people know where Oman is. I need to say that it's a place next to Dubai, then they know what it is. (R3)

Attending these exhibitions or even these bilateral agreements at the G2G level, helps to keep the image of Oman as a logistics player fresh in the minds of different countries...Attracting investors and anchor tenants has a lot to do with our marketing and promotion activities and also our external communication, establishing that Oman is now a first-class product in terms of logistics. Also, marketing ourselves as a multimodal player in the sector will help diversify the interest from different stakeholders, those who are thinking about sea cargo but also those thinking about sea-air or air-sea and so on. Additionally, any improvements made to our logistics product or air cargo product...This is a joint effort between both the sea and logistics players as well as the air cargo players. It's a joint presence in any kind of cargo conference around the world. (R13)

4.2.6 Establishing Strong Coordination between Air Cargo Stakeholders

Figure 4.7 provides the treemap of the sixth theme: establishing strong coordination between air cargo stakeholders. A total of four sub-themes were identified during the qualitative analysis.



Figure 4.7 Treemap of Establishing Strong Coordination among Air Cargo Stakeholders

Sample quotes:

There's a lot of players. We need to create a common governance committee, coordination committee, whatever it is, to unify our efforts to the world. Today each one, each party works alone. If these efforts are coordinated, we will be much more powerful on the group to attract partnerships at market times...I think there needs to be some sort of consolidated database across all entities, which can give us an insight. (R18)

The company is doing a fantastic job when it comes to delivering, from their end. But then other parties are not controlled by the operator: governments, semi-government, private sector. If they don't up to their game and deliver their end of the service agreement, the value of that building does not materialize to the end-user, the customer. The customer could care less about who did what. They care about their delivery being on time and in good condition. You can't go to a customer and tell him, 'I've delivered my bit, but the company that should handle your cargo didn't do a good job'. That can't take place. It's an overall experience. It's an overall product that needs to be delivered. (R15)

4.2.8 Improving Customs and Government Agencies

Figure 4.8 provides the treemap of the seventh theme: improving customs and government agencies. A total of five sub-themes were identified during the qualitative analysis.



Figure 4.8 Treemap of Improving Customs and Government Agencies

Sample quotes:

For all of our customs products to succeed, we need to transform that completely to customs as a customer service. Customs needs to see itself as an enabler of international trade. It needs to see that if I'm doing this in four hours, the economy is that. If I'm doing this in forty hours, the economy is that... They're doing their job. They're doing an excellent job from a security perspective, but when it comes to an economic perspective, it's not serving the needs of the country and the sector. We witnessed this firsthand, and we've seen it while we are doing some visits. They're not following what was agreed in terms of clearance. They claim they do, but in one of the cases that we came across, until six months ago and the Sultan was there, they were still using stamps to approve some activities even though everything was on the ban. The agreement was that everything should be done electronically and simultaneously...So again, the process is important, but for me, most of your processes, as you mentioned, where it's something like customs or ministries, it's a monopoly. So you have to get your processes right and your people right. (R14)

The biggest change that needs to happen at the moment is that customs must be driven by business and not by security. This is a requirement that we are

seeing in all of the leading countries in the world that are excelling in air cargo or cargo or logistics in general. If we think about Singapore and the Netherlands, Dubai and other successful hubs in the world, they are treating cargo and customs as a product, as a business. (R13)

4.2.9 Development of Specialised Infrastructures

Figure 4.9 provides the treemap of the eighth theme: development of specialised infrastructures. A total of ten sub-themes were identified during the qualitative analysis.

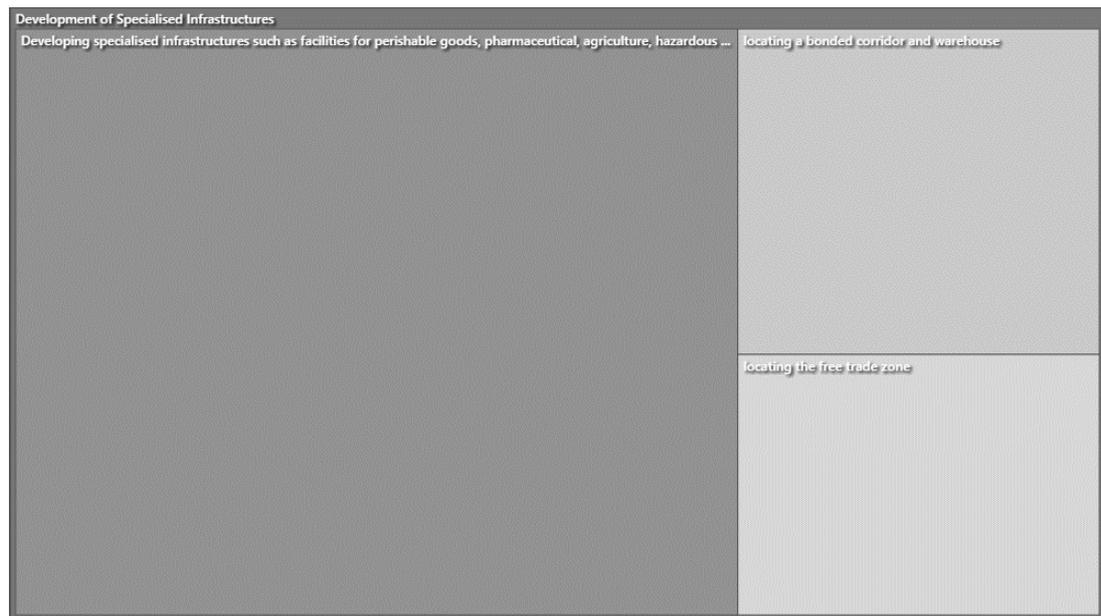


Figure 4.9 Developing Specialised Infrastructures

Sample quotes:

Our free zone doesn't have any perishable items or fast transit cargo, so our free zones are most in sea cargo...dedicated perishable centres for food, pharmaceuticals, fisheries, agriculture, any perishable import or export dedicated facility for that and even a space for international players such as freight forwarders and integrators to have direct airside access to speed up their operations and also set up a more significant presence here in Oman. (R12)

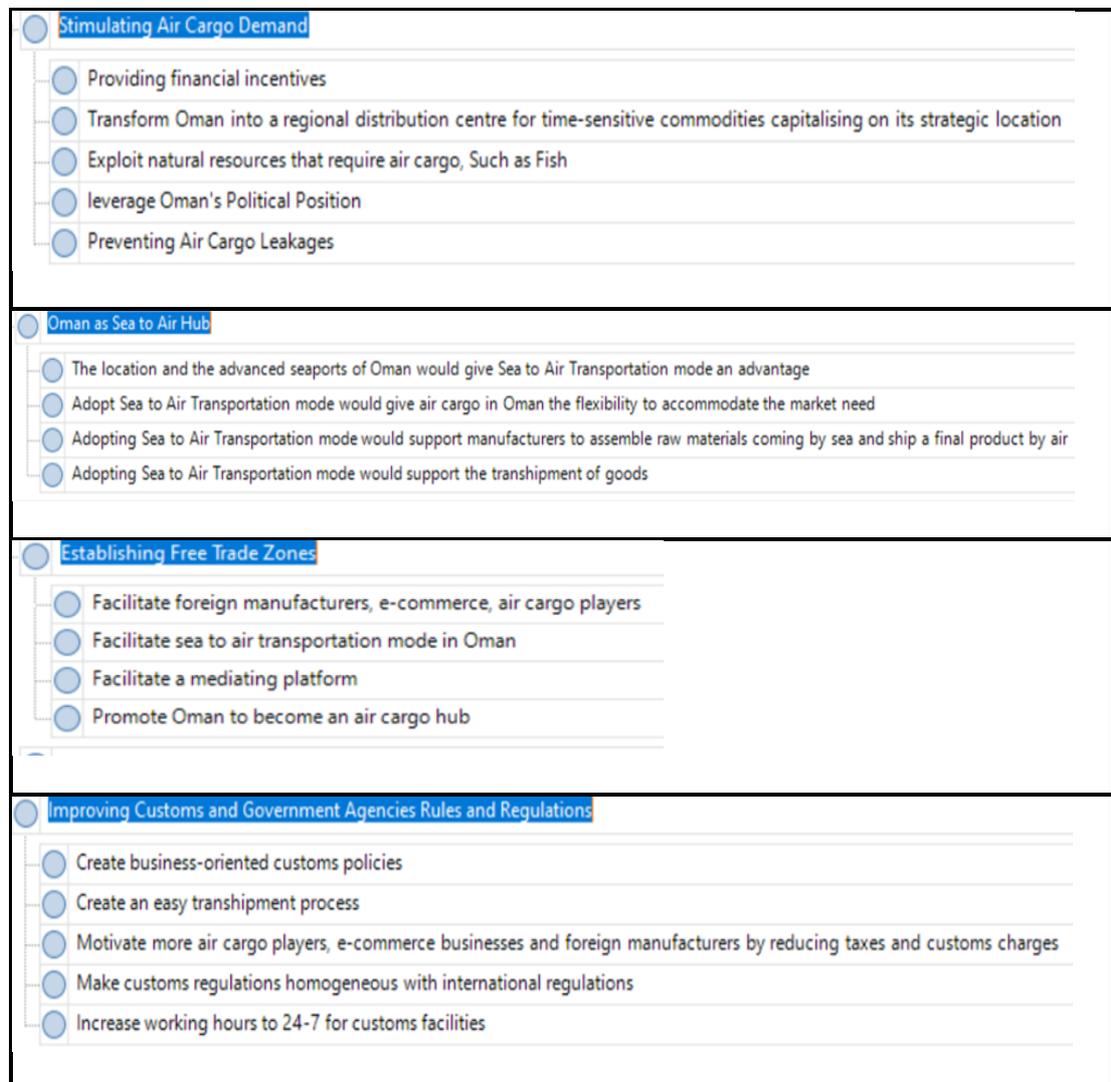
We need to have warehouses dedicated to different commodities. Express cargo facility, perishable cargo facilities, specific live animal centre. And this kind of specific thing where you can sort of diverting it to. (R3)

We need, for example, a cargo agent warehouse. We need bonded warehouses. We need an express courier centre and also a perishable handling centre. So these are, I think, basic infrastructure that we need to increase the movement of cargo and also to develop Oman as a hub. (R1)

We need to invest more into other supportive infrastructures or auxiliary that will be able to aggregate more volumes into Oman and hence increase the utilization factor. For instance, we are investing into the perishable centre, so that will allow more of the fruits and vegetables to be routed through Muscat airport. Also, it will support the fisheries; it will support the whole cold chain logistics in Oman. (R14)

4.2.10 The Themes (Strategies for the Development of the Air Cargo Sector)

The qualitative data analysis phase revealed eight dimensions/themes of air cargo strategies needed to promote Oman's air cargo sector development extracted through in-depth interviews in Phase-I. Figure 4.10 shows the sub-themes identified under each main theme of the study.



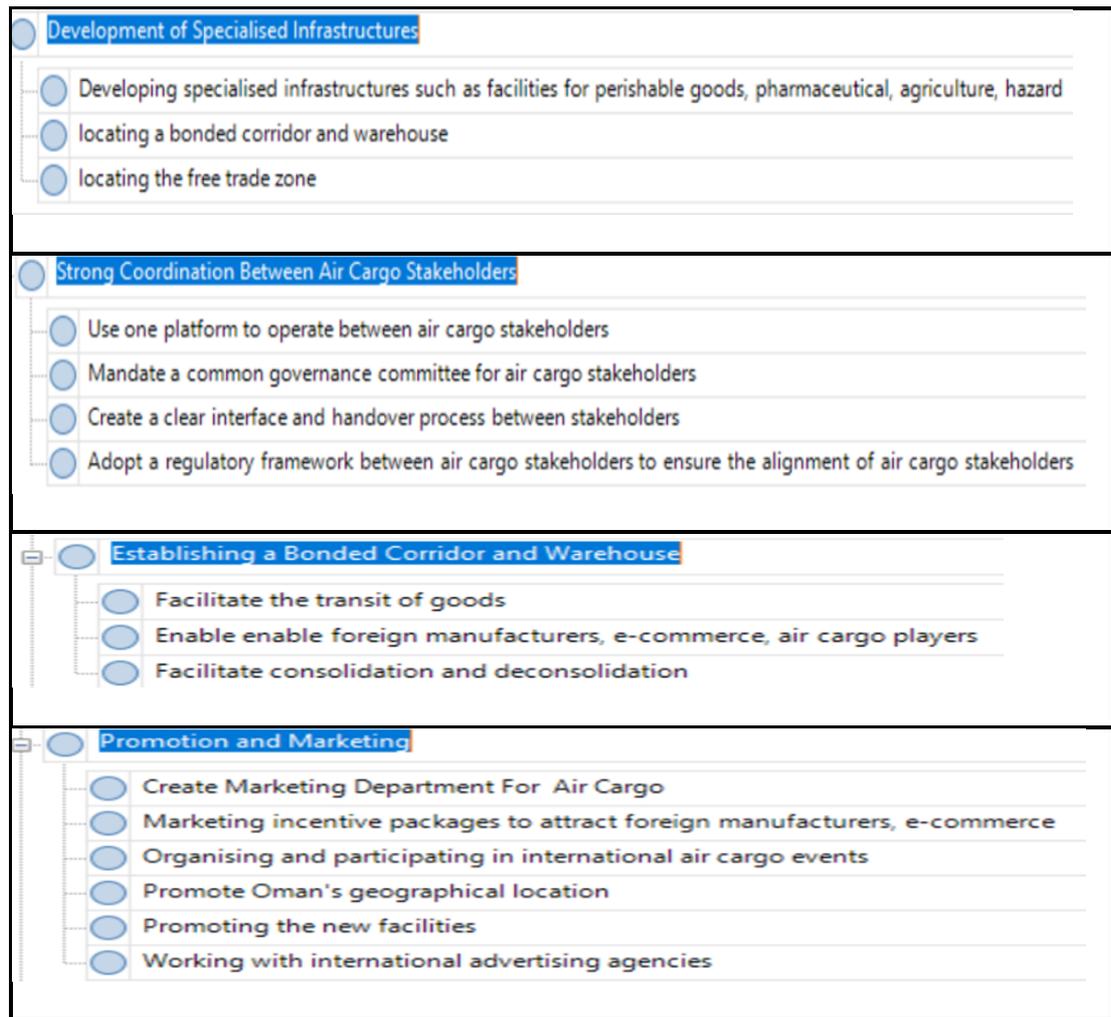


Figure 4.10. Themes Extracted from the Textual Data

4.3 Conceptual Framework

Based on the first stage of the current study (qualitative phase), the conceptual framework was developed for the second phase (quantitative phase). The second phase examined the objective of developing the air cargo sector in Oman together with the eight identified main themes. This is in line with the second research objective: to confirm air cargo development strategies in Oman which were identified in the first phase. The conceptual framework is illustrated in Figure 4.11.

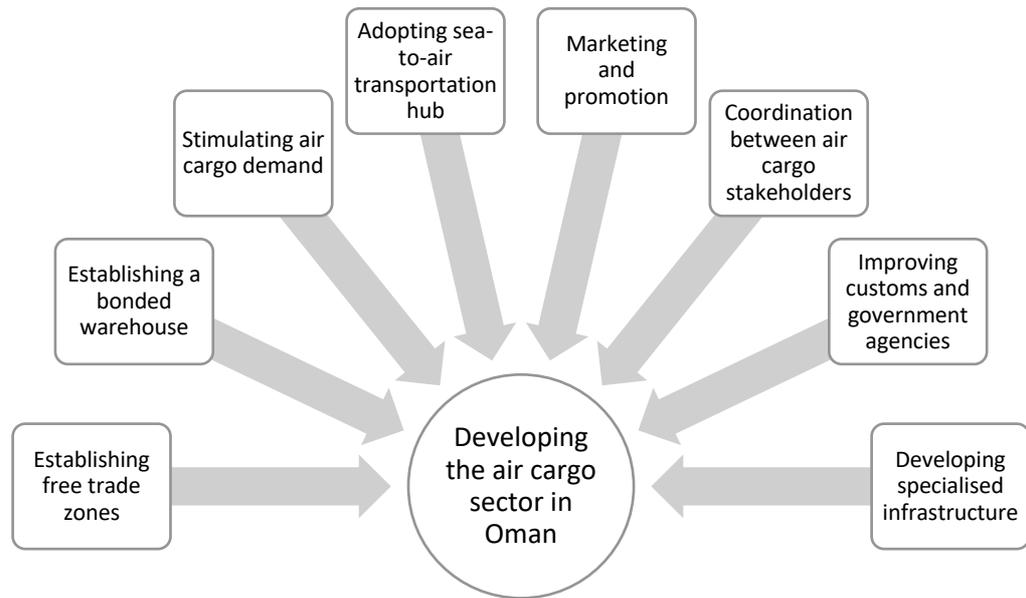


Figure 4.11 The Conceptual Framework

4.4 Quantitative Instrument Development (Qualitative to Quantitative)

The quantitative instrument was developed as a result of the first phase of qualitative research. The instrument was designed for surveying for confirmatory purposes. A total of eight sets of questions with a total of thirty-four items were formulated in the quantitative survey questionnaire to cover and confirm air cargo development strategies. A five-point Likert scale was employed against each question to make the questions closed-ended. Low values were assigned to strongly disagree and disagree options, while high values were allotted to the agree and strongly agree choices (see Appendix F).

4.5 Quantitative Empirical Results

4.5.1 Demographic Information

4.5.1.1 Type of Business

As a part of the survey questionnaire's demographic information, respondents were requested to indicate the type of business entity they work for in the sector. Their responses are presented in Figure 4.12 below. From the results obtained, it was observed that the largest group of individuals (n=33) who took part in this study were working for freight forwarders, which comprised 16.1% of the study sample size. The second-highest sample was from airlines, with twenty-nine participants (14.1%). Twenty-two participants took part from customs, and twenty-two participants from government agencies, which contributed 10.7% from each department. Twenty-one participants were taken from aviation management (10.2%). Twenty participants took part from logistic companies (9.8%). Nineteen participants took part from the airport (9.3%). Eighteen participants were air cargo operators (8.8%). The remaining categories were represented by six or fewer respondents: logistics academicians, ground handling, air cargo regulators, clearing agents, integrators, and logistics institutions.

The reason for fewer representatives in other segments is because Oman's air cargo sector is small since the focus of the Omani government has been on other parts of the logistics sector, such as sea logistics. Al-Wahaibi (2019) confirmed this by saying air cargo was not on the radar of Oman's development logistics strategy. Thus, the low number of responses from certain segments targeted in this study is explained by the low number of employees in the stated air cargo segments rather than a low response rate.



Figure 4.12 Type of Business

4.5.1.2 Position in the Organization

The current study enquired about the managerial levels of Oman's air cargo sector survey participants. Their feedback is presented in Figure 4.13 below.

The study results show that 49.8% of the participants (102) were working in middle-level management. Fifty-four participants (26.3%) belonged to top-level management, and forty-nine participants were junior staff, which equalled 23.9% of the total population in the study. As a result, inferences from the study will be applied across all levels of management as there is enough representation from each level in the management hierarchy.

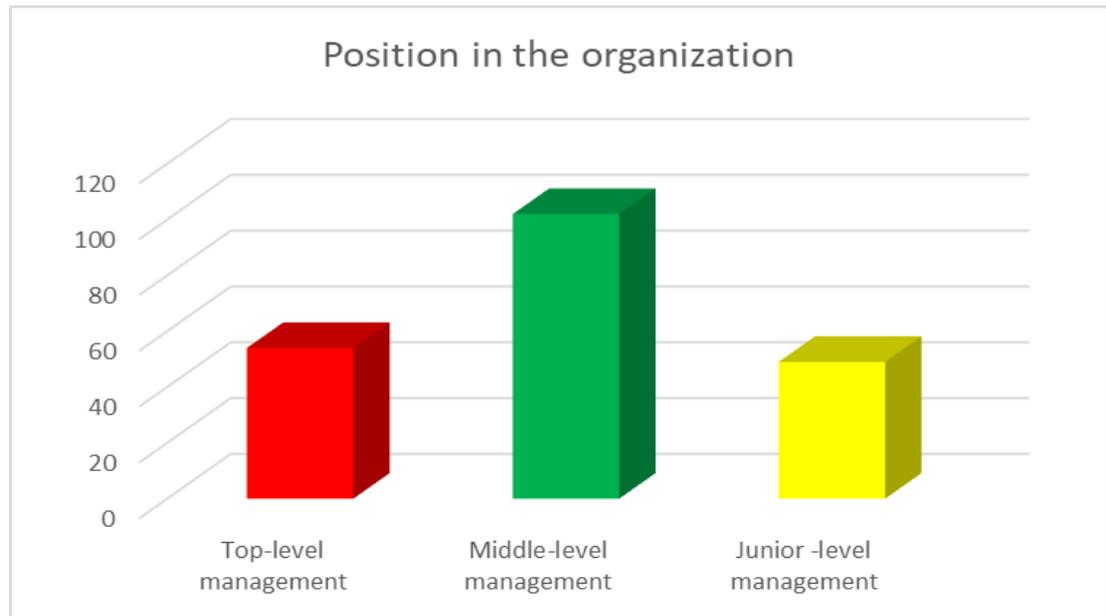


Figure 4.13 Position in the organization

4.5.1.3 Total Work Experience

The current study considered the years of work experience of the respondents. Their feedback is presented in Figure 4.14 below. The study showed that eight participants (3.9%) had one to two years of working experience. Twenty-two participants (10.7%) had two to four years of working experience. Thirty-five participants (17.1%) had four to ten years of working experience, and 140 (68.3%) participants had more than ten years of working experience, the highest among the working individuals. Thus, the study outcomes are drawn from high expertise.

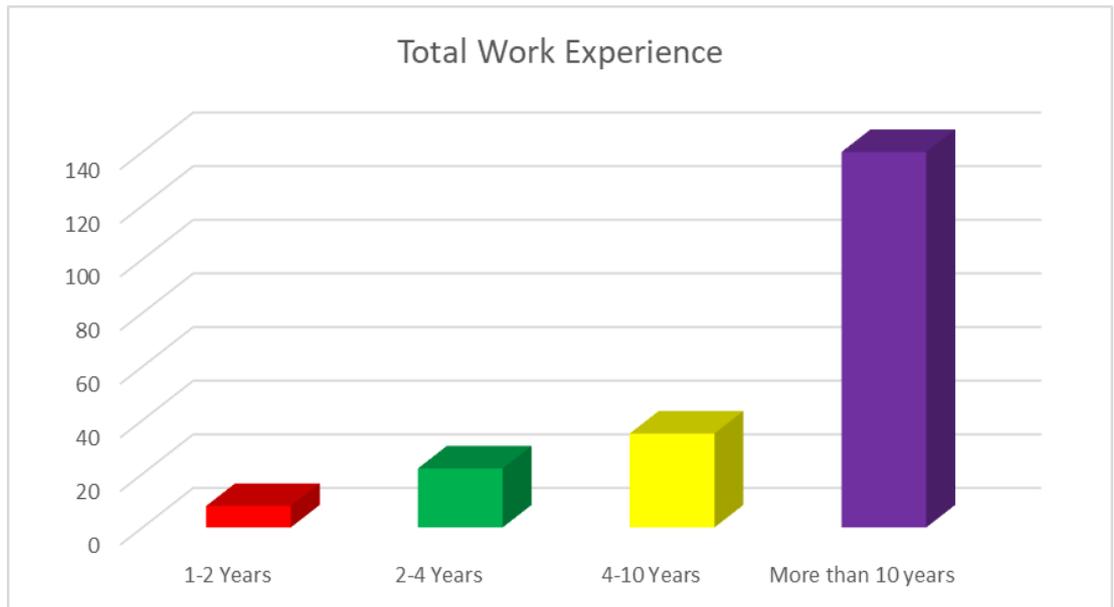


Figure 4.14 Working experiences

4.5.1.4 Gender

The study also collected information about participants' gender in this research (Figure 4.15). The study showed that 177 participants were male, which equalled 86.3% of the total participation, and only twenty-eight participants were females, almost 13.7%.

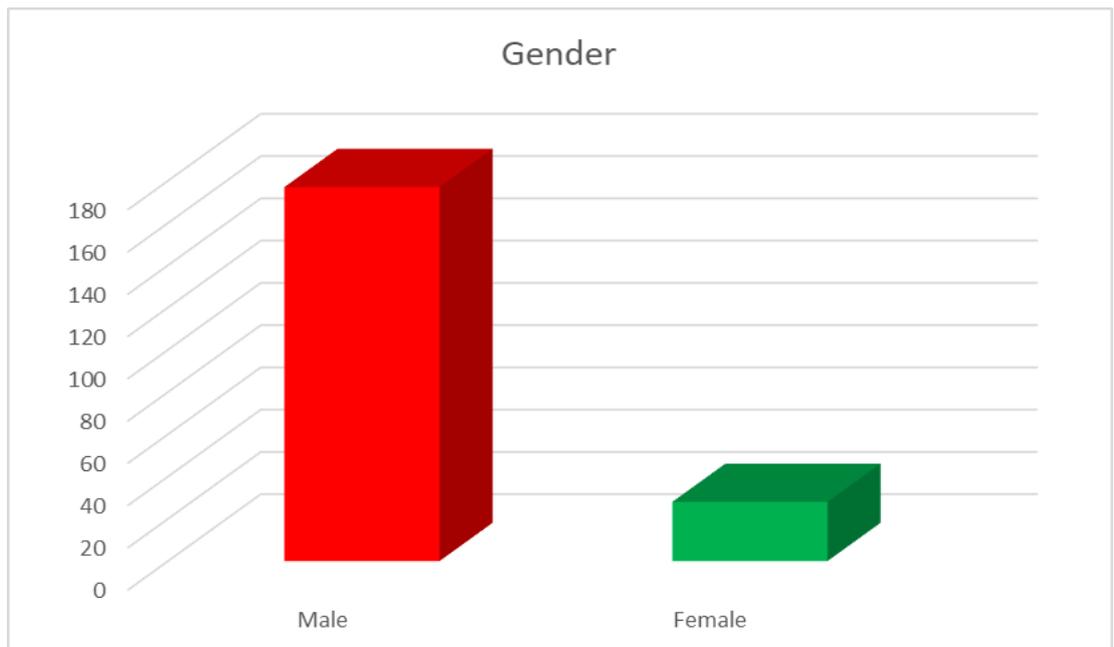


Figure 4.15 Gender

4.5.1.5 Education Level

The study also examined the participants' education level as part of the demographic characteristics (see Figure 4.16 below). The study found that twenty-five participants (12.19%) had a high school education. Ninety-six participants (46.8%) were bachelor educated, and seventy-two participants (35.1%) had master's degrees. Only twelve participants had a PhD degree, comprising (5.9%) of the total participants. This finding can be interpreted to mean that the participants in Oman's air cargo sector are professionals with a high level of education.

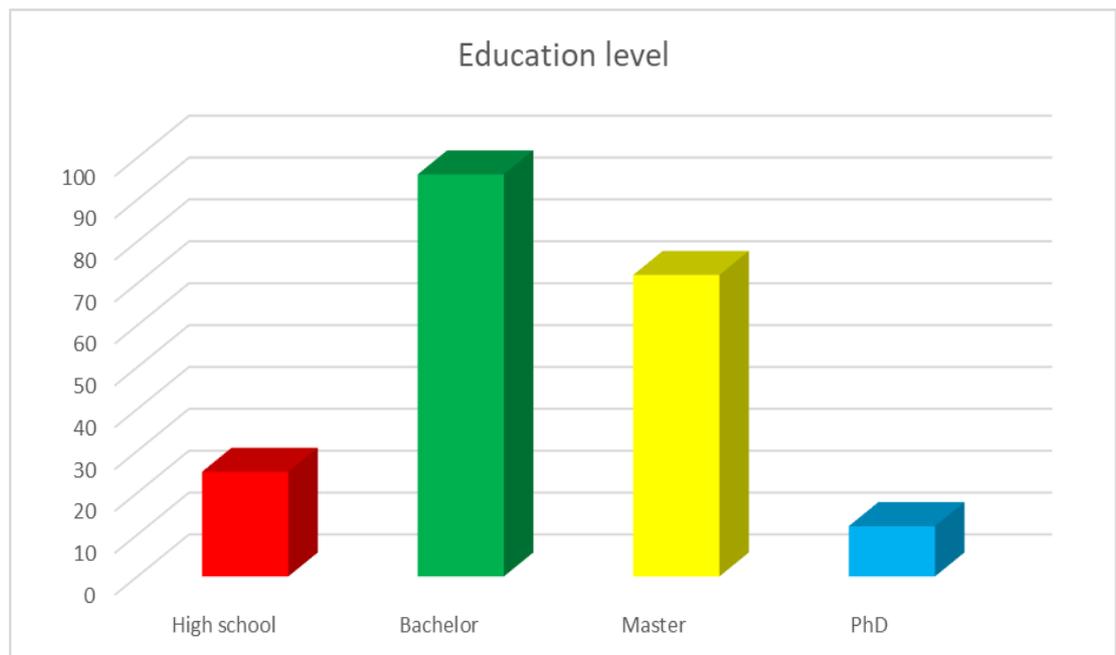


Figure 4.16 Education-level

4.5.2 Testing Measurement Models

4.5.2.1 Testing Convergent Validity

Convergent validity, the degree to which multiple items to measure the same concepts are in agreement, includes two statistics: (1) factor/outer loadings, which should be >0.7 (Hair et al., 2020; Richter et al., 2020; Sarstedt et al., 2019) and (2) average

variance extracted (AVE), which should be >0.5 (Richter et al., 2020; Sarstedt et al., 2019; Wong, 2013).

An algorithm technique by Smart PLS 3 software was run to check the convergent validity of the measurement constructs. Two items of development of cargo (Cargo1=0.665, Cargo3=0.659), one item of customs (CUS2=0.592), and two items of coordination (CORD1=0.401, CORD2=0.383) were deleted from the model since each item should be equal to or higher than the value of 0.70. Then, the algorithm was again run and found that one more item of customs (CUS3=0.623) had a lower factor/outer loading than the value of 0.70, so this item was also deleted. The remaining items and their factor/outer loadings are listed in Table 4.2.

Table 4.2. Factor/Outer Loadings

	1	2	3	4	5	6	7	8	9
ACD1									0.760
ACD2									0.883
ACD3									0.859
ACD4									0.857
ACD5									0.799
BWH	0.859								
BWH	0.792								
BWH	0.733								
COR		0.871							
COR		0.881							
CUS1			0.785						
CUS4			0.809						
CUS5			0.795						
Cargo				0.758					
Cargo				0.812					
Cargo				0.735					
Cargo				0.771					
Cargo				0.793					
Cargo				0.795					
FTZ1						0.772			
FTZ2						0.854			
FTZ3						0.787			
FTZ4						0.844			

INSF	0.893	
INSF	0.914	
PAM		0.735
PAM		0.766
PAM		0.762
PAM		0.734
PAM		0.787
PAM		0.813
STA1		0.798
STA2		0.848
STA3		0.815
STA4		0.812

Note: Bonded Warehouses=1, Coordination=2, Customs and Government Agencies =3, Development of Air Cargo in Oman=4, Development of Specialized Infrastructures=5, Free Trade Zones=6, Promotion and Marketing=7, Sea-to-Air Transportation=8, and Stimulating Air Cargo Demand=9

Next, AVE was tested to check the variation from construct items to overall construct. AVE explains how construct items make variations in an overall exogenous construct and comprises the items' correlations with each other that explain the variations in an exogenous construct. Its value should be higher than 0.50, which explains the construct variation above 50% (Richter et al., 2020; Sarstedt et al., 2019; Wong, 2013). The study found that the AVE value of each construct was higher than the value of 0.5, which explains above 50% variation in an endogenous construct (Table 4.3 and Figure 4.17). The results showed that the AVE ranged from 58.8% for promotion and marketing to 81.7% for Development of Specialised Infrastructures.

Table 4.3. Average Variance Extracted

	Average Variance Extracted (AVE)
Bonded Warehouses	0.634
Coordination	0.767
Customs and Government Agencies	0.634
Development of Air Cargo in Oman	0.605
Development of Specialised Infrastructures	0.817

Free Trade Zones	0.664
Promotion and Marketing	0.588
Sea-to-Air Transportation	0.670
Stimulating Air Cargo Demand	0.694

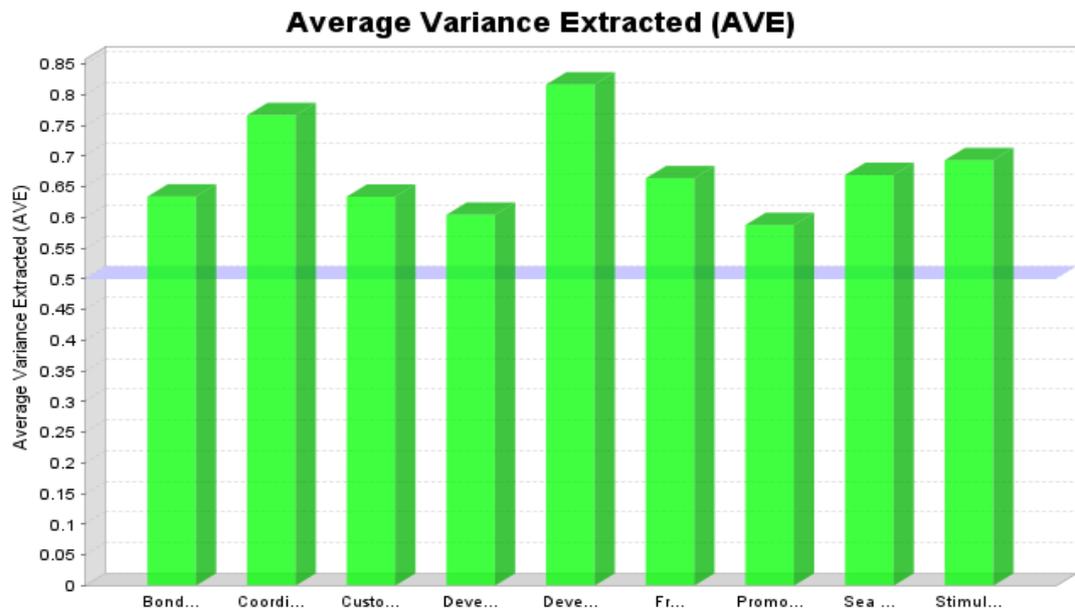


Figure 4.17 Average Variance Extracted (AVE)

4.5.2.2 Discriminant Validity

Discriminant validity is the degree to which items differentiate among constructs or measure distinct concepts by examining the correlations between the measures of potentially overlapping constructs. It comprises two statistical measures, cross-loadings and Fornell and Larcker criteria (Hair et al., 2020; Wong, 2013).

Cross-loadings of the measurement construct should be higher than the loadings of another construct. In other words, items should load more strongly on their constructs in the model. Table 4.4 presents the statistics showing that the cross-loadings of each construct item in this study were higher than the cross-loadings of another construct.

Table 4.4. Cross Loadings

	1	2	3	4	5	6	7	8	9
ACD1	0.406	0.145	0.444	0.465	0.303	0.410	0.423	-0.018	0.760
ACD2	0.430	0.182	0.411	0.489	0.284	0.510	0.482	-0.048	0.883
ACD3	0.467	0.165	0.359	0.443	0.285	0.509	0.465	-0.150	0.859
ACD4	0.430	0.030	0.415	0.511	0.398	0.483	0.488	-0.040	0.857
ACD5	0.382	0.096	0.293	0.421	0.305	0.430	0.427	-0.108	0.799
BWH1	0.859	0.098	0.425	0.612	0.424	0.715	0.537	-0.036	0.404
BWH2	0.792	0.143	0.293	0.521	0.430	0.633	0.316	0.019	0.377
BWH3	0.733	0.141	0.529	0.471	0.411	0.539	0.709	-0.073	0.444
CORD	0.135	0.871	-0.012	0.204	0.120	0.098	0.106	0.042	0.095
CORD	0.139	0.881	-0.015	0.212	0.143	0.204	0.040	0.170	0.162
CUS1	0.356	-0.006	0.785	0.466	0.401	0.379	0.636	0.067	0.378
CUS4	0.398	-0.037	0.809	0.463	0.380	0.366	0.542	0.103	0.382
CUS5	0.472	0.004	0.795	0.513	0.414	0.432	0.539	0.032	0.352
Cargo2	0.513	0.157	0.559	0.758	0.561	0.531	0.545	0.131	0.386
Cargo4	0.591	0.216	0.497	0.812	0.427	0.577	0.570	0.135	0.460
Cargo5	0.367	0.212	0.403	0.735	0.466	0.485	0.433	0.212	0.471
Cargo6	0.603	0.168	0.433	0.771	0.436	0.578	0.490	0.027	0.489
Cargo7	0.512	0.237	0.356	0.793	0.620	0.550	0.437	0.142	0.423
Cargo8	0.556	0.122	0.563	0.795	0.547	0.553	0.557	0.148	0.401
FTZ1	0.563	0.078	0.339	0.473	0.371	0.772	0.385	-0.003	0.448
FTZ2	0.641	0.170	0.506	0.614	0.529	0.854	0.577	0.075	0.470
FTZ3	0.615	0.064	0.339	0.521	0.365	0.787	0.403	0.004	0.442
FTZ4	0.753	0.225	0.410	0.655	0.478	0.844	0.503	-0.033	0.477
INSF1	0.451	0.114	0.452	0.562	0.893	0.426	0.426	0.075	0.314
INSF2	0.501	0.156	0.454	0.623	0.914	0.548	0.503	0.021	0.370
PAM1	0.483	0.134	0.593	0.452	0.403	0.389	0.735	0.069	0.417
PAM2	0.433	0.045	0.575	0.519	0.404	0.419	0.766	0.008	0.390
PAM3	0.496	0.067	0.581	0.473	0.418	0.453	0.762	0.065	0.483
PAM4	0.464	0.085	0.522	0.442	0.325	0.455	0.734	-0.056	0.389
PAM5	0.544	0.048	0.492	0.560	0.417	0.427	0.787	-0.034	0.447
PAM6	0.541	0.014	0.553	0.534	0.402	0.528	0.813	-0.030	0.410
STA1	-0.014	0.168	0.038	0.130	0.039	-0.009	0.052	0.798	-0.069
STA2	-0.033	0.083	0.082	0.147	0.048	-0.006	-0.004	0.848	-0.073
STA3	-0.015	0.041	0.100	0.151	0.031	0.038	-0.005	0.815	-0.080
STA4	-0.061	0.121	0.044	0.126	0.052	0.019	-0.033	0.812	-0.053

Note: Bonded Warehouses=1, Coordination=2, Customs, and Government Agencies =3, Development of Air Cargo in Oman=4, Development of Specialized Infrastructures=5, Free Trade Zones=6, Promotion and Marketing=7, Sea-to-Air Transportation=8, and Stimulating Air Cargo Demand=9

Discriminant validity is also measured by the criteria developed by Fornell and Larcker (1981). As a rule of thumb, the value in the Fornell-Larcker criteria is comparatively based on the squared construct correlation and average variance extracted (AVE). It inherently ties with the common factor of model variance (Richter et al., 2020; Sarstedt et al., 2019). It is a degree of shared variance between the values of squared correlations (Wong, 2013); therefore, the value of one construct should be higher with itself rather than the other diagonal values, which is what happened for the current study (see Table 4.5). Thus, the discriminant validity of the measurement constructs was also proved by both the cross-loadings and Fornell-Larcker criteria tests.

Table 4.5 Fornell-Larcker Criterion

	1	2	3	4	5	6	7	8	9
Bonded Warehouses	0.796								
Coordination	0.157	0.876							
Customs and Government Agencies	0.516	-0.016	0.796						
Development of Air Cargo in Oman	0.676	0.237	0.605	0.778					
Development of Specialized Infrastructures	0.528	0.150	0.501	0.657	0.904				
Free Trade Zones	0.796	0.174	0.494	0.702	0.542	0.815			
Promotion and Marketing	0.645	0.082	0.717	0.651	0.516	0.581	0.767		
Sea-to-Air Transportation	-0.036	0.122	0.083	0.170	0.052	0.014	0.003	0.818	
Stimulating Air Cargo Demand	0.509	0.147	0.465	0.562	0.380	0.563	0.550	0.085	0.833

4.5.2.3 Testing the Reliability of the Constructs

The reliability of the measurement constructs was assessed using Cronbach alpha and composite reliability (see Table 4.6 and Figure 4.18). Cronbach alpha is an average measure to test the internal consistency of the measurement constructs in case of exploratory factor analysis (EFA), and composite reliability is a new threshold to check

the overall scale reliability in case of confirmatory factor analysis (CFA) (Hair et al., 2020; Richter et al., 2020; Wong, 2013). A Cronbach alpha value greater than 0.60 indicates an acceptable level of reliability (George and Mallery, 2003; Ursachi et al., 2015) whereas the composite reliability value should be equal to or higher than the value of 0.70 (Hair et al., 2020; Richter et al., 2020; Sarstedt et al., 2019).

In the current study, the results showed that both the Cronbach alpha and the composite reliability value were at acceptable levels for all items. Therefore, the reliability of the measurement constructs was proved.

Table 4.6. Reliability of the Constructs

	Cronbach's Alpha	Composite Reliability
Bonded Warehouses	0.711	0.838
Coordination	0.696	0.868
Customs and Government Agencies	0.712	0.839
Development of Air Cargo in Oman	0.869	0.902
Development of Specialized Infrastructures	0.777	0.899
Free Trade Zones	0.832	0.888
Promotion and Marketing	0.860	0.895
Sea-to-Air Transportation	0.836	0.890
Stimulating Air Cargo Demand	0.889	0.919

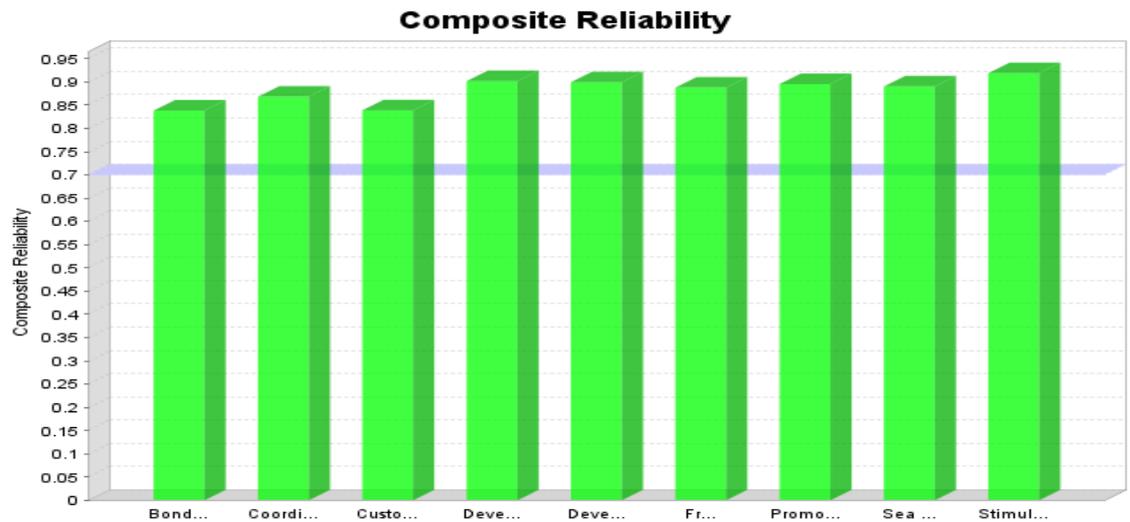


Figure 4.18 Composite Reliability

4.5.2.4 Collinearity Statistics

The collinearity statistical technique is used to examine two or more exogenous constructs (independent variables) in a multi-regression model to check the collinearity problem in the variables to eliminate or merge variables into one. The collinearity problem happens when independent variables in a regression model have correlated; in other words, independent variables are non-independent, causing wrong predictors in a statistical model (Wong, 2013).

PLS-SEM handles collinearity problems for a set of exogenous latent constructs in the inner and outer model (Sarstedt et al., 2019). Collinearity of the inner and outer model could be investigated to get the variance inflation factor (VIF). As a rule of thumb, the VIF is accepted if the value is five or lower (Sarstedt et al., 2019; Wong, 2013).

Wong (2013) asserted that strong collinearity exists between two constructs if the values are lower than five. The present study's empirical investigation revealed a high collinearity between two or more constructs (Table 4.7). The VIF of all measurement constructs were lower than the value of five. Moreover, outer VIF values were also less than the suggested value of five, which further showed high collinearity between the

observed variables to build strong correlations (Table 4.8). Therefore, the items in this study proved to be good predictors of the development of air cargo by demonstrating that there was a strong correlation (multi-regression) among the measured constructs.

Table 4.7. Inner Variance Inflation Factor (VIF)

	Variance Inflation Factor
ACD1	1.750
ACD2	2.871
ACD3	2.642
ACD4	2.359
ACD5	2.151
BWH1	1.561
BWH2	1.427
BWH3	1.299
CORD3	1.399
CORD4	1.399
CUS1	1.397
CUS4	1.484
CUS5	1.334
Cargo2	1.744
Cargo4	2.159
Cargo5	1.697
Cargo6	1.861
Cargo7	1.896
Cargo8	1.949
FTZ1	1.669
FTZ2	2.015
FTZ3	1.680
FTZ4	1.868
INSF1	1.675
INSF2	1.675
PAM1	1.820
PAM2	1.835
PAM3	1.830
PAM4	1.702
PAM5	1.918
PAM6	2.113
STA1	1.722
STA2	2.022
STA3	1.688
STA4	1.881

Table 4.8. Outer Variance Inflation Factor (VIF)

	1	2	3	4	5	6	7	8	9
Bonded Warehouses				3.216					
Coordination				1.096					
Customs and Government Agencies				2.284					
Development of Air Cargo in Oman									
Development of Specialized Infrastructures				1.637					
Free Trade Zones				3.160					
Promotion and Marketing				2.783					
Sea to Air transportation				1.064					
Stimulating Air Cargo Demand				1.702					

4.5.3 Testing of the Path Model

Assessment of the path model involves three values: β /regression coefficient value, t-value, and p-value. The regression coefficient is known as the β value, representing the effect weight from an exogenous construct to an endogenous construct (Wong, 2013). Smart PLS provides the statistical parameters of accepting and rejecting the proposition (Hair et al., 2020, 2019; Sarstedt et al., 2019). These parameters are based on the rejection and acceptance of the proposition. The β /regression coefficient value varies from +1 to -1. A value closer to +1 indicates the higher positive regression effect, and a value closer to -1 indicates the higher negative effect of an exogenous construct on an endogenous construct (Richter et al., 2020). Meanwhile, the t-value is based on the level of significance, whether the study used a 1%, 5% or 10% significant level and a

99%, 95%, or 90% confidence interval (Wong, 2013). The present study used a 5% significant level with a 95% confidence interval so, in this case, the t-value should be equal to +1.96, or higher than the value of +1.96 in the case of a 5% significance level, while the p-value should be lower than the value of 0.05 in the case of a 5% significance level (Sarstedt et al., 2019).

A bootstrapping technique using Smart PLS 3 was run to test the path coefficient (regression coefficient) between two testable variables (see Table 4.9 and Figure 4.19). A bootstrapping technique of 1000 subsamples with maximum iterations was run. The study found that two items did not significantly and positively influence the development of Oman's air cargo sector: establishing a bonded warehouse ($\beta=0.137$, t-value=1.670, p-value=0.095), and promotion and marketing ($\beta=0.120$, t-value=1.606, p-value=0.109). For all others, the relationship was accepted and significant influences the development of cargo in Oman.

Table 4.9. Path Coefficients

Relationships	Beta (β)	Standard Deviation (STDEV)	T Statistics ($\beta/STDEV$)	P- Values
Bonded Warehouses -> Development of Air Cargo in Oman	0.137	0.082	1.670	0.095
Coordination -> Development of Air Cargo in Oman	0.092	0.045	2.020	0.044
Customs and Government Agencies -> Development of Air Cargo in Oman	0.132	0.064	2.047	0.041
Development of Specialized Infrastructures -> Development of Air Cargo in Oman	0.263	0.074	3.543	0.000
Free Trade Zones -> Development of Air Cargo in Oman	0.218	0.088	2.477	0.014

Promotion and Marketing -> Development of Air Cargo in Oman	0.120	0.075	1.606	0.109
Sea-to-Air transportation -> Development of Air Cargo in Oman	0.148	0.046	3.220	0.001
Stimulating Air Cargo Demand -> Development of Air Cargo in Oman	0.141	0.061	2.324	0.021

*** p<0.05

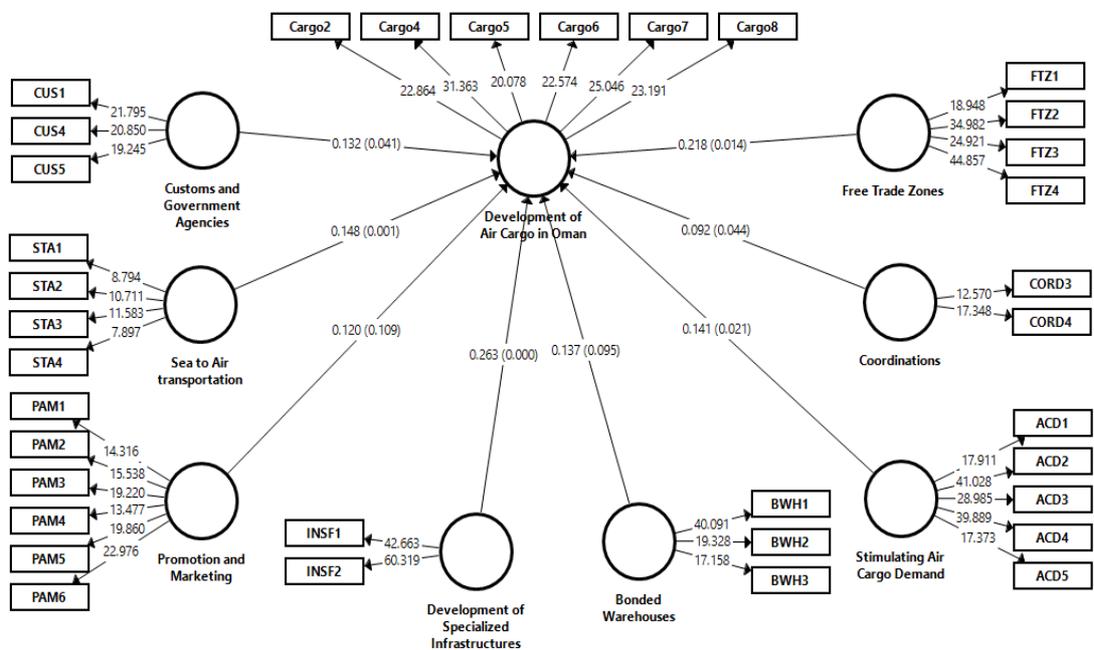


Figure 4.19 Path Coefficient Model

Figure 4.19 shows a path coefficient model in which the relationships of six out of eight air cargo development strategies were found positive and significant with the development of the air cargo sector in Oman. Unfortunately, two out of eight relationships, i.e., (1) establishing a bonded warehouse ($\beta=0.137$, t-value = 1.670 p-value=0.095) and (2) promotion and marketing ($\beta=0.120$, t-value = 1.606, p-value=0.109) were not found to be significant because their p-values > 0.05 and t-values < 1.96.

Although the β values were positive, they were not statistically significant, which means these two strategies were identified as having a positive relation to developing the air cargo sector in the qualitative study phase, but they did not reach the level of confidence to have a significant effect based on data from the quantitative phase.

Bonded warehouses are warehouses licensed by the government or relevant customs authorities to accept imported goods for storage before payment of customs duty (Bhatia, 2010, p. 141). The shipper can import products to a bonded warehouse across the world and store them there without paying any duty charges (Chalmers, 2019). Thus, bonded warehouses can facilitate and attract foreign manufacturers, e-commerce businesses, and air cargo players (freight forwarders, integrators, express carriers, etc.) to operate in Oman, thereby increasing import and export activities.

Promotion and marketing was the other strategy identified during the qualitative study phase. Al Balushi et al. (2013) point out in their research looking into Oman's case that nation branding has positive implications on the nation, such as enhancing exports. Moreover, Strydom (2005, p. 194) emphasises that marketers must inform current and potential customers in the marketplace about their products and their marketing activities in their promotion decisions. In the same sense, if Oman aims to transfer the country into a logistics hub, including air cargo, it needs to have promotion and marketing efforts to reach current and potential customers. The current and potential customers would be foreign manufacturers, air cargo players, and e-commerce businesses, and marketing to them could increase air cargo import and export activities.

4.5.4 Testing of Model Fit

4.5.4.1 Model Predictive Accuracy and Adequacy

Another critical criterion to test the structural model is the coefficient of determination (R^2). The R^2 value represents the proportion of variation in the dependent

variable(s) explained by one or more predictor variables. In other words, R^2 is a measure to test the model's predictive adequacy (Hair et al., 2020; Sarstedt et al., 2019). It is calculated by taking the square of the correlation coefficient between the exogenous and endogenous constructs. R^2 values must be zero (0) to 1, with higher levels demonstrating a high level of predictive accuracy (Richter et al., 2020). R^2 values of 0.75 or higher indicate a strong effect, 0.50 or higher value indicate a moderate effect, and 0.25 or higher values indicate a weak effect of an exogenous construct on an endogenous construct (Hair et al., 2020; Sarstedt et al., 2019). The present research has 0.703 as an R^2 value, as shown in Table 4.10. That means the study's propositions explained 70.3% of the variance in an endogenous construct (development of cargo sector in Oman) which means all factors had a substantial effect on cargo development in Oman.

Furthermore, Adjusted R^2 values were also acceptable and supportive to model accuracy and adequacy. Adjusted R^2 values reduced the values of R^2 by the number of explaining variables and the sample size. Adjusted values are measured by the same R^2 criteria, i.e., 0.75 (strong), 0.50 (moderate) and 0.25 (weak) (Hair et al., 2019; Richter et al., 2020; Sarstedt et al., 2019). The Adjusted R^2 values for the current study were 0.691, as shown in Table 4.10. That means the study propositions explained endogenous construct (development of cargo sector in Oman) by 69.1%, which confirmed that all factors in the development of Oman's air cargo sector had a substantial effect on cargo development in Oman.

Table 4.10. R^2 and Adjusted R^2

Dependent Variable	R Square	R Square Adjusted
Development of Cargo in Oman	0.703	0.691

4.5.4.2 Construct Cross-Validated Redundancy (Q^2)

Cross-validated redundancy (Q^2), also known as ‘blindfolding’, is a measure of out of sampling prediction to check the study’s inner model predictive accuracy and adequacy of the measurement constructs (Hair et al., 2020; Sarstedt et al., 2019).

There are two approaches to investigate Q^2 : (1) cross-validated redundancy and (2) cross-validate communality (Hair et al., 2020). As a rule of thumb, the Q^2 value should be greater than zero (0) for a specific endogenous variable to reveal that the model’s predictive accuracy is acceptable for that specific exogenous construct (Sarstedt et al., 2019).

Table 4.11 presents construct cross-validated redundancy where the Q^2 value was 0.413, which is greater than zero (0); thus, the study’s propositions had good predictive adequacy for the development of cargo in Oman.

Table 4.11. Construct Cross-validated Redundancy

	SSO	SSE	$Q^2 (=1-SSE/SSO)$
Bonded Warehouses	615.000	615.000	
Coordination	410.000	410.000	
Customs and Government Agencies	615.000	615.000	
Development of Air Cargo in Oman	1230.000	721.479	0.413
Development of Specialized Infrastructures	410.000	410.000	
Free Trade Zones	820.000	820.000	
Promotion and Marketing	1230.000	1230.000	
Sea-to-Air Transportation	820.000	820.000	
Stimulating Air Cargo Demand	1025.000	1025.000	

Table 4.12 presents construct cross-validated communality, determining whether observed variables significantly show consistency with their latent factor (Hair et al., 2020; Sarstedt et al., 2019). As shown in Table 4.12, all measurement items of one construct are significantly correlated with the overall factor as $Q^2 > \text{zero}$ in all items. Therefore, the study model has an adequate ability to predict.

Table 4.12. Construct Cross-validated Communality

	SSO	SSE	Q² (=1-SSE/SSO)
Bonded Warehouses	615.000	443.563	0.279
Coordination	410.000	291.492	0.289
Customs and Government Agencies	615.000	444.613	0.277
Development of Air Cargo in Oman	1230.000	685.539	0.443
Development of Specialized Infrastructures	410.000	248.125	0.395
Free Trade Zones	820.000	461.621	0.437
Promotion and Marketing	1230.000	713.475	0.420
Sea-to-Air Transportation	820.000	460.916	0.438
Stimulating Air Cargo Demand	1025.000	475.886	0.536

4.5.4.3 Model Fit Indices

Model fitness measured by standardised root means square residual (SRMR) is a covariance residual value of absolute mean (Sarstedt et al., 2019). SRMR is evaluated as the difference between the observed correlation and model correlation. If the SRMR value is lower than 0.10, it is considered a good model (Hu and Bentler, 1999). In the current study, the SRMR value was .066 (Table 4.13); thus, the study proved a good model fitness.

Table 4.13. Model Fit Indices

	Saturated Model	Estimated Model
SRMR	0.066	0.066

4.6 Summary

As discussed in the previous chapter, the present study has applied an exploratory sequential research design without preferring only a qualitative or quantitative, single-sided approach.

In the first phase of research, the interview questions were formulated based on a literature review to conduct in-depth interviews to elicit the participants' experiences and beliefs towards Oman's air cargo development strategies using qualitative analysis. A treemap of all the themes and their sub-themes was identified using QSR Nvivo Ver 12. After the qualitative analysis was completed, eight main themes and a total of thirty-four sub-themes were identified.

In the second phase, a conceptual framework and questionnaire (i.e., instrument) were built based on the qualitative findings. A pre-testing of the instrument was conducted with the help of various academicians and air cargo professionals. Moreover, the study tested the validity and reliability of the measurement constructs, and the path analysis was done using Smart PLS 3. The validity and reliability of the measurement constructs were within the acceptable ranges, so there was assurance that the validity and reliability of the constructs were adequate. Next, the study tested the path. The qualitative study supported the finding that six of the eight items identified would significantly and positively influence air cargo development in Oman: coordination between air cargo

stakeholders, improving customs and government agencies, developing specialized infrastructure, establishing free trade zones, adopting a sea-to-air transportation hub, and stimulating air cargo demand (See Figure 4.20).

The reasons and justifications of all significant relationships are provided in the next chapter.

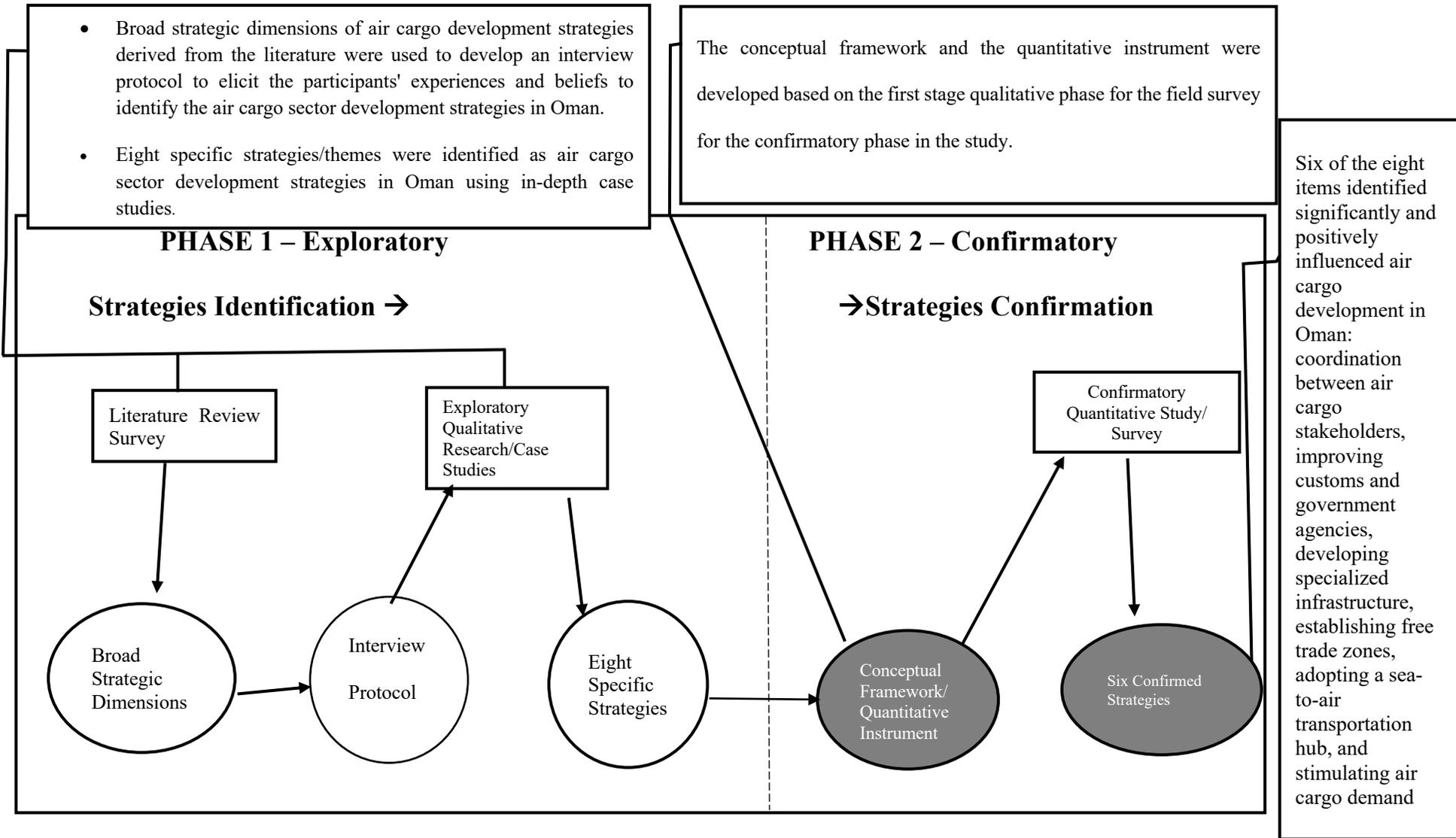


Figure 4.20 Overall Framework of the Present Study

Chapter Five: Discussion and Conclusions

5.1 Introduction

This chapter focuses on interpreting and explaining current research findings, as well as demonstrating their relationship to the research goal, objectives, research questions, and other scholars' perspectives on air cargo sector development. Moreover, at the end of his chapter, the emphasis will be upon drawing conclusions by summarising the study's findings and providing answers to the research questions in the present study.

The air cargo business shows positive performance and trends, particularly in Middle Eastern countries, as the region is considered a transit point for air cargo between Asia, Africa, and Europe. These regions generate approximately one-third of the total air cargo tonnage in the world. Unfortunately, Oman's air cargo sector received very little attention in the Sultanate of Oman Logistics Strategy 2040, which is a plan intended to transform Oman into a world top-ten logistics centre by 2040.

The study aimed to conceptualise ways in which future development strategies in Oman's air cargo sector can be established as part of the logistics sector to enhance Oman's logistical footprint in the area to boost the non-oil income logistics sector. The current study's objectives were to identify and confirm Oman's air cargo sector development strategies/initiatives.

The research questions of this study were:

- 1) How can Oman achieve a larger air cargo market share?
- 2) In what capability and capacity can Oman develop its air cargo sector?
- 3) What advantages will the development of air cargo provide to the Omani logistics sector?

- 4) What are the advantages of Oman's strategic location that would support its air cargo sector development?

A mixed methods research design has been used because of the study's two-phased objectives of identifying and confirming air cargo sector development strategies. In the first phase of research (qualitative/identification), eight main themes were extracted through in-depth interviews, as shown in Figure 5.1.

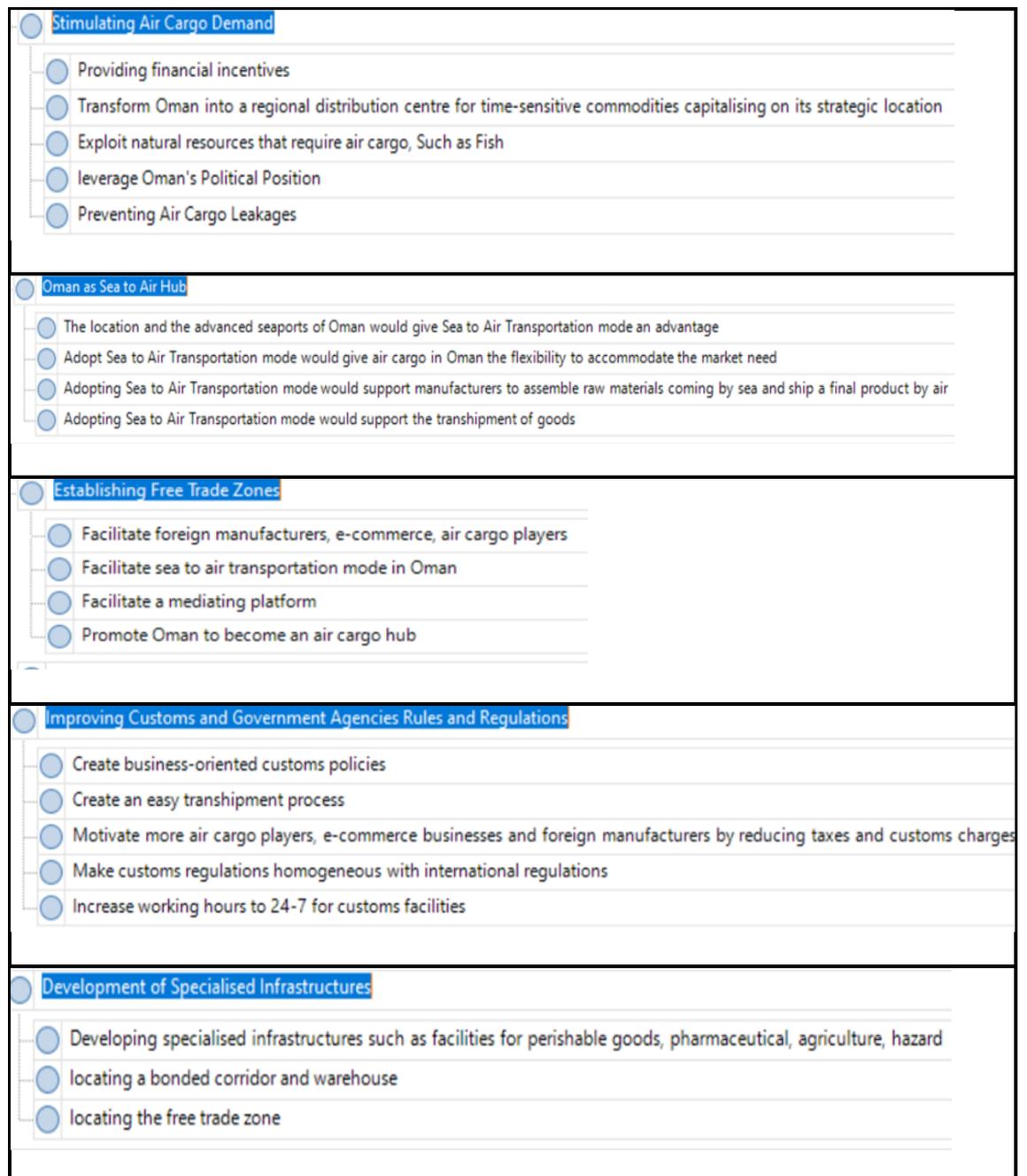




Figure 5.1 Themes Extracted from the Textual Data.

The Conceptual Framework (Figure 5.2) was developed based on the first stage of the current study (qualitative/identification) and used to confirm identified strategies/initiatives related to Oman's air cargo sector development in the second (quantitative) phase. The eight main themes extracted from in-depth interviews were converted into propositions, and then the relationships were tested.

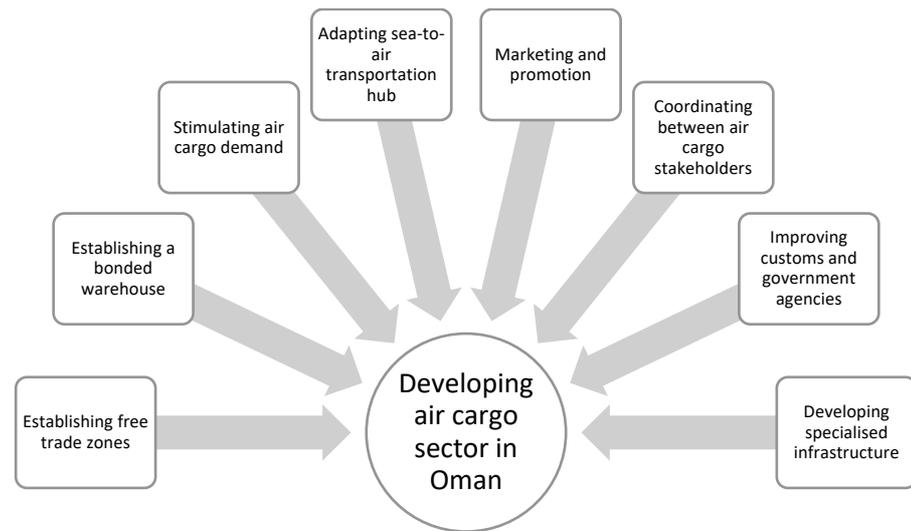


Figure 5.2 The Conceptual Framework

A field survey strategy was applied for the confirmatory phase. Data was collected through a structured questionnaire based on data output themes (Figure 5.1) from the first stage, which presented air cargo strategies/initiatives that need to be developed for Oman's air cargo sector. A total of eight sets of questions were itemised in the quantitative survey questionnaire (see Appendix F).

In the second phase of research (quantitative/confirmation), six out of the eight air cargo sector development strategies/initiatives were confirmed to have a significant and positive relationship influence on Oman's air cargo sector development, as shown in the path coefficient model below (Figure 5.3):

- Stimulating Air Cargo Demand
- Adopting a Sea-to-Air Transportation Hub
- Establishing Free Trade Zones
- Improving Customs and Government Agencies Policies
- Development of Specialised Infrastructures
- Strong Coordination between Air Cargo Stakeholders

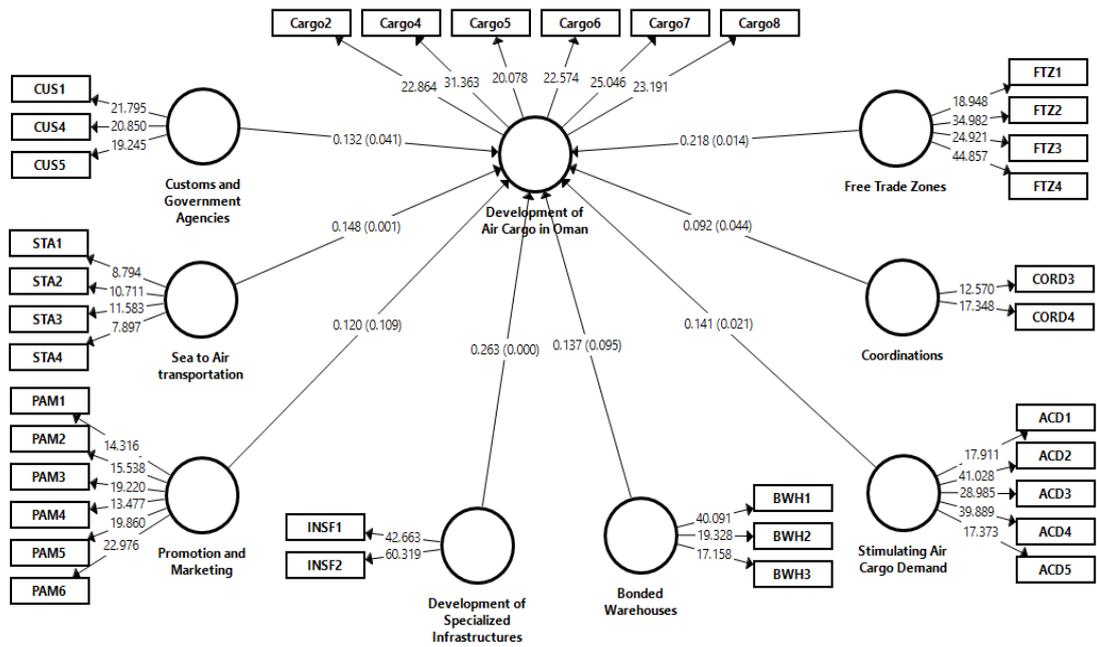


Figure 5.3 Path Coefficient Model

These six strategies are discussed in the following sections. This discussion includes direct quotes from most of the interview respondents to provide a deeper understanding of how the strategies fit into the specific context of the air cargo sector in Oman and what the key issues are. Moreover, the discussion shows how the study’s findings relate to other scholars' views on air cargo sector development.

5.2 Stimulating Air Cargo Demand.

The ground-breaking findings of the study discovered in a precise manner that the strategy of stimulating air cargo demand has a significant and positive influence on the development of Oman’s air cargo sector (see Figure 5.3); the consensus among air cargo experts in Oman is that once the availability of products necessitates the use of air cargo, air cargo traffic will increase and boost investment in air cargo sector development.

Air cargo is linked to industrialisation and commercial activities as it aims to fulfil demand. By creating specific demand/commodities characterised as just-in-time, high-

value goods, or commodities with short marketing, we feed the whole air cargo value chain and create new business through suppliers engaging other suppliers in a different part of the value chain to meet the demand. That will lead to directly stimulating domestic economic activity such as income from taxation, customs, and utilities, and increase the desire for investment in the air cargo sector.

The literature indicates that air cargo is linked to the larger patterns of physical trade (Kim and Park, 2012), and demand for air cargo services depends on other sectors' performances (Gong et al., 2018). Moreover, Wong et al. (2016) stated that air cargo markets are driven by the demand of global supply chain operations. Kupfer et al. (2017) point out that air cargo demand depends on a country's economy, especially the evolution of world trade merchandise. Also, Hsu et al. (2009) specified that an air cargo carrier might achieve a larger market share if its supply attributes match the product characteristics and industrial structure. Kupfer et al. (2016) stated that the government could play an essential role in making a country attractive for air cargo carriers by stimulating the expansion of industries reliant on air cargo, thus guaranteeing sufficient future capacity and a stable regulatory environment. Shiao and Hwang (2013) agree with Kupfer et al. (2016) that the decision to enter a market for air cargo carriers depends on the operation scale. Hence, previous studies confirm that stimulating the production of products necessitates air cargo demand.

This study determined that the air cargo demand in Oman can be stimulated by capitalising upon Oman's geostrategic position by transforming the country into a regional distribution hub, leveraging Oman's political position, exploiting natural resources that require air cargo, preventing air cargo leakages, and providing financial incentives to attract air cargo carriers, e-commerce companies, and foreign manufacturers

(see Figure 5.4). The utility of each of these specific strategies is explored in the following sections.



Figure 5.4 Stimulating Air Cargo Demand Theme

5.2.1 Oman as a Distribution Centre

Oman has a population of around four million people, so it is a relatively small market. As a result, Oman's air cargo volume is low because few exports and imports are based on country-specific demand. Assuming, however, that Oman desires exponential cargo volume growth, it will need to expand as a distribution hub, leveraging its geostrategic location as a logical distribution centre for East Africa, the Red Sea, and the Indian subcontinent. Acting as a gateway for the Gulf, Oman would be a catalyst for exponential growth in air cargo volumes, stimulating additional traffic as demand increased and, consequently, attracting air cargo carriers such as integrator, all-cargo carriers, and combination carriers to the country. As one interviewee (R2) for the current study noted:

With a higher population automatically means more demand, more supply and as a result, the air cargo industry feeds and brings volumes automatically. Here the population in Muscat city being only two million in total there's not enough demand to drive the air cargo business, which means that you have to depend on transshipment cargo to grow.

Another interviewee, the CEO of an air cargo operator (R1), stated:

Oman has a big advantage, in a sense, because of its location. It is actually very central, and I think you need eight hours flight, yeah. You can reach almost 75% of the world's population. So we should capitalize on that, and

Oman has a lot of other advantages, the neutrality the connectivity as well. So we need to build on this.

In a quantitative empirical study on Oman's logistics, Al Abbad et al. (2021) confirmed that Oman's geographical location positively affects the performance of the logistic sector, thus contributing to the Omani economy. The Oxford Business Group (2019) also stated that Oman's strategic location could serve as a competitive advantage for local and foreign investors who can contribute significantly to the development through logistics businesses. Supporting this viewpoint, the Implementation Support and Follow-up Unit (ISFU) mentioned that Oman's geographical location provides the logistics sector with a unique opportunity for significant growth as it is viewed as the gateway of the Arabian Gulf to the world (ISFU, 2019). Oman's strategic location provides Oman access to the global shipping market throughout the Indian subcontinent, Asia, Africa, and Europe (SOLS 2040, 2014). This allows the logistics sector to be one of the pillars of Oman's economic diversification, as it contributed 3.75% of GDP in 2018 (Abdul Rahman et al., 2021). Taderera et al. (2018) named Oman as the jewel of the GCC and the Middle East because of its geostrategic location on the Strait of Hormuz in the Arabian Peninsula. Furthermore, the Governorate of Musandam grants Oman territorial rights on the Strait of Hormuz, accounting for 30% of global oil exports worldwide through shipment (Zahlan, 2016). Thus, its strategic location gives a competitive advantage to Oman as it provides a direct route for trading between the GCC market, India, and Africa (see Figure 5.4).



Figure 5.5. Map of Oman's Strategic Location
 Source: ASYAD Group

The current study identified a novel strategy for making Oman a regional distribution centre for time-sensitive commodities that need to be transported by air: leveraging its geographic location as a logical distribution hub for nations in East Africa, the Indian subcontinent and the Gulf. Hence, Oman can be a gateway for commodities such as aircraft spare parts, textiles, electronics, e-commerce, and pharmaceuticals. Consequently, Oman's air cargo sector would achieve a larger market share as one Cargo Expert (R17) stated in an interview for the current study:

If we have an e-commerce hub in Muscat in a free zone, and link it to the far East, then a new destination that they get for cargo can be opened. So, it should be driven by key industries demand, and the routes would be justified...textile is one common or potential player, especially from India and Bangladesh. We get the textile here, manufacture the clothes, then ship them, just in time to global players wherever they are...also help local industries globalize and be shipped by air and become a regional hub with the right incentives, free zones, et cetera. If create demand, the freighters, the integrators, the freight forwarders will come along.

This correlates with Niine et al. (2017), who found that air cargo facility location plays a critical role in affecting the market size, service quality, and costs because the

location is an essential factor contributing to the success of business activities in each area. Also, it corresponds with the network perspective theory, which considers location as the key variable. The theory presumed that location is a critical factor that influences the business' performance and competitiveness. (Halldórsson et al., 2015; Wellenbrock, 2010).

The network perspective theory objectives are to link multiple entities in the supply chain by boosting collaboration with suppliers or other firms and create a more established network. A distribution centre is a practical example of the theory as it is a cluster for most business activity including storage, segregation, coordination, distribution, and value-added services such as assembly, customising, labelling, and light manufacturing. (Notteboom and Rodrigue, 2009; Sheffi, 2012). Distribution centres create a platform for collaborating between logistic players such as transporters, brokers, shipping agents, e-commerce, and packing companies. These hubs empower the expansion of transport networks and efficiency. In the same manner, network perspective theory assumes that networks influence information sharing or transfer among different entities in the supply chain (Coetzee and Swanepoel, 2017). Halldórsson et al. (2015) further argue that networks offer a learning platform for companies as they play a significant role in ensuring that information is efficiently shared among companies.

5.2.1.1 E-commerce Distribution Centres

According to Research and Markets (2020), the demand for air cargo services is increasing dramatically due to increasing trends in e-commerce, resulting in a paradigm shift in the global market. Moreover, the ICAO (2017) reported that 87% of business-to-consumer e-commerce packages are currently being shipped by air cargo. Because of the expansion of e-commerce activity, ACI (2019) predicted that the overall global air cargo

industry would grow by 20% over the next five years; in 2017, the air cargo rate increased by 11.5%, and cargo traffic increased by 10%.

Ithraa (2016) expected that the e-commerce market size of USD 230 billion (in 2014) would increase to USD 1 trillion in 2016. Confirming that forecast, Fabre et al. (2019) indicated that the e-commerce market was worth USD 2.2 trillion with 24% annual growth rate. Redseer (2018) reported that this market in the Middle East and North Africa (MENA) jumped from USD 4 billion in 2015 to USD 6 billion in 2016, and by 2020 it was estimated to surpass USD 15 billion. In 2017, MENA e-commerce reached USD 8.3 billion and was forecasted to hit USD 28.5 billion by 2022, according to Karrar (2018). Accordingly, this research advises that Oman should keep pace with this rapid growth and attract e-commerce by offering a distribution centre in the Middle East. It is a crucial opportunity for air cargo sector development in Oman. In support of this strategy, a Group Chief for Sector Development and Promotion (R15) stated:

E-commerce and assembly centres can also add a lot of value for a certain type of goods that can be shipped via air. This brings a lot of value to the manufacturer. And then for us, it drives the volume up, which helps us meet our targets...It makes more sense for other players and other airlines to come and operate cargo here if they have more volumes of different products coming in the belly of their planes.

To do so, a market survey would be required to explore e-commerce companies, taking into account the following questions: (1) do the e-commerce companies have customers in the Middle East and do they ship there? (2) Do they have a distribution centre in the Middle East? (3) What is the size and volume of the business globally and in the Middle East? (4) Is the marketed item suitable to send by air? (5) Where are the e-commerce headquarters and offices? The answers to the above questions will lead to identifying the right e-commerce companies to be attracted to Oman as a Middle East

distribution centre and, consequently, Oman's air cargo sector, as well as the economy, will benefit from increasing imports and exports.

An example of the potential type of e-commerce to attract is Rakuten, a Japanese e-commerce company which ships to the Middle East and specialises in all items, has USD 11.6 billion revenue, and, most importantly, does not have a distribution centre in the Middle East (Forbes, 2020). In contrast, Amazon US uses the UAE and Saudi Arabia as regional distribution centres; therefore, it should not be the first choice to attract as they already have a presence in the region (The Jerusalem Post, 2019).

5.2.1.2 Aircraft Spare Parts Distribution Centre

Another area Oman ought to exploit with its geostrategic location is the aircraft spare parts industry. This industry requires carrying just-in-time, making it an ideal commodity for air cargo transportation. As previously mentioned, Oman has proximity to major airline players in the region including Dubai, Doha, and Abu Dhabi. For example, despite having the largest customer hub in the region, including Qatar Airways, Emirates, Etihad Airways, Saudia, and Air Arabia, Airbus does not have a spare parts distribution centre in the GCC. According to Airbus (2017), their service aircraft in the Middle East are 694 in number, and there are newly signed orders for a further 1,319 Airbus aircraft bound for Middle Eastern carriers over the next decade. It would benefit Oman to attract Airbus by establishing a spare parts distribution centre to increase inbound and outbound air logistics. One Air Cargo Expert (R18) supported this strategy by mentioning in the current study interview that Oman should

Establish a regional logistics hub or the regional distribution centre within the free zone so that they can take goods in and out without the impact on their costs. It could also be something like a key automotive or aerospace manufacturer who houses their regional maintenance support base here...aerospace manufacturers who house their regional maintenance support base here. So these would be examples of anchor tenants that could really kick start that free zone and encourage the volumes to come through. Because

once they start bringing the volumes through, you'll automatically see the whole value chain benefit. You'll see the cargo handler benefit; you'll see the last mile delivery benefit; you'll see everyone benefit.

5.2.1.3 Pharmaceutical Distribution Centre

Another area for exploration, due to Oman's geostrategic location for a distribution centre, is the pharmaceutical industry. According to The Business Research Company (2018), the pharma global market was worth USD 934.8 billion in 2017 and will reach USD 1,170 billion in 2021; however, Mikulic (2020) recorded that the global pharmaceutical industry already totalled USD 1.25 trillion in 2019. Hsu et al. (2009) identified air cargo as the best means for delivering commodities with a short marketing span, such as pharmaceuticals. Furthermore, Suwanwong et al. (2018) mentioned pharmaceuticals, live animals, and perishable goods as examples of air cargo commodities. Therefore, Oman should attempt to attract pharmaceutical companies by using its geostrategic location for a distribution centre in the region and increase inbound and outbound air logistics. As an Air Logistics Program Manager (R13) said:

We are seeing some demand in the pharmaceuticals and healthcare industries where the raw materials for different medicines and pharma products can be received by sea due to their long shelf life and then consolidated or manufactured here in Oman. And then the final product can be exported by air to the target market.

5.2.1.4 Textiles Distribution Centre

Textiles revolving around seasons are a time-sensitive commodity, making it a suitable market for air cargo transportation. According to Mordor Intelligence (2020), the universal textile business was estimated at USD 920 billion in 2018 and is expected to reach approximately USD 1,230 billion by 2024. China is the world's leading producer and exporter for textiles, and the second place European Union is valued at more than USD 160 billion. India is the third-largest textile enterprise valued at approximately USD 150 billion with an export value of more than USD 30 billion. Lu (2020) gives the World

Trade Organisation rankings as China, Bangladesh, and India being the top apparel exporters. One-third of the Middle East's international air cargo market, which accounted for 848,000 tonnes of air cargo in 2017, includes trade with Europe, where the primary commodity is garments (Boeing, 2017).

Free zones are one of the major factors that attract textile companies as they are not required to pay taxes or repatriation fees. Therefore, if Oman established a textile distribution centre with free zones, textile companies could use the sea-to-air hub and transport bulky shipments of raw textiles by sea to save costs, assemble them at free zones, and then ship manufactured garments to various locations by air, such as the European Union, which, according to Lu (2020), is the biggest textile product importer. In an interview for the current study, a Cargo Expert in Aviation Management (R17) supported the agreement of establishing a textile distribution centre in Oman:

Textiles are time sensitive. It is going to a destination where the home carrier flies. And currently, the home carrier is flying relatively empty. So there could be some value in thinking about transporting this sea cargo through a bonded corridor up to Muscat, where it gets loaded onto a plane to its final destination, thereby giving some incremental revenue to the national carrier, at the same time using this opportunistic play.

5.2.1.5 Electronics Distribution Centre

Air cargo is best used for delivering commodities with a short marketing life span, such as cell phones and computers (ICAO, 2020). Moreover, Yuan et al. (2010) specified that between 80–90% of high-value, light-weight goods, such as electronics, are shipped by air. During 2019, the worldwide sales from electronic exports totalled USD 720.5 billion, with the top countries exporting the highest dollar value worth of electronics being Hong Kong, China, Taiwan, and South Korea (Workman, 2019). Mikulic (2020) predicted that consumer electronics revenue would reach USD 378,995 million in 2020, with China generating the most revenue (around USD 152,785 million) and the United

States coming in second at USD 69,962 million. Furthermore, the global consumer electronics market is predicted to reach USD 1,538,410 million by 2026 (Market Watch, 2020).

Electronics products consist of many components in one device, and the electronics industry comprises multiple companies that design, assemble, manufacture, and service electronic products (Edwards,1991). A free zoned electronic distribution centre in Oman would encourage electronic companies to assemble and value-add in this centre prior shipping the finished devices to the many different locations by air, boosting inbound and outbound air logistics for Oman. In an interview for the current study, an Air Logistics Program Manager (R13) supported that idea that the electronic industry is a potential for a distribution centre in Oman since ‘technological products, consumer technologies like televisions, or any other kind of electronics...can be consolidated in Oman and then exported by air, again to target markets’.

5.2.2 Oman’s Political Position

A country’s safety and stability are essential factors to build the economy. The air cargo sector follows the same economic reasoning. Oman is one of the safest and most stable countries in the region, giving it a competitive advantage as a hub for air cargo carriers, stimulating demand and increasing export and import. Supporting this argument Al Abbadi et al. (2021) asserted that the excellent international relations of Oman and trade agreements with leading world business countries can advance its logistics sector. Taderera et al. (2018) also stated that Oman’s biggest strengths are excellent global relations, peace, tranquillity, hospitality, friendship, and a strategic location in the middle of international trade routes, which give Oman advantages over other GCC countries, if not the Asian region. In this regard, a Cargo Expert (R17) stated:

We need to promote Oman to the world, especially given the geopolitical aspects of and the friendship of Oman with different countries; this is very important in the Middle East...So this can be a much bigger advantage in the future, from a strategic location, geopolitical aspect, Oman has great benefits.

Katzman (2020) pointed out that Oman follows a peaceful and balanced political policy, always mediates, and refrains from joining any military interventions in the region. Additionally, it has a very good relationship with countries worldwide, including the unstable Middle East countries, and even with disputing parties in the Gulf Cooperation Council. Moreover, Oman has air circumference outside all Gulf countries; therefore, an Omani hub can provide independence for air cargo and attract carriers who aim to get access to air cargo between Asia, Africa, and Europe, which makes up almost one-third of the total tonnage of air cargo and is expected to increase between 2018–2037 (Boeing, 2017).

Also, Oman can benefit from its political position to be a distribution centre for the Iranian market. Katzman (2020) specified that Oman has cordial relations with Iran, unlike other countries in the GCC. Oman's leaders have consistently stated that engaging Iran is preferable than confrontation. Moreover, Oman brokered agreements between the United States and Iran regarding Iran's nuclear agreement and Joint Comprehensive Plan of Action (JCPOA) on 14 July 2015. As one Sea-to-Air Logistics Expert (R12) observed:

We have an advantage because we can handle cargo for Dubai as well as Qatar. We can handle cargo for Iran. We can handle cargo for Pakistan and India and China and America, so this can be a natural hub because of our political supremacy, because of our geographical...because of our national manpower wealth. So we must ask them, 'What is stopping you from coming?' If they give you the reasons, we must address those and give them a better option than what Dubai or Eastern European countries are giving them.

5.2.3 Exploiting Natural Resources Requiring Air Cargo.

Oman's Ministry of Agriculture, Fisheries and Water Resources reported that from 2012 till 2019 there was constant growth in fish production. Furthermore, the fisheries

sector is expected to achieve a growth rate of 6.5% annually (TANFEEDH, 2017). According to the Food and Agriculture Organization of the United Nations (2019), Oman is one of the largest fish producers and net exporters of fish in the region and possesses important catches of small pelagic and tuna species, shrimp, lobster, cephalopods, and bream. During 2017 the total capture production reached 347,600 tonnes with a value of USD 114.5 million. Furthermore, Oman's Ministry of Agriculture, Fisheries and Water Resources reported that during 2018, the total fish production in Oman was 553,000 tonnes, worth USD 699 million, and the number of exported fish totalled 245,000 tonnes with a value of RO 99 million, equal to USD 257 million. In 2019, the total fish production increased by 4.8%, which approximated 580,000 tonnes, with a value of USD 732.5 million. In 2020 Oman's Ministry of Agriculture, Fisheries and Water Resources (2020) reported 45% growth in fish production from 2019 by 840,000 tonnes and a value of RO 364 million, equal to USD 947 million.

The Oman Observer (2020) reported that in 2019, 35% of the total Omani fish production was exported to the GCC countries; 22% of that went to the UAE, which reached 45,590 tonnes, with a value of RO 24,816 million; nearby Asia accounted for 41%, and Bangladesh alone took 16% with a quantity of 32,600 tonnes and a value of RO 8,715.

There is constant growth in Oman's fish production, currently worth more than USD 900 million. This indicates future opportunities for globalising Oman's fish market. For the statistics given above, most of those exported fish were transported via land or sea and not by air. In regards to this, a Cargo Expert (R18) stated:

Certainly, the one big thing I would focus on if I was asked for my view is certainly the fresh produce, especially fish and seafood going out of Oman. I think that's especially in line with the fisheries blend that they have or the next four or five years. I think that would be a very strong proposition.

Air cargo sector development would give opportunities for Omani fish exports to spread worldwide, especially during this time of the COVID-19 pandemic when all land borders between GCC countries were closed, leading to a serious shortage of fish exports and, colossal financial losses. Exporting Omani fish by air will lead to more utilisation of air cargo and promotion of air cargo demand in Oman. Moreover, this gives more credence to the current study's findings, which points out the non-availability of specialised infrastructures for Oman's air cargo, such as cold chain facilities for perishable goods like fish. Supporting the current study regarding globalising Oman's fishing industry, a Group Chief for Sector Development and Promotion (R15) remarked:

The second-largest natural resource in the country is fish, but at the same time only 1% of fish is exported by air. And why fish is important? One kilogram of frozen fish would cost you around USD 2 to ship. You can send it for USD 2 per kg. The same kind of fish, if chilled and handled in the correct way, packaged in the right way, same fish would sell for USD 10 per kg. This requires a bit of an investment in infrastructure. And then also having that inside a free zone, right next to an airport, adds a lot of value because then you cut on the timing of the handling and shipping of the fish to the markets that are interested in buying.

TANFEEDH (2017) reported that 24% of fishery production, worth USD 68 million, is lost because of miscoordination in the supply chain. If Oman builds the required air cargo infrastructure facility to handle fish exports, obtain the required certification, and coordinate with all stakeholders involved in the fish industry, it will benefit from a new transportation model—air cargo—and be enabled to sell fish globally, avoiding the future risk of closed land borders. In addition, exploring potential new customers for Omani fish, other than the present limited market, will lead to direct international export without requiring a middleman, which is currently UAE air cargo, because of the unreadiness of Oman air cargo. Supporting the current study's recommendation regarding the Omani fishing industry, The CEO of an air cargo operator (R1) stated:

While we are in this position, then we may have to think of what we can do best. For example, you know Oman is strong in fisheries, so why don't we consider making a special fisheries hub for the region. So that all the fisheries' items, products, they can actually be on from Oman and have all the facilities, cost storage facilities and even to have an online platform for people to order online. Let's say, for example, if Paris orders a hundred, let's say the twenty tons of fish and then the next day...straight away, we can do it. So we can do a distribution hub for specialized products.

5.2.4 Preventing Air Cargo Leakages

SOLS 2040 (2014) reported that approximately 70% of Oman's air cargo imports arrive through the UAE, and 50% of fruit and vegetable imports are by land, resulting in higher transport cost. Direct employment opportunities are lost in Oman's air cargo sector due to the high capacity of well-established UAE air cargo services and infrastructure at DXB and Al Maktoum International Airport (e.g., cold chain and live animals), and their ability to handle and transport special cargo (Emirates SkyCargo, 2020). Conversely, Oman's air cargo does not have a cold chain facility; thus, there is an urgency to build one, as advised in the current study. Another reason for the leakages is the large Emirates fleet of 270 aircraft and its connectivity of fifty-seven destinations (Emirates, 2020). However, Oman can reduce the domination of the Emirates fleet by having national courier network growth to attract other airlines, freighters, and integrators as advised in this study.

There is also a potential to divert a portion of the 70% of Oman's air cargo imports currently entering via the UAE land border and bringing them in directly via Oman's air cargo. To that end, Oman's air cargo management must investigate what these products are, their origins, and their air connectivity to Oman. Coordination between both the importer and exporter would be required to plan diversion of the products using Oman's air cargo. This will potentially capture some leakage. Oman's air cargo management can

carry out the same process for re-exporting products, resulting in increased demand for air cargo and increased export and import volumes.

5.2.5 Incentives for Air Cargo Carriers, E-commerce Businesses, and Foreign Manufacturers

Because of Oman's small population, there is not much export and import based on the country-required demand, ergo the air cargo volume is also small. To gain exponential growth in cargo volumes, Oman will have to provide incentives to entice e-commerce businesses, foreign manufacturers, and air cargo carriers to operate in the country. As a result of the income generated and the jobs created, this will result in a high economic multiplier. Capital investment attracts suppliers, air cargo carriers, e-commerce, and manufacturers to operate in the country and increase traffic flows that can be created by channelling operations and development demand in the air cargo sector.

In turn, providing incentives will lead to more revenue, increased jobs and earnings in the country, and overall GDP growth (Dimitrios and Sartzetaki, 2018; Holloway, 2008). As a Director of Business Development and New Ventures (R16) observed regarding incentives to stimulate more air cargo demand:

If investors are to be attracted, we need to provide long-term incentives. So we need to provide lucrative incentives for them to come to Oman, like a long grace period. Let's say some form of tax assurance or tax levy or some of these incentives that usually would attract partners to come and do business in Oman...Once we can bring the anchor tenant through many incentives that we can provide to them, then other people will come in. You can spend a lot on promotions and on ads and videos, but it will not be as effective as if you bring an anchor tenant to your country.

Larrodé et al. (2018) identified several elements that attract air cargo logistics: handling costs, airport charges, accommodation and cost of services, infrastructure including airport and ground infrastructure, air cargo facilities, and ease of custom processes. Furthermore, Scholz and von Cossel (2011) stated that for development, the

air cargo sector must set incentives (e.g., night flights, operating hours, fees) to get a long-term commitment from the operating cargo airline. Also, to attract future air cargo services, offering first-class facilities at a competitive price will lead to attracting freight forwarders that create additional air freight demand. Moreover, Coetzee and Swanepoel (2017) concluded in their study that there is a strong relationship between the preference of air cargo carriers to operate, travel time/distance between the air cargo terminal and the airport, and the prevalence of air cargo-related development around industrial areas. The desire to select an air cargo hub as an operation base increases by reducing time and distance. Kupfer et al. (2016) stated that the government could play an essential role in making a country attractive for air cargo carriers by the expansion of industries reliant on air cargo to guarantee sufficient future capacity and a stable regulatory environment. This idea is echoed by a Cargo Expert in aviation management (R18), who stated that

Oman requires to offer a lot of incentives and enablers. They typically would be financial incentives...an air freighter to start flying one or two rotations for a month, a week, or every two weeks. I can't think other than financial incentives...the financial incentives that you can put on the table that might take the form of handling charges for a certain number of months or years when they start operations or giving them discounted handling relative to the competition in the region. So, it could take a few different forms, but I think it has to be multifaceted because, I'm sorry to say, the core underlying volumes are not there, which means that you'll have to support these stakeholders through financial targets and incentives.

Likewise, a Sea-to-Air Expert for a logistics company (R12) commented:

Additionally, we are looking at international players, and what incentives can be given to them to come and base their airlines here in Oman to increase the frequencies to improve or add into their transshipment activities...The incentives that would be provided, not only commercially but even at an operation level, will all help to increase our connectivity and capacity inbound and outbound.

Thus, identified strategies in the current study, such as establishing free trade zones and specialised infrastructures, would play an essential role to incentivise foreign manufacturers, air cargo carriers, and e-commerce businesses to function in Oman,

thereby expanding air cargo activities. Incentive mechanisms such as financial incentives, for example in fuel cost, ground handler cost, tax and customs, air cargo building rent, and slots for air cargo traffic were also suggested in this study.

5.3 Oman as a Sea-to-Air Hub

Establishing Oman as a sea-to-air hub is another innovative strategy (Figure 5.5) found and confirmed in the current study that can positively influence the development of Oman's air cargo sector. The centre of this strategy lies in the advanced seaports of Oman that would give the sea-to-air transportation hub an advantage.



Figure 5.5 Oman as a Sea-to-Air Hub Theme

Reliable and affordable sea transport is well established in Oman, carrying more than 80% of its freight to most parts of Asia through the Sohar and Salalah ports (Ithraa, 2016). Oman's strategic location gives its seaports an advantage and is the reason for current government's focus on developing them. Oman's government identifies seaports as a new source of income for the country in its National Programme for Enhancing Economic Diversification, known as 'Tanfeedh', which drove economic diversification in 2016 (TANFEEDH, 2017). Ithraa (2016) reported a 4.9% contribution to Oman's GDP in 2015 by the logistics sector, and between 2010–2015 this sector's growth exceeded 8% on average (TANFEEDH, 2017).

Oman has four major seaports: Port Sultan Qaboos, the Port of Salalah, the Port of Sohar, and the Port of Duqm (see Figure 5.6). Port Sultan Qaboos is an ideal hub for

the Arabian Gulf, the Indian subcontinent, and markets in East and South Africa (Port Sultan Qaboos, 2020).

The Port of Salalah includes services such as bulk handling terminals for oil, grain, and cement with huge transshipment facilities, warehousing facilities, conveyor belts, and additional container berths. Moreover, it is considered a leading transshipment hub globally and is viewed as the region's best-located port to access the Indian subcontinent, East Africa, and the Middle East (Salalah Port, 2020).

Due to its central location, the Port of Duqm overlooks the Indian Ocean and the Arabian Sea, is a multipurpose commercial gateway, and is quickly emerging as a hub of economic activity. It is expected to become one of the largest ports in the region. The port is a secure location for industries and businesses as it is far removed from the Strait of Hormuz and the Arabian Gulf. Furthermore, the Port of Duqm is equipped with a fully operational airport and a well-connected road network, allowing it to develop into an integrated, multimodal logistics centre (Port of Duqm, 2020).

The Port of Sohar is a deep-sea hub port located midway between Dubai and Muscat, near the Strait of Hormuz, and close to the markets of Iran, Pakistan, and West India. It includes world-class bulk facilities and a free trade zone. This port gives safe and easy access to the Gulf states and Iran as it is located outside the congested Strait of Hormuz and sits at the centre of global trade routes between Asia and Europe (Sohar Port and Freezone, 2020).

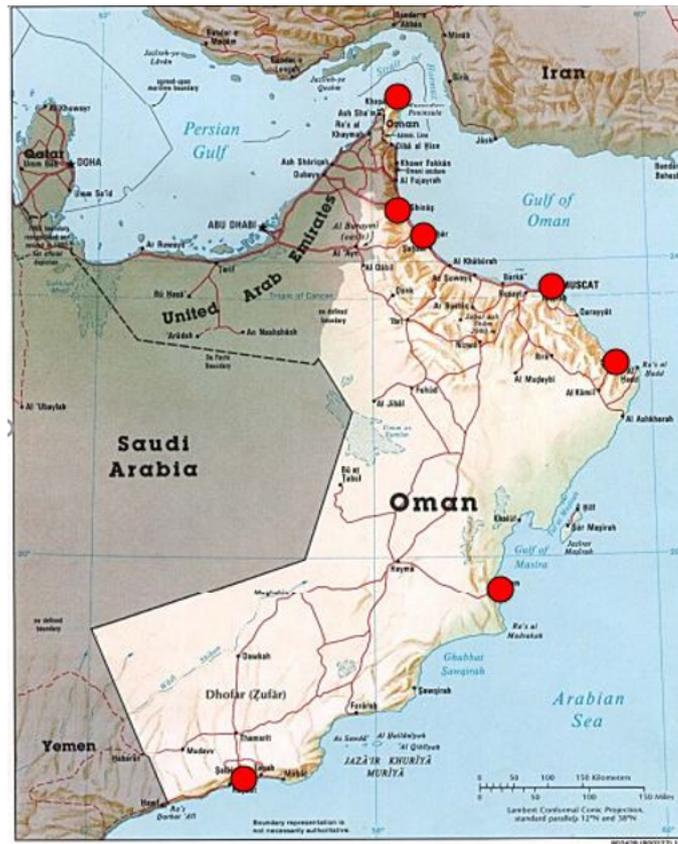


Figure 5.6. Map of Oman's Seaport Locations
 Source: Moloobhoys Group of Companies (n.d.)

According to Ithraa (2016), using Oman's ports provides cheaper access to the GCC markets with up to USD 250,000 savings on fuel charges per vessel and the ability to avoid the politically sensitive Strait of Hormuz. Based on a study by the Oman Ministry of Transport and Communications, which used a consolidated container vessel for a benchmark voyage direct from Singapore to Suez, it was estimated that a weekly call at Salalah would represent an annual cost of USD 4.47 million, at Duqm USD 8.69 million, and Sohar USD 17.09 million. On the other hand, Dubai's Jebel Ali would cost an estimated USD 24.62 million for the same vessel (Ithraa, 2016).

The location of Oman and its advanced seaports offers an advantage over its larger neighbours (UAE and Qatar), who have developed pure air cargo. Combining sea and air would make Oman cheaper and faster, an observation supported by Yuan et al. (2010),

who asserts that integrating different sectors in the logistics industry will enhance the coordination and overall performance. As a Sector Development and Promotion Subject Matter Expert (R14) in reference to a sea-to-air hub strategy benefiting from Oman seaports stated:

I think the sea-air is a real opportunity. We've got a fantastic port in Salalah with a very different market from the north, which is much less competitive than the north. I mean, it's all the same region to a degree, but actually, if you look at Salalah going down south, that's definitely serving a different market from Muscat and Dubai and other places. Salalah is now the third biggest port in the Gulf Region...sea-air, its time is coming. It works a lot, in particular in Asia. Asia runs now by sea-air, and I think there's potential in Oman for sea-air up in Sohar by Muscat, and definitely in Salalah, which is very close and very integrated. You could have a perfect corridor, Salalah definitely...Should Yemen come on stream, which we all hope it will do at some point, it's a golden opportunity, I would say, for Salalah. It's the obvious entry port for the whole country. I think it's twenty-six or thirty more million people.

Scholars have stated that to remain competitive, companies need to guarantee parts of the value-chain located in countries where they can benefit from lower expenses due to location factors and economies of scale. This should be balanced with the resultant higher costs of transportation and lead times (fast transportation, what quantities to ship, and where and how to tranship) (Ba-Awain and Daud, 2018; Lee and Meng, 2014; Mentzer, 2001; Zijm et al., 2019). Fernandes and Rodrigues (2011) explain that developing an integrated logistics hub is necessary to develop robust air cargo and maritime capabilities and capacities. Supporting this argument, the Executive Director of a logistics company (R9) asserted:

With regard to sea-air, there is a double benefit. One benefit is that it's contributing to the volumes and the targets of the sea logistics sector. It also has value for land logistics as well as air cargo. Therefore, in terms of volumes, it's impacting these three verticals together. Still, in addition to that, it's also targeting a very specific segment in the market requiring very customized products that utilize the competitive advantage of our different ports as well our connectivity to different markets. For example, between the Indian subcontinent and Europe, there's a clear demand movement of certain products there that cannot be captured through only air alone. This is where products like sea-air can help us increase market share.

Using a sea-to-air transportation hub combines speed from the air and cost efficiencies by the sea (Fernandes and Rodrigues, 2011). Typically, sea-to-air use is for bulky shipments delivered to many different locations. Instead of sending the shipments to many locations by air, which is costly, they are amassed into one large shipment by sea from the origin to a hub. At the hub, the shipment is broken down into the smaller size batches again, and air cargo delivers them to different locations. This method is also used in the reverse order, for example if small quantities of raw material arrive by air to the hub from different places around the globe. For value-added activities, they can then be combined as one product at the hub and sent as one shipment by sea. Thus, sea-to-air enables faster transportation compared to sea only and at a lower cost than pure air cargo.

According to Boeing (2017), the sea-to-air option is likely to introduce efficiency and improvement in the value of traded products, both locally and internationally. Chen et al. (2017) emphasised that sea-to-air transport should be considered as a viable option because it is common practice for airlines and logistics service providers to deliver cargo by sea from Asia to a Middle Eastern air cargo hub, then transfer it via air to Europe or Latin America. Moreover, Nguyen (2014) maintains that a combination of different modes of transport, such as sea-to-air, creates an enabling environment for business operations and the attraction of international trade. That viewpoint is in agreement with that of a Director of Business Development and New Ventures (R16), who stated:

If you make a shipment by air from origin to destination, it becomes really expensive. But if you send from origin to a transit hub and then from the transit hub use air cargo, it becomes less expensive than air cargo from origin to destination. Also, you can ship bulk things, and once they arrive, it can dispatch and there, the air cargo can add more benefit, and it even probably will become cheaper...Personally, I see Salalah as a sea-to-air hub because it is closer to the Red Sea, and many of the traffic is happening from the Suez Canal. So, if we can have Salalah as a hub for the sea-to-air, then that's something that we can leverage on.

Moreover, the Chief Operating Officer for an air cargo operator (R2) asserted that the

Model of the sea-to-air comes in where in the customer doesn't want to pay the full air freight costs but is willing to pay a little bit more for one sector and to connect to air and still make the goods arrive on destination on time. So being a cost-sensitive product.

Thus, Oman should work on implementing the sea-to-air transportation hub strategy, as advised in the current study, to gain a competitive advantage and integrate sea with air logistics. Adding a sea-to-air transportation hub would give Oman's air cargo more flexibility to accommodate the market needs, support the transshipment of goods, allow manufacturers to assemble raw materials coming by sea and ship the final product by air, and facilitate consolidation/deconsolidation of goods in an easier manner. Hence, sea-to-air transportation would encourage foreign manufacturers, air cargo carriers, and e-commerce businesses to operate in Oman, consequently increasing air cargo import and export activities. Adopting a sea-air transportation hub would also support developing an air cargo hub in Oman, as it would provide advantages of flexibility and agility to accommodate more air cargo stakeholders. Furthermore, initiating this transportation model strategy would work well with other strategies, such as establishing free trade zones, and will give the transporters the advantage of customising their shipment, storage, and assembly strategy by using the sea-to-air hub.

5.4 Establish Free Trade Zones

Establishing free trade zones near or in airports is another fundamental strategy identified (Figure 5.7) and confirmed in the current study that has a pivotal role in Oman's air cargo sector development. The unanimous consent to this strategy is because the free trade zones are a natural catalyst, enhancing manufacturing activities, e-commerce, and business by providing freedom, cost efficiency, tax exemption, and proximity to customers.

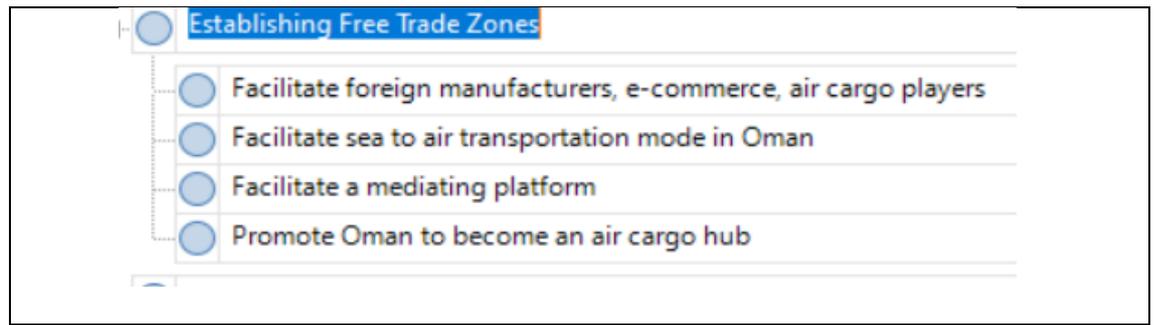


Figure 5.7 Establish Free Trade Zones Theme

Free trade zones in Oman have an attractive advantage because of Oman's geostrategic position and advanced seaports which allow the manufacturers, e-commerce businesses, and air cargo couriers to customise and utilize any type (sea, air, sea-to-air, or land) shipments in an effective manner. Free trade zones offer a better interlink between sea, air, and land by acting as a bonded corridor between the country's airport, port, and warehouses, making the whole country an integrated logistics hub. Hence, there is an urgent requirement to establish free trade zones to grow Oman's logistics and air cargo sector and to maximise its benefits from the geostrategic location. As one Senior Manager (R3) reiterated:

How are you going to have a viable market opening the economy big time? By free zones where there is a lot of encouragement for people to come and open up their own plants. And once an industry thrives, basically cargo movement thrives as well because it is built on the backbone of an economy itself.

Baack et al. (2013, p.80) defined free trade zones as 'selected areas within a country that have independent laws for motivating trade, unrestricted international goods exchange, and the reduction in customs tariffs or complete removal of fees'. Interestingly, although free trade zones are physically located within a country, they are considered legally outside a nation's customs territory. They include facilities and well-established processes to simplify the smooth physical flow of goods and easy trade transactions. Roy (2020) adds that these zones are areas in which products can be made, modified, or stored

under specific customs regulations and are usually not subjected to custom charges. For that reason, businesses use free trade zones to reduce costs and to make their goods more competitive; this is consistent with Leu et al. (2009), who argued that overall operational efficiency and financial effectiveness will be achieved, both in the short and long terms, for companies who are located in the free trade zones. Agreeing with scholars regarding the free Trade zone benefits, a Director of the Business Development and New Ventures (R16) stated:

Free zone to the air cargo will give huge leverage for manufacturers to come and set up in Oman because they know that they can set up in the free zone, they don't have to pay taxes, they just ship it directly into the airport air cargo. So it is a great incentive for the air cargo to have a free zone close to it, so immediately you manufacture, package, and fly out of the country without any taxes.

Clearly, free trade zones have a critical role in the air cargo sector development in Oman to facilitate and attract foreign manufacturers, e-commerce businesses, and air cargo couriers. This finding is consistent with that of Research and Markets' (2020) recommendation that free trade zones need to be developed for the air cargo sector to succeed and to accommodate the global increase in air cargo. Free zones attract companies because they are tax and fee-free for repatriation, allowing unrestricted profits (Mordor Intelligence, 2020). The trend of major cargo airports having free trade zones, hubs, and cargo villages, as observed by Coetzee and Swanepoel (2017), could easily facilitate access to licences for free transportation of products. This would, without doubt, attract foreign and international business (Gavin, 2010). In this regard, one Cargo Expert (R17) affirmed:

Free zone is a key enabler, especially for foreign players who want to use the country as a hub, because of tax, holidays and other benefits, employees, organisation, et cetera. So having a free zone status land close to the terminal is very important to attract foreign investment, especially in the cargo space...free zones is a very proven and attractive value proposition in the region, the most important or proven one is the Jebel Ali free zone. And the

idea of a free zone, that you don't pay the local taxes, you have benefits and waivers on labour law and other laws, which is very attractive. So basically companies, international companies, can be based there and serve the region without bearing any tax. But also, being in close proximity to the hub, so they can serve countries in the region very quickly. And at the same time, they can get their goods from the far East or Africa or Europe, assemble them on that, add value on it in the free zone and then send the full or final product to the end-user. So it's very efficient in terms of setup. Yes, and if a consumer asks for something, literally, you can put it on a plane and send it there, especially with Muscat Airport that has good connectivity to the most regional countries.

Confirming the advantages of free trade zones, Fernandes and Rodrigues (2011) point out that they boost employment, foreign exchange, and export, and they play the role of catalysts in transforming the given region into a business hub. Moreover, many scholars concur that free trade zones facilitate major business functions such as distribution, production, and marketing, and provide low costs in import and export activities, leading to revenue and increased job opportunities whilst attracting capital investment and GDP into the country (Ba-Awain and Daud, 2018; Dimitrios and Sartzetaki, 2018; Kotzab and Wünsche, 2015).

Thus, Oman could receive major economic advantages contributing to economic growth, the standard of living, and job employment opportunities by establishing free trade zones near or in airports, leveraging its geostrategic location and advanced seaports. That also will support other strategies identified in this study, such as a sea-to-air hub and a distribution centre, as free trade zones are a natural catalyst enhancing manufacturing activities, e-commerce, and business. Finally, they provide freedom, cost efficiency, tax exemption, and proximity to customers, and they integrate the logistic sector (air, sea, and land).

5.5 Improving Customs and Government Agencies Rules and Regulations

This research has established that improving customs and government agencies rules and regulations is a vital element for Oman's air cargo development (Figure 5.8)

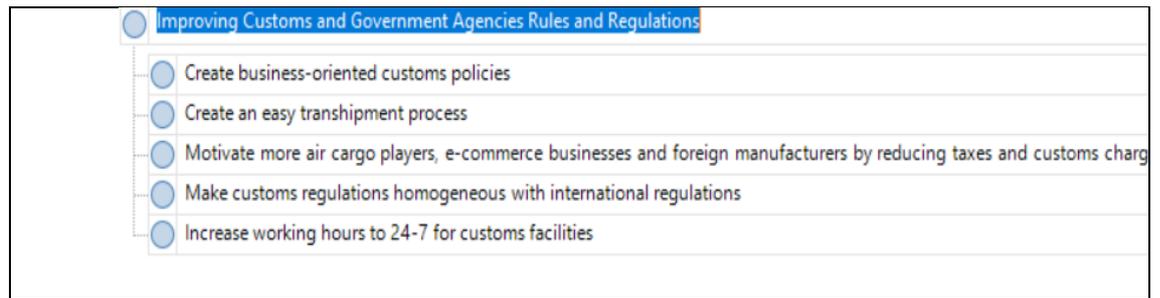


Figure 5.8 Improving Customs and Government Agencies Rules and Regulations Theme

Customs and government agencies are a crucial part of the air cargo sector. They can be facilitators by simplifying regulations or by hampering bureaucracy; thus, this strategy identified in the current study can make or break the air cargo sector. As an Air Logistics Program Manager (R13) in his interview for the present study asserted:

The biggest change that needs to happen at the moment is that customs must be driven by business and not by security. This is a requirement that we are seeing in all of the leading countries in the world that are excelling in air cargo or cargo or logistics in general. If we think about Singapore and the Netherlands, Dubai, and other successful hubs in the world, they are treating cargo and customs as a product, as a business.

Yuan et al. (2010) stated that complex customs services and procedures need simplification to avoid slowing down the air cargo delivery process. Moreover, the ICAO (2017) argued that the air cargo industry gets negatively affected by trade protectionism, regulatory restrictions, rising world interest rates, and international conflicts. Governments must facilitate one-stop-shop services, simplify regulations, and improve infrastructure (Chen et al., 2017). Air cargo needs business-oriented treatment, liberalisation, and commercial freedom of air cargo services (ICAO, 2020). As a Group Chief of Sector Development and Promotion (R15) with reference to Omani customs stated:

There is still room for improvement, and we need to work hand-in-hand with our stakeholders, more specifically customs, in training these individuals and showing them why this matters. They are delivering their part of the job, but they can't see the big picture; then there is no use of whatever investment in terms of infrastructure or latest technologies. They need to use that

technology. They need to embrace that technology. They need to understand the big picture. Why do we have a Vision 2040? What is their contribution to that vision? If this is clear, then action is taken.

Kasarda and Green (2005) noted that maximum impacts on air cargo come from improving customs quality. ASYAD (2016) supported this by observing that improving customs procedures makes the overall air cargo clearance process faster and more accurate, a fact that can significantly support the establishment of a foreign and local logistics business. Likewise, Gardiner et al. (2005) agreed that if the customs administration can provide timely clearance and pre-clearance, this creates a competitive advantage. The World Customs Organisation (2019) suggested that some of the essential improvements in customs procedures could include the following: licences obtainable within twenty-four hours, easy procedures in customs declaration, easy processing of custom duties, electronic processing of permits, and e-government services such as Integrated Management Systems (IMS) and Risk Management Systems (RMS).

Clearly, there is a strong relationship between customs and air cargo. Ba-Awain and Daud (2018) indicated the unfortunate weakness of border procedures and documentation for Oman's customs. Moreover, according to the World Bank, Oman indices related to the customs clearance process, speed, and tracking remain low (TANFEEDH, 2017). In this regard, a Sector Development and Promotion Subject Matter Expert (SME) (R14) stated:

For all of our customs products to succeed, we need to transform that completely to customs as a customer service. Customs needs to see itself as an enabler of international trade. It needs to see that if I'm doing this in four hours, the economy is that. If I'm doing this in forty hours, the economy is that...They're doing their job. They're doing an excellent job from a security perspective, but when it comes to an economic perspective, it's not serving the needs of the country and the sector.

Therefore, if Oman desires to transform the air cargo and logistics sector per the SOLS 2040 objectives, it must add customs and government agencies to the equation, as

recommended by this study. Development in these areas would reduce customs clearance times and costs and control export and import in air cargo, making it more attractive. To do so, Omani customs and government agencies could adopt risk-based control measures by moving many controls away from the border to reduce the risk factors and customs clearance times. This move would allow customs to release low-risk goods based on the risk profile. In case of risk or threat to people's health or the environment, such risks can be addressed at the border, for example, drugs, guns, prohibited products, or explosives. In the case of goods not posing an immediate threat to people's health or the environment, such as checking compliance with standards for product certification or fraud revenue, such risks should be addressed beyond the border to reduce clearance time.

Oman's customs could also issue licences, permits, or certificates for the goods after analysis and risk rating, initiated by market-based surveillance. The trader can create a declaration for the goods. If the goods are matched, they can be released; if not, they cannot be cleared.

Furthermore, Oman's customs could use market checks for low-risk goods to confirm the conformity of the products with national and international standards. Customs can test to ensure compliance for a range of low-risk goods, including some food and agricultural products. In case non-compliant goods are found, they can be removed from the market. Another method for risk-based control measures might be customs for allowing conditional release, so the trader can apply for and create a declaration for customs staff to visit the trader warehouse, undertake essential checks and tests, and then either release or seize the goods if they do not match the declaration. Those measures are aligned with Solomon (2013), who is of the view that the air cargo industry must move towards risk-based screening for cargo where this will improve the movement of goods throughout the air cargo supply chain.

The development of transshipment processes is another angle for improving customs and government agencies. Transit goods are not aimed to be exported to Oman, but to transit, so would not enter into the Oman customs system, pay a fee, or suffer inspection of goods. This will motivate more volume of transit shipment, increasing export and import via air cargo. In the current situation of Oman's customs, there is no differentiation between transit shipments and other types of shipment. Therefore, all shipments are inspected, even if it is a transit, and that causes delays in shipment delivery. It is an undesirable protocol for air cargo stakeholders as air cargo tends to be just-in-time; moreover, this stops Oman's air cargo sector from being a hub and distribution centre in the region. According to one Sector Development and Promotion SME (R14):

If you are genuinely trying to build a transshipment hub, ultimately, you're going to have ten times as many goods with the tranship either entering or leaving the country. You need to have different processes and different mindsets about goods that are coming in and out of the country without ever actually entering the country.

Additionally, improving customs and government agency operations by increasing working hours to 24/7 for customs' facilities, developing business-oriented customs policies and processes, and training customs employees on the economic impact of the development of Oman's air cargo sector would result in superior customer service, awareness about customs policies, reduction in taxes and customs, and homogeneity between Oman's customs regulations and international regulations. An example would be implementing the international road transport (TIR) system, enabling goods to flow across borders, reducing the administration for customs, and streamlining procedures at borders. The TIR system reduced the transportation time by 72% for shipment times from KSA to Oman: usually, the journey time is three days; however, after implementation, TIR just took twenty hours (IRU, 2020). In support of 24/7 working hours, improving

customs processes and training customs agents, the Chief Executive Officer of an air cargo operator (R1) mentioned:

The custom officers...Are they prepared to open twenty-four hours? Do we have the right people? Do we have enough manpower to do this? Because right now, there are doctors who need to examine some of these products, are they prepared to work twenty-four hours? So, these are issues that we need to look into, and we need to resolve.

Moreover, an Expert in a logistics company sea-to-air department (R12) recommended that agents ‘work 24/7 in air cargo terminals, because air cargo is urgent. People send cargo by air because of urgency. We can never tell that we are closed for two days’. This sentiment is compatible with Taderera et al. (2018, p 89), who stated that, ‘logistics is not an 8.00-5.00pm job as cargo moves non-stop 24 hours a day, 7 days a week and 365 days a year’.

5.6 Development of Specialised Infrastructures

Development of specialised infrastructures is the most vital strategy for developing Oman’s air cargo sector identified in the current study (Figure 5.9) because in order for air cargo to function, you need to build the required infrastructure. As Al Abbadi et al. (2021) have asserted, the development of the logistics sector mainly depends on the infrastructure to ensure the smooth flow of goods and provide the sector with flexibility and competitive advantages. That argument is compatible with Porter's value chain model, which considers infrastructure an essential element to direct the operation towards the deliverable and add value for clients (Koc and Bozdag,2017).

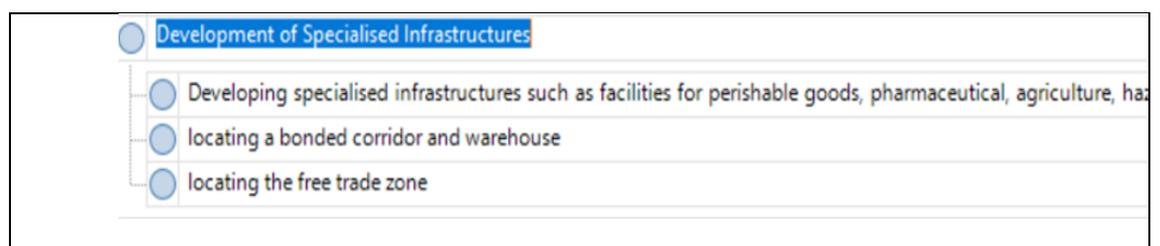


Figure 5.9 Development of Specialised Infrastructure Theme

Ba-Awain and Daud (2018) observed that developing Oman's cargo sector requires investments in the air logistic infrastructures. This is valid advice and, over the time period in which this study was conducted, the air cargo infrastructure in Oman has been updated. Oman opened the new Muscat International Airport in 2018, which includes a new cargo terminal of 32,000 sqm with approximately 350,000 tonnes per year capacity and a further 500,000 tonnes per year potential to expand. This is a game-changer for the air cargo industry in Oman (Airport Business, 2018).

However, despite the new airport and air cargo infrastructure, the current study identifies additional strategies for developing air cargo specialised infrastructures in Oman. The new infrastructure still requires facilities for perishable goods, pharmaceuticals, agriculture goods, hazardous goods, valuable goods, cold chain facilities, and live animals. Specialised infrastructure will provide a favourable environment for Oman's air cargo sector as it gives the sector accommodable premises and flexibility, thus attracting cargo carriers, e-commerce businesses, and foreign manufacturers to select Oman as their base. In an interview for the present study, a Director of Business Development and New Ventures (R14) stated:

We need to invest more into other supportive infrastructures or auxiliary that will be able to aggregate more volumes into Oman and hence increase the utilisation factor. For instance, we are investing into the perishable centre, so that will allow more of the fruits and vegetables to be routed through Muscat Airport. Also, it will support the fisheries; it will support the whole cold chain logistics in Oman.

Reinforcing this idea, a Sea-to-Air Expert for a logistics company (R12) asserted:

We need dedicated perishable centres for food, pharmaceuticals, fisheries, agriculture, any perishable import or export dedicated facility for that and even a space for international players such as freight forwarders and integrators to have direct airside access to speed up their operations and also set up a more significant presence here in Oman.

This finding supporting the development of specialised infrastructures is consistent with that of dos Santos Vieira et al. (2016), who asserted that the value-added gain in the air cargo sector is related to the functional aspects of facilities to handle any type of goods, whether manufactured goods or bulk cargo. Moreover, Scholz and von Cossel (2011) stated that to attract future air cargo services, offering first-class facilities at a competitive price to entice the freight forwarders will create more air freight demand.

Another specialised infrastructure is bonded warehouses. Bhatia (2010, p.141) described bonded warehouses as ‘warehouses licenced by the government or relevant customs authorities to accept imported goods for storage before the payment of customs duty’. Hidayat et al. (2017) define these structures as customs facilities designed to reduce the cost and time of logistics. Chalmers (2019) elaborated that the shipper could import products to a bonded warehouse across the world and store it there until needed, without paying any duty charges. For example, if an imported, full container load of product arrives but the customers need only 50% of the total import at a particular time, they can get this 50% released by paying customs on the released amount only. However, they must pay a fee to keep the remainder at the warehouse, which motivates and gives the trader flexibility. Moreover, the shipper saves 25%–30% by postponing duties because the shipment can be stored in the bonded warehouse until there is an increase in demand for those products. At this point, the importer would pay the charges for the released products as they are delivered to their destination within the country of holding. The availability of bonded warehouses is considered a motivational factor to attract air cargo customers. As the Chief Executive Officer of an air cargo operator (R1) remarked:

We need, for example, a cargo agents warehouse. We need bonded warehouses. We need an express courier centre and also a perishable handling centre. So, these are, I think, basic infrastructure that we need to increase the movement of cargo and to develop Oman as a hub.

Therefore, bonded warehouses are a crucial infrastructure that plays an important role in Oman's air cargo sector development by facilitating and attracting foreign manufacturers, e-commerce business, and air cargo carriers. In addition, they offer flexibility and agility to accommodate more air cargo stakeholders as they integrate seaports, airports, warehouses, and cargo terminal buildings.

5.7 Strong Coordination between Air Cargo Stakeholders

This study found that building strong coordination between air cargo stakeholders is crucial and has a pivotal role in developing Oman's air cargo sector (Figure 5.10). This study found unanimous agreement on this strategy because air cargo transport consists of several entities, situations, and processes that make it extremely complex. It must organise all the stakeholders, such as shippers, forwarders, airlines, air cargo stations, customs, banks, and clearinghouses. This reflects Porter's value chain model, which explains the importance of organising stakeholders within supply chain entities. They engage in several activities to transform inputs into outputs that add value at each stage. Thus, it requires coordination between stakeholders (Kuratko and Hoskinson, 2016).



Figure 5.10 Strong Coordination between Air Cargo Stakeholders Theme

Air cargo has various stakeholders from source to destination (Feng et al., 2015). It is inter-linked with the airport, air freight, airlines, air cargo building, banks, customs, and clearinghouse agents. Drljača (2017) explained that the air cargo process is complex—the cargo handling activities at arrival run simultaneously with departure and include

several sub-processes for both receipts and dispatchment. Additionally, the processes at landside and airside run concurrently, as do documentary receipt, dispatch activities, and physical receipt. Dos Santos Vieira et al. (2016) specified that there are service-specific processes according to the kind of product (e.g., perishable, dry, hazardous, or refrigerated), as well as product type packaging, such as bulk, containers, full load, or less-than-truckload. Furthermore, the market, whether worldwide or domestic, can also need specific processes, such as customised clearance.

The ICAO (2020) claimed that air cargo managed properly will benefit consumers, businesses, and end-users by supporting the global supply chain with stakeholder coordination between air cargo regulatory framework developers. This, in turn, will facilitate air cargo sector growth. However, as Ba-Awain and Daud (2018) concluded in their study that Oman's logistics industry is out of the competition because of fragmentation and poor coordination between transport stakeholders. Thus, alignment is needed for all these entities to enable air cargo mobility. Likewise, Taderera et al. (2018) stated that the one-stop-shop concept in Oman is not a full-fledged, functional operation. Moreover, according to ASYAD (2016), it is imperative to improve Oman's logistics procedures and processes from its current state to a more developed and reformed one if great success and operational efficiency is to be achieved. The Group Chief for Sector Development and Promotion at one aviation management company (R15) described stakeholder coordination in Oman's air cargo sector thusly:

The company is doing a fantastic job when it comes to delivering, from their end. But then other parties are not controlled by the operator: governments, semi-government, private sector. If they don't up their game and deliver their end of the service agreement, the value of that building does not materialise to the end-user, the customer. The customer could care less about who did what. They care about their delivery being on time and in good condition. You can't go to a customer and tell him, 'I've delivered my bit, but the company that should handle your cargo didn't do a good job'. That can't take

place. It's an overall experience. It's an overall product that needs to be delivered.

This study identified strong coordination between air cargo stakeholders as one of the most critical requirements to develop Oman's air cargo sector. Enhancement is required in information-sharing, collaboration between air cargo stakeholders, and updated or revised processes, regulations, and rules that hinder the benefits of this sector in Oman. Furthermore, this initiative would enable different stakeholders to deliver their part of the air cargo services, providing a clear interface and handover process between multiple air cargo entities. Thus, strong coordination between air cargo stakeholders and more developed air cargo processes will ease the business, reducing the time and cost, and thereby attracting foreign manufacturers, e-commerce businesses, and air cargo carriers to operate in Oman.

Another requirement is the establishment of a common governance committee to ensure stakeholder alignment and raise awareness among Oman's air cargo stakeholders. This will encourage a common understanding and a bigger picture of the economic impact, which should inspire the sector to work towards achieving the same objectives. Moreover, making air cargo processes in Oman compliant with international standards, such as the IATA, is another recommendation as implementing lean and reengineered air cargo processes in Oman will prove more efficient. Digitalisation and the use of one platform integrating information system between air communities will also make operations easier and faster.

Lastly, the current study emphasises the need to design processes for sea-to-air transit and to interlink processes with free trade zones and bonded corridors as these do not exist currently. Thus, the strong coordination between the air cargo stakeholders'

strategies identified, confirmed, and explained in this study corresponds with channel coordination theory, which aims to align plans and objectives between supply chain entities to improve the performance of a supply chain. Consequently, the model allows logistic companies to realign their channels to meet the goals of multiple customers (Modak et al., 2016; Panda et al., 2015).

5.8 Reflection on the Study's Findings from a Practitioner Lens

The supply chain is designed to handle the movement of goods entered into production as raw materials (inbound logistics) or sold as a final product (outbound logistics). Every stage in the supply chain is a pre-requirement for the next stage and can add to the total cost ownership of the final product. For example, the raw material goes to warehousing, then from warehousing to manufacturing, then to the distribution centres, and then the end-user. So, we need to look at it as one product even when it comes from different entities, since adding value along the supply chain contributes to the cost of the given product. Thus, the cost of logistics is part of the cost of the product. So, if we manage to reduce the logistic cost, that will impact the overall product cost positively.

The present study identified six strategies/initiatives that need to be in place to develop Oman's air cargo sector. We can categorise them into two groups according to their nature. The first three strategies are stimulating air-cargo demand, making Oman a sea-to-air hub, and establishing free zones in the airports; these link to the supply chain cost element. The second three strategies identified are improving customs and government agency, developing infrastructure, and building strong coordination between air-cargo stakeholders; these three link to the supply chain integration element—that is, the coordination between phases from the supplier to the buyer, to warehousing, to manufacturing, and to the end customer.

As mentioned, the cost of the product is affected by the cost of the supply chain and the cost of logistics and transportation. So, the general assumption here is that if we manage to reduce the cost of logistics and the supply chain, the manufacturer can reduce the production cost, and thus charge a more competitive product price.

The strategies of stimulating air-cargo demand, developing Oman as a sea-to-air hub, and establishing free zones can all improve costs in the supply chain. By implementing these strategies, Oman can facilitate business benefits from the strength of its strategic location. Oman offers manufacturers a strategic location where they can be close to their suppliers, their GCC and Iranian market customers, and the rest of the world. They can reduce logistic costs by an economy of scale as the manufacturer can bring raw materials cheaply by bulk via sea, assemble or manufacture their products in the free zone, and distribute them easily to the world by air. To make the equation work, the current study recommends targeting specific commodities which need just-in-time delivery, such as e-commerce, aircraft spare parts, pharmaceuticals, textiles, and electronics; consequently, air cargo demand in Oman will be further stimulated. At the same time, the whole logistics sector in Oman will be more complete and integrated and thus able to accommodate different types of market needs for the delivery of the products (sea, air, land).

The second group of strategic initiatives that were identified in the current study are linked to the role and nature of supply chain management and logistics to have a smooth process, coordination between stages and entities, a clearly set up interface, and the proper infrastructure to accommodate the development of the products. Because every stage in the supply chain is a pre-requirement for the next stage, through integration, coordination, and the availability of specialised infrastructure, we strengthen Oman's supply chain platform and consequently create a competitive advantage.

To summarise, the six strategic initiatives give an ideal supply chain platform or hub for companies that need to reduce their cost and increase their responsiveness to their customer, or to get new customers in the market. The first three initiatives—stimulating air-cargo demand, establishing Oman as a sea-to-air hub, and establishing free zones—work with the concept of economy of scale as the manufacturer can get a low-cost place in the free zone, bring raw materials by bulk via sea, and reduce transportation or shipment costs through consolidation. Manufacturers can then send the final product to the customers easily and quickly by capitalising on Oman’s strategic geographic location. Moreover, the current study identified the kinds of commodities that need to be targeted, which include e-commerce, aircraft spare parts, pharmaceuticals, textiles and electronics.

The second three strategic initiatives—improving customs and government agency policy and procedure, developing specialised infrastructure, and providing strong coordination between air cargo stakeholders—create integration in the supply chain, which must also be enhanced so that Oman can be an attractive, and ideal logistics hub.

5.9 Conclusions and Summary of the Study

The undertaking of this study was founded on the recent move made by the government of Oman to emphasise much-needed diversification in the economy in order to lower the reliance on oil as the main source of income. Oman’s economy is excessively dependent upon oil and gas, accounting for approximately 85% of government revenue. Furthermore, from 2016, Oman’s economy has faced a deficit in its budget of approximately USD 13.8 billion due to fluctuations in oil prices. Therefore, the government has proposed to follow a development plan which shifts the nation to a non-oil-based economy (Al-Wahaibi, 2019). One such strategy is the Oman Logistics Strategy 2040, a blueprint intended to transform Oman into a world top-ten logistics centre by

2040 with an integrated logistics system including airports, ports, infrastructure, road transportation, and sea shipping, thereby creating Oman as a global logistics hub. The logistics sector is expected to contribute to non-oil income, employment, Oman's global perception of logistics, the country's position on various logistical and industrial indices, market share of goods flowing into the region, and overall GDP growth (SOLS 2040, 2014).

The air cargo sector is a part of the logistics sector which shows positive performance and trends, particularly in the Middle East, as it is considered a transit point for air cargo between Asia, Africa, and Europe, areas responsible for approximately 33% of the total air cargo tonnage globally. The air cargo market between Europe and the Middle East is expected to grow at a rate of 4.2% annually between 2018 and 2037, implying that the industry will more than double in the next fifteen years (Boeing, 2017).

However, the air cargo sector has received less attention in SOLS 2040. Supporting this claim Al-Wahaibi (2019) stated that air cargo has not been part of the logistics strategy in Oman; also, there is a lack of data on air logistics in the current logistic sector's structure. Yuan et al. (2010) emphasised that the air cargo industry is one of the most important sectors belonging to the overall logistics industry. They also highlighted that all modes of transportation ought to be integrated into the entire supply chain and the wider logistics industry, which will lead to better efficiency, enabling nations to connect to global supply chains and distant markets more speedily and reliably. Despite air cargo being a small industry as compared to the passenger business, air cargo services have now become more significant to the economy.

As a result, the study sought to conceptualise Oman's air cargo sector developmental directions, which need to be established in order to improve the air cargo sector and meet the Sultanate of Oman Logistics Strategy 2040's goals (SOLS 2040,

2014). Furthermore, an improvement in Oman's air cargo sector will promote revenue generation and increase its market share from the growing air cargo industry in global and the Middle East markets, ensuring healthy economic growth and development.

The main objectives of the present study are:

- 1) To identify air cargo sector development strategies/initiatives in Oman
- 2) To confirm air cargo strategies identified in the first phase.

This study found that stimulating air cargo demand, establishing free trade zones, adopting a sea-to-air transportation hub, developing strong coordination between air cargo stakeholders, improving customs and government agency policies, and developing specialised infrastructures are significant and positive influencing factors for Oman's air cargo sector development.

Air cargo demand is influenced by the economics of a country's activities, particularly the evolution of world trade merchandise, and is linked to physical trade, other sectors' performance, and global supply chain operations. However, Oman has a small population, so it is a relatively small market. Consequently, the air cargo volume in Oman is small as not much export and import are based on the country-required demand. Thus, the current study established that Oman should adopt a sea-to-air hub and make a regional distribution centre to capitalise on its geostrategic and political position. Having a regional distribution centre and developing a flexible air cargo sector in the region will boost air cargo traffic volumes.

Location plays a critical role in affecting the market size, service quality, and costs, as location is an essential factor that contributes to the success of business activities in each area (Niine et al., 2017). This study has revealed that making Oman a regional distribution centre for time-sensitive commodities to be transferred by air is a key strategy and should be adopted. It would make sense to capitalise on Oman's geostrategic location

as a logical distribution hub for East Africa, the Indian subcontinent, and the Gulf for commodities such as aircraft spare parts, textiles, electronics, e-commerce, and pharmaceuticals. As a result, Oman's air cargo sector would gain a larger market share as a catalyst for related growth in air cargo volumes, stimulating more traffic and demand and enticing more players to operate in Oman, resulting in increased import and export activities.

The study also has revealed that implementation of the sea-to-air transportation hub is important as it combines faster transportation at a lower cost than pure air cargo. Moreover, it creates an enabling environment by developing infrastructures to allow the movement of goods from one terminal to another. Sea transport is already well-established in Oman and carries more than 80% of its freight in most parts of Asia, due to its reliability and affordability, through Sohar and Salalah ports (Ithraa, 2016).

The location of Oman and its advanced seaports gives Oman air cargo a competitive advantage over pure air cargo when it combines sea to air. Adding a sea-to-air transportation hub would give Oman's air cargo flexibility to accommodate market needs, support the transshipment of goods, allow manufacturers to assemble raw materials coming by sea, ship final products by air, and facilitate the consolidation/deconsolidation of goods. These features of sea-to-air transportation would attract foreign manufacturers, air cargo carriers, and e-commerce businesses to set up in Oman, thus increasing air cargo import and export activities.

Likewise, from the standpoint of capitalising on its political position, Oman could be the distribution centre for the Iranian market, due to its positive affiliation with Iran that the remainder of the GCC does not have. Oman could be the most important distribution centre for Iran because of the political restrictions on the Iranian market.

Another area to inspire air cargo demand in Oman, as identified in this research, is the export of Omani fish. According to Oman's Ministry of Agriculture, Fisheries, and Water Resource, the fisheries sector is now expected to achieve a growth rate of 6.5% annually (TANFEEDH, 2017). However, 98% of exported fish is transported via land, sea, or by UAE air, because Oman air cargo is not established. Air cargo will allow Omani fish to go worldwide and will lead to more utilisation of air cargo and a higher air cargo demand in Oman.

Stopping air cargo leakages is another way for Oman's air cargo sector to increase demand through air cargo loss avoidance; currently, roughly 70% of Oman's air cargo imports arrive by land through the UAE, resulting in lower customs receipts and fewer direct job opportunities in the air cargo sector (SOLS 2040, 2014). However, if they can be imported directly through Oman air cargo, some of that 70% of air cargo imports could be diverted. To capture some of the leakage, Oman's air cargo management must look into the origins of the products, their air connectivity to Oman, and how they can be diverted to Oman's air cargo, coordinating with both the importer and the exporter.

The study has affirmed that providing incentives is an important strategy for stimulating air cargo demand to attract many air cargo carriers. Some examples of incentives that could be offered are lessening taxes, the provision of customs services, and reductions in fuel costs, ground handler costs, and air cargo building rents. As a result, incentives could lead to an overall increase in import and export activities at the hub in Oman. Moreover, promoting Oman as a central and preferred geographic location for connecting to the outside world can bring in more business and increase the volume of air cargo activities.

The research established that launching free trade zones is an important strategy, as this will encourage foreign manufacturers to operate at the hub, as well as facilitate an

e-commerce business community and act as a platform to create relationships between e-commerce businesses, foreign manufacturers, and air cargo. The free trade zones in Oman have an attractive advantage because of Oman's strategic location and advanced seaports, allowing the manufacturer, e-commerce, and air cargo couriers an effective, customised experience. Companies can utilise any type of shipment (sea, air, sea-to-air, and land) as free trade zones give better interlink between sea, air, and land, which can act as a bonded corridor between airports, ports, and warehouses that will help make the whole country an integrated logistics hub.

Another strategy that supports the results is ensuring strong coordination between different stakeholders in the industry, which is important in guaranteeing that different stakeholders would deliver their part of cargo services. Similarly, strong coordination of stakeholders by using a full-fledged, functional, one-stop-shop centre would ease business in Oman, and mandating a common governance committee would ensure alignment of air cargo goals.

The research also supports the improvement of customs and government agencies through adopting risk-based control for goods and technological innovation to reduce the time taken in the clearance phase. In addition, remote access to services would reduce costs and overall clearance procedures. This will make Oman's service delivery align with the best international practices, thus encouraging foreign manufacturers to trade through Oman's air cargo services.

The current research stresses the development of a specialised infrastructure; this is important as it enables the air cargo industry to introduce facilities to take care of perishable goods, handle pharmaceuticals and agricultural goods, and have amenities suitable for cold chain goods, hazardous goods, live animals, and valuable goods. Furthermore, a bonded warehouse, among other specialised infrastructure, is instrumental

in facilitating the transit of goods and products that would allow Oman to become an air cargo hub that supports hub activities. These developments would enable foreign manufacturers to operate using a facilitated movement of goods, aid e-commerce businesses to function due to the easy transit of goods, and be crucial in integrating seaports, airports, and cargo terminal facilities.

The findings also support the concept of developing different air cargo processes in Oman to achieve international standards and bring in foreign manufacturers, e-commerce businesses, and other players in the industry. Reduction in response time, enhanced compliance with international standards such as the IATA, simplified processes, the implementation of better support and policies, and procedures for air cargo are some of the recommendations suggested by this research.

According to prior studies, establishing a successful air cargo sector required having a strategic location, building connectivity, establishing value-added services (such as labelling, packing, and assembly), expanding capacity (including cargo transit and transshipment capacity), multimode transportation, presence of global air cargo carriers, business centres (such as regional headquarters), and regional distribution centres of international companies. These encourage private sector participation and the development of innovative infrastructure and processes in the sector (Alam, 2013; Drljača, 2017; Fernandes and Rodrigues, 2011; Jie Yin, 2018; Lam and Ramakrishnan, 2017). Sheffi (2012) likewise mentioned that a logistics hub requires six drivers: a favourable location, stakeholder collaboration, value-added services, establishing infrastructure, human capital skillset development, and efficient and supportive government.

The study achieved its stated aims and objectives and answered the following research questions:

1) How can Oman achieve a larger air cargo market share?

This study found that Oman should stimulate air cargo demand and capitalise on its geostrategic position by transforming itself into a regional distribution centre for time-sensitive commodities that must be transported by air such as aircraft spare parts, textiles, electronics, and e-commerce and pharmaceutical businesses. Also, Oman should take advantage of its political position, exploit natural resources requiring air cargo, stop air cargo leakages to attract e-commerce businesses, foreign manufacturers, and air cargo carriers. Thus, the volume of air cargo export and import in Oman can increase, and Oman's air cargo sector would achieve a larger market share.

2) In what capability and capacity can Oman develop its air cargo sector?

This study found that to build air cargo capacity and to accommodate and motivate the export and import of greater air cargo volumes (stimulating air cargo demand), and air cargo sector development, the following areas need to be addressed: the establishment of a sea-to-air hub and free trade zones; improvement in customs and government agency policies; coordination between air cargo stakeholders and air cargo processes; and the development of specialised infrastructures, such as perishable goods, pharmaceuticals, agriculture goods, hazardous goods, valuable goods, cold chain facilities, and live animal centres.

3) What advantages will the development of air cargo provide to the Omani logistics sector?

Developing air cargo would give Oman's logistics sector more flexibility to accommodate market needs, support the transshipment of goods, allow manufacturers to assemble raw materials coming by sea and ship the final product by air, and facilitate the consolidation/deconsolidation of goods more efficiently. Hence, Oman's logistics sector would encourage foreign manufacturers, air cargo carriers, and e-commerce businesses

to operate in Oman, consequently increasing import and export activities. Adding air cargo to Oman logistic sector would support developing Oman as an integrated hub as it would provide advantages of flexibility and agility to accommodate more logistics stakeholders. It will give them an advantage of customising their shipment, storage, and assembly strategy by using both the air and sea logistics hubs.

4) What are the advantages of Oman's strategic location that would support its air cargo sector development?

This study found that Oman's geographical location provides the air cargo sector with a unique opportunity for significant growth, and it is linked to air cargo development strategies identified in the current study. The data derived in this study supports the notion that Oman's location can be a catalyst for exponential growth in air cargo volumes, stimulating additional traffic as demand increases and, consequently, attracting air cargo carriers such as integrator, all-cargo carriers, and combination carriers. Oman's strategic location provides a competitive advantage to the country over its Middle Eastern neighbours.

The current study's findings regarding the advantages of the strategic location to develop the air cargo sector are also backed up by the literature. Oman is named as the jewel of the GCC and the Middle East because of its geostrategic location on the Strait of Hormuz in the Arabian Peninsula, which is one of the main areas involved heavily in logistics operations (Taderera et al., 2018). Oman's strategic location allows the whole logistics industry to be one of Oman's economic supports, and it gives Oman access to the global shipping market. (Abdul Rahman et al., 2021). Also, Oman's strategic location could serve as a competitive advantage for local and foreign investors who can contribute significantly to the country's development through logistics businesses (Oxford Business Group, 2019). The Implementation Support and Follow-up Unit (ISFU) has also

mentioned that Oman's geographical location provides the logistics sector with a unique opportunity for significant growth as it is viewed as the gateway of the Arabian Gulf to the world (ISFU, 2019). Oman's location makes it an ideal distribution hub for the Indian subcontinent, nations in East Africa, and beyond.

Chapter Six: Contributions to Professional Practice and Academic Knowledge

6.1 Contributions to Professional Practice and Academic Knowledge

The current study has contributed to professional practice and academic knowledge by conducting significant, original, and extensive research to achieve its aim of conceptualising the Oman air cargo sector's future development strategies in order to achieve the SOLS 2040 goals and enhance Oman's logistical footprint in the region. Recommendations based on the findings have been made to assist the government of Oman and related stakeholders in improving Oman's logistics industry by focusing on specific strategies for air cargo development to boost non-oil income and diversify the country's economy.

The current study's vision of the future for Oman comes from the understanding that being ready for the future requires knowledge-based developments and responsiveness to the changes taking place. The aims also took into consideration the fast-paced developments of air cargo, which may require revolutionary changes across the board to find consensus on the way forward for a better future of Oman.

Throughout this study, there is compelling evidence that air cargo sector operations are closely linked to regional economic development. Air cargo traffic and the demographic makeup of urban areas enjoy a positive relationship, as reflected in employment and wages (Lakew and Tok, 2015). Air cargo is a facilitator of financial growth because it creates employment and adds value to an economy. It strengthens connections in global trade and attracts foreign capital investments (Yuan et al., 2010). De Lima et al. (2007) remind us that air cargo is a strong force in industrial development and promotes imports and exports. Statistics prove that air cargo volumes and incomes

are increasing substantially annually (Research and Markets, 2020). Thus, air cargo is a mainstay of economic development, contributing immensely to world prosperity, particularly in an industrialised world. Because air cargo is a vital element of the global supply chain and international trade, it encourages economic expansion for better integration and new employment opportunities.

Despite the air cargo business showing positive performance and trends, minimal importance and attention has been given to the sector in the Oman Logistics Strategy 2040. Therefore, this study has called on practitioners to play their roles in implementing the strategies identified by this research after a thorough qualitative and quantitative data analysis. The recommendations in this study can light the path to securing greater market share from the growing air cargo trade in the global and Middle East market. The most essential strategies for building capacity in the air cargo industry in Oman are capitalising on the country's geostrategic location, establishing a sea-to-air hub and free trade zones; improving the policies of customs and government agencies; creating better coordination between air cargo stakeholders and air cargo processes; and developing specialised infrastructures (see Figure 6.1).



Figure 6.1 Oman Air Cargo Sector Development Strategy.
Source: Author

From a theoretical and academic knowledge perspective, the study's findings significantly contribute to the existing body of knowledge and theories concerning air cargo development strategies as there are no previous studies that have explicitly focused on Oman's air cargo to enhance logistics in Oman. In fact, with the exception of a study by Chang et al. (2007) in Taiwan, no other known studies in the world concerning air cargo sector development have been identified. Future researchers will be able to generalise and apply the empirical results to explore development opportunities in different associated air cargo sectors. The present study has generated a conceptual model

to develop the air cargo sector, and future researchers can take it further to investigate and explain various related phenomena and develop their own theories.

6.2 Recommendations and Future Investigations

Following the conclusions and the findings established in the study, it is essential to make recommendations for improvement and future investigations. The study strongly recommends that the air cargo industry in Oman should be given more consideration as part of Oman logistics sector and SOLS 2040 objectives as they now have a very good blueprint of the milestones that are necessary to improve and integrate the logistic sectors to help achieve economic diversification.

Moreover, the study confirms that Oman's air cargo sector can stimulate air cargo demand by capitalising on Oman's geostrategic location and should strive to build its capacity and capabilities to be able to attract clients from all over the globe. This is a fact that will increase the volume of exports and imports and secure market share from the growing air cargo market in the global and the Middle East.

Further, the current research recommends that investment in research and development should be a continuous strategy in the air cargo industry for monitoring the market trends and identifying new challenges and opportunities; the current pandemic is the best example of the air cargo market's modern context and trends as there has been a shift to the more flexible air cargo system in the digital era and a paradigm shift to e-commerce. Thus, the air cargo system needs to monitor the market continuously.

The results have also revealed that the global logistics business has greatly contributed to economic development and growth in different countries, suggesting that a decision to shift focus from oil and gas to air cargo and logistics, in general, is a viable idea. This argument is supported by Ba-Awain and Daud (2018), as they stated there is a

need for alternative economic drivers, like logistics, to promote the economic growth of Oman. However, research on the impact of air cargo activities on Oman's economic growth is still lacking.

Additionally, the study recommends creating an independent department, or team, to manage Oman's air cargo sector from a strategic point of view, as in the current situation there is no ownership of air cargo sector development. This is because air cargo does not fall under the purview of the Ministry of Transportation or the Public Authority for Civil Aviation. What the current study is looking for is a department to understand the changes that have taken place, or will take place, in the air cargo industry, and focus their resources to take advantage of the future growth that is waiting on the doorstep. The department in question should also be responsible for managing the identified strategies in the present study, implementing them, designing a comprehensive plan (including societal, economic, and environmental factors as advised by material flow theory), and selecting the right business models for Oman's air cargo sector development. For example, should developing and operating air cargo be a joint venture? Shared development and management could be done through a combination or consortium of air carriers, or through a tenant model, or even by third-party management and development of the air cargo property. Another role for the proposed independent department is being responsible for setting up objectives and a comprehensive air cargo business development plan to attract customers. This should include identifying the strengths and weaknesses of the regional market, coordinating with government agencies, checking required air cargo facilities and services to attract air carriers, and developing a wide range of supporting businesses within Oman's air cargo sector.

For further study, the research recommends that future scholars consider increasing the study's target population to include different countries in the same region

to compare the findings. They could also examine the national air cargo sector market in a regional context, as Oman is surrounded by very successful air cargo hubs in the region (Dubai, Doha, and Abu Dhabi); however, Oman has other advantages over these regional air cargo industries, such as a strong geostrategic position, which still needs to be explored.

In addition, future scholars can consider researching the impact of air cargo activities on Oman's economic growth, as highlighted by the current and previous studies. Another area which needs researching is the adoption of technology in Oman's air cargo because technology is paramount for overall success, and this should be applied in all departments and strategies. Fundamentally, technology is founded on the concept that the modern business environment is characterised by technological solutions and innovations, which can reduce costs and enhance service delivery in terms of efficiency and timeliness. Interestingly, there are contradictory opinions about the adoption of technology in air cargo: some scholars support the adoption of technology, while others do not. Larrodé et al. (2018) believe technology is the most important strategy supporting air cargo. Supporting this argument is Solomon (2013), who stated that technology would improve the accuracy of the information, decrease the chances of human error, increase efficiencies across the air cargo supply chain, and move cargo faster; as a result, technology would create cost savings that affect the bottom line. On the contrary, Yoon and Park (2015) observed that technology could not help the air cargo sector as it needs high costs to be installed, making it an undesirable strategy.

Future scholars should look into the impact of the new desert highway between Oman and Saudi Arabia, the Gulf's largest economy, on air cargo and Oman's logistic sector in general, as well as evaluating current research findings such as transforming Oman into a regional distribution centre and sea-to-air hub, leveraging Oman's

geostrategic position as Oman never had direct road connections with Saudi Arabia even though they share a border. Also, how will the new road benefit Oman's air cargo and logistics sectors? Given the possibility of a safer and less expensive alternative route for shipments through the Strait of Hormuz, this can represent a massive shift in maritime routes.

6.3 Study Limitations

The research plan was carried out successfully although the entire process faced a few limitations. First, there are methodological limitations associated with using only two organisations in the qualitative stage. Both organisations are government-owned, limiting the depth and width of the study's findings and giving a one-sided perspective. Future researchers could use various organisations to represent the private sector in Oman as it is also important to developing the air cargo sector. Second, the study focuses on identifying strategies and initiatives and does not touch upon prioritisation and implementation plans, mainly because adding the implementation phase is beyond the scope of the thesis; thus, it is recommended that future researchers consider focusing on prioritisation and implementation plans for the strategies and initiatives to develop the Oman air cargo sector that were identified in this thesis. Third, in the context of scope, the study focused on Oman's scenario only; hence, it did not have the opportunity to compare with different countries for stronger and perhaps more reliable conclusions. The study highlights Oman's competitive advantages in developing its air cargo sectors, such as strategic location and political position, but does not touch on competitive risk. Oman is a neighbor to the largest airline operators in the world—the UAE, which owns Etihad and Emirates airlines and Qatar, which owns Qatar Airways. Thus, studying the competitive risk for Oman's air cargo sector should be part of potential future research.

Fourth, the research aims and objectives were formulated broadly, covering the development of the whole sector; the reason was the lack of previous studies focusing on air cargo sector development. Usually, existing literature is used as a foundation for the researcher to build upon to achieve study objectives. A lack of previous studies prevented the researcher from narrowing the current study's scope of work. Future researchers could more narrowly focus on one or two strategies identified in the present study. Fifth, there were constraints in terms of health risks as the study was carried out amidst the global pandemic of COVID-19, which rendered meetings nearly impossible due to different government containment measures. As such, the data collection process was finally limited to online surveys instead of the previously intended plan of conducting of face-to-face surveys. Sixth, the depth of discussions in the current research could be compromised as the researcher is a practitioner who doesn't have many years of experience writing large-scale academic papers compared to experienced scholars. For the same reason, the researcher chose to study a DBA instead of a traditional PhD as the DBA focuses on contributing to practice. Finally, time was a constraint as the researcher is a full-time employee who works nine hours a day and is required to travel eight hours every weekend from work to home, making the time to conduct research activities very tight.

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Appendix A Interview Questions

Interview Questions

Introduction to the Interview

The main aim of this interview to find in-depth information about the best strategies to develop Oman's air cargo sector.

(Purpose) If you do not mind, I would like to gather some brief information about who you are, e.g., educational background, career experience, and responsibilities in your current organisation.

Interview Body

Topic 1: Oman's Air Cargo Capability and Capacity (Infrastructure, Tools, Processes, Technology, and Human Capital)

1. What are the **infrastructures** required to develop Oman's air cargo sector?

Hint: Infrastructures like air cargo buildings (e.g., warehouses), transfer/truck loading space/area, aprons for aircraft parking, landside access, parking space for employees, and terminal of air cargo that cargoes are loaded, offloaded/unloaded

2. What are the **tools** required to develop Oman's air cargo sector?

Hint: Tools like weighing devices, forklifts, refrigerators, thermometers, security screeners.

3. What is the **process** required to develop Oman's air cargo sector?

4. What are the **technologies** required to develop Oman's air cargo sector?

Hint: Technologies like blockchain technology, artificial intelligence, automation, and robotics

5. What are the **human capital** skills required to develop Oman's air cargo sector?

Topic2: Air Cargo Partnership

1. How would the Oman air cargo sector model be able to attract air cargo carriers or additional integrators?
2. How can we establish partnerships with air cargo carriers to channel more imports/exports via Oman?

Topic 3: Create Demand for Air Cargo Sector

1. How can we attract more air cargo traffic in Oman?
2. How can we enable air cargo traffic for Oman's industries?

Topic 4: Air Cargo Sector Promotion

1. How can we increase visibility to attract industry players, investors, and anchor tenants to Oman's air cargo sector?
2. How can we open new markets and enable air cargo growth through Oman's airports to new destinations?

Topic 5: Air Cargo Connectivity

1. As you know connectivity impacts air cargo positively; how we can increase connectivity and networks for Oman's air cargo sector?
2. How can we increase the competitiveness of Oman's air cargo for timely perishables delivery through improved connection times?

Topic 6: Free Zones and Air Cargo Development

1. What do you see as the potential of free zones in air cargo development?
2. What is the airport free zone infrastructure required to enable the air cargo sector?
3. What free zone policies and procedures need to exist to make Oman attractive and enhance the air cargo sector?

Topic 7: Sea-to-Air Hub and Air Cargo Development

1. Are there some impacts of the sea-to-air hub on air cargo operations that would affect the success of SOLS 2040?
2. Where do you see as the potential for sea-to-air cargo in Oman (e.g., Salalah, Duqum, Muscat, or Sohar)?
3. Which industries do you consider most promising for sea-to-air cargo?
4. How can we promote Oman as a sea-to-air cargo hub?
5. What capabilities need to be established for sea-to-air cargo and enhancing facilities?
6. What is the benefit of Oman's geographic location on its air cargo industry?

Topic 8: Air Cargo Customs Procedures and Processes

As you know, customs and security processes and protocols need to facilitate air cargo business requirements across all airports.

1. What types of changes will be required in the **legislation and customs** process to develop the air cargo sector?

Closing

Is there any more information that relates to the study topic that you feel is important to share with me?

Appendix B Nodes (Coding)

Nodes (Coding)

Stimulating Air Cargo Demand

- Providing financial incentives
- Transform Oman into a regional distribution centre for time-sensitive commodities capitalising on its strategic location
- Exploit natural resources that require air cargo, Such as Fish
- Leverage Oman's Political Position
- Preventing Air Cargo Leakages

Oman as Sea to Air Hub

- The location and the advanced seaports of Oman would give Sea to Air Transportation mode an advantage
- Adopt Sea to Air Transportation mode would give air cargo in Oman the flexibility to accommodate the market need
- Adopting Sea to Air Transportation mode would support manufacturers to assemble raw materials coming by sea and ship a final product by air
- Adopting Sea to Air Transportation mode would support the transshipment of goods

Establishing Free Trade Zones

- Facilitate foreign manufacturers, e-commerce, air cargo players
- Facilitate sea to air transportation mode in Oman
- Facilitate a mediating platform
- Promote Oman to become an air cargo hub

Improving Customs and Government Agencies Rules and Regulations

- Create business-oriented customs policies
- Create an easy transshipment process
- Motivate more air cargo players, e-commerce businesses and foreign manufacturers by reducing taxes and customs charges
- Make customs regulations homogeneous with international regulations
- Increase working hours to 24-7 for customs facilities

Development of Specialised Infrastructures

- Developing specialised infrastructures such as facilities for perishable goods, pharmaceutical, agriculture, hazard
- locating a bonded corridor and warehouse
- locating the free trade zone

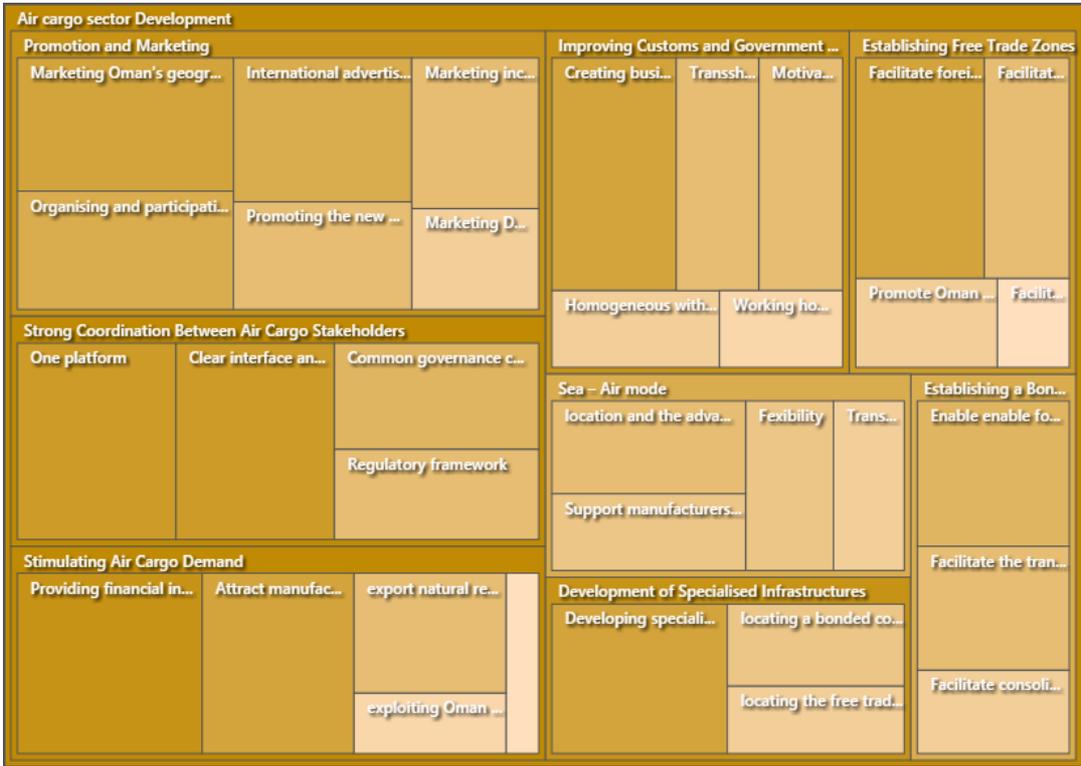
Strong Coordination Between Air Cargo Stakeholders

- Use one platform to operate between air cargo stakeholders
- Mandate a common governance committee for air cargo stakeholders
- Create a clear interface and handover process between stakeholders
- Adopt a regulatory framework between air cargo stakeholders to ensure the alignment of air cargo stakeholders

- **Establishing a Bonded Corridor and Warehouse**
 - Facilitate the transit of goods
 - Enable enable foreign manufacturers, e-commerce, air cargo players
 - Facilitate consolidation and deconsolidation

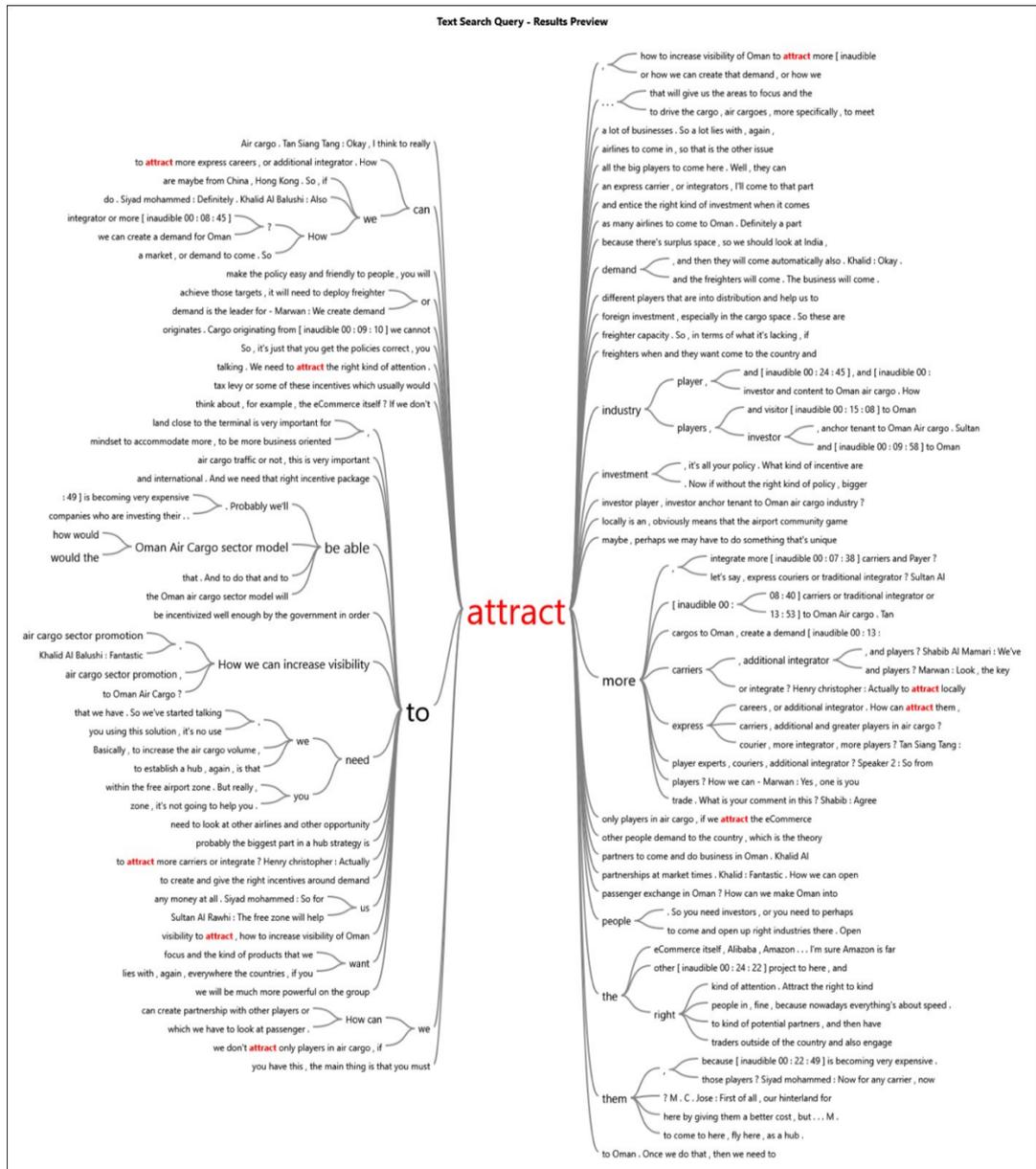
- **Promotion and Marketing**
 - Create Marketing Department For Air Cargo
 - Marketing incentive packages to attract foreign manufacturers, e-commerce
 - Organising and participating in international air cargo events
 - Promote Oman's geographical location
 - Promoting the new facilities
 - Working with international advertising agencies

Appendix C Tree Map Analysis



Appendix E Word Tree Analysis





Similarly, a number of other word trees were extracted to show the pattern of talk of the people during the interviews relating to the themes of the study.

Appendix F Instrument with Likert Scale

The University of Northampton United Kingdom

Department of Supply Chain

Address: _____

Tel: _____

You are kindly requested to join in this study concerning the conceptualisation of Oman's air cargo sector development to the success of the Oman logistics industry.

This study aims to conceptualise the Oman air cargo sector development strategies that should be established as part of the logistics sector.

It will take 10–15 minutes to complete the attached survey. Your time and effort are much appreciated.

We assure you that neither your name nor the name of your organisation will be revealed in reporting the findings of this research. Your responses will remain strictly confidential, and they will not be used for any other purpose than for this study.

Proceeding to take part of this survey indicates that you have decided willingly to volunteer as a research participant for this study, and you have read and understood the information provided in the Participant Information Sheet. <https://drive.google.com/file/d/1CpiftAkKtD-t8GF8YUTCTZ8n-ojNMf9a/view?usp=sharing>

Thank you for your attention and cooperation.

Yours sincerely,

Khalid Al-Balushi
Doctoral Candidate
Cell: +968 9189 9990

1. Your organisation/business type	<input type="checkbox"/> Air Cargo Operator <input type="checkbox"/> Airport <input type="checkbox"/> Airline <input type="checkbox"/> Customs <input type="checkbox"/> Government Agencies <input type="checkbox"/> Civil Aviation Authority <input type="checkbox"/> Freight Forwarder or Integrator <input type="checkbox"/> Logistics Company/Institute. <input type="checkbox"/> Clearing Agents <input type="checkbox"/> Logistics Academician <input type="checkbox"/> Express Mail
2. Managerial level	<input type="checkbox"/> Top <input type="checkbox"/> Middle <input type="checkbox"/> Junior
3. Gender	<input type="checkbox"/> Male <input type="checkbox"/> Female
4. Air cargo experience by years	<input type="checkbox"/> 1-2 <input type="checkbox"/> 2-4 <input type="checkbox"/> 4-10 <input type="checkbox"/> 10 years and more
5. Educational degree	<input type="checkbox"/> High school Degree <input type="checkbox"/> Bachelor Degree <input type="checkbox"/> Master Degree <input type="checkbox"/> Doctoral Degree

The given order between the range of 1 to 5 represents how much you agree/disagree with the statements:

- Strongly disagree 1
- Disagree 2
- Neutral 3
- Agree 4
- Strongly agree 5

1	Oman's Air Cargo Sector Development					
1.1	Establishing free trade zones near the airport would promote the development of Oman's air cargo sector.	1	2	3	4	5
1.2	Establishing bonded warehouses would promote Oman's air cargo sector development	1	2	3	4	5
1.3	Stimulating air cargo demand by attracting e-commerce businesses, foreign manufacturers, and air cargo carriers to operate in Oman would promote the development of Oman's air cargo sector.	1	2	3	4	5
1.4	Adopting a sea-to-air transportation hub would promote the development of Oman's air cargo sector.	1	2	3	4	5
1.5	Promotion and marketing for air cargo would promote Oman's air cargo sector development.	1	2	3	4	5

1.6	Strong coordination between air cargo stakeholders would promote Oman's air cargo sector development	1	2	3	4	5
1.7	Improving customs and government agencies would promote the development of Oman's air cargo sector.	1	2	3	4	5
1.8	Development of specialised infrastructures would promote the development of Oman's air cargo sector.	1	2	3	4	5
2	Establishing Free Trade Zones					
2.1	Establishing free trade zones would facilitate foreign manufacturers, e-commerce, air cargo carriers such as, integrator, all-cargo carriers, and combination carriers to operate in Oman, hence increasing export and import activities.	1	2	3	4	5
2.2	Establishing free trade zones would facilitate the implementation of a sea-to-air transportation hub in Oman	1	2	3	4	5
2.3	Establishing free trade zones would promote Oman to become an air cargo hub.	1	2	3	4	5
2.4	Establishing free trade zones would facilitate a platform to create a business relationship between e-commerce businesses, foreign manufacturers, and air cargo carriers at the hub, hence boosting export and import movements	1	2	3	4	5
3	Establishing a Bonded Warehouse					
3.1	Establishing a bonded warehouse would ease the transit of goods.	1	2	3	4	5
3.2	Establishing a bonded warehouse would enable foreign manufacturers, e-commerce, and air cargo carriers such as integrator, all-cargo carriers, and combination carriers to operate in Oman by facilitating product movement.	1	2	3	4	5
3.3	Establishing a bonded warehouse would facilitate deconsolidation and consolidation of goods.	1	2	3	4	5
4	Stimulating Air Cargo Demand					
4.1	Stimulating air cargo demand by providing financial incentives (e.g., fuel cost, ground handler cost, tax and customs, air cargo building rent, slots for air cargo traffic) would attract foreign manufacturers, e-commerce businesses, and air cargo carriers to operate in Oman.	1	2	3	4	5
4.2	Stimulating air cargo demand by capitalising on Oman's strategic location and providing incentives to attract manufacturers whose products need to be transferred by air, such as aircraft spare parts, textiles, electronics, e-commerce, and pharmaceutical would increase the air cargo market share in Oman.	1	2	3	4	5
4.3	Stimulating air cargo demand by exploiting Oman's peaceful and balanced political position in the region to be a distribution centre for the GCC and Iranian market.	1	2	3	4	5
4.4	Stimulating air cargo demand by prompt and coordinated export of natural resources requiring air cargo such as fish.	1	2	3	4	5
4.5	Stimulating air cargo demand by capturing air cargo leakages through building Oman air cargo capabilities and capacity as most	1	2	3	4	5

	air cargo products arrive in Oman through the UAE via land.					
5	Adopting Sea-to-Air Transportation Hub					
5.1	Adopting a sea-to-air transportation hub would give air cargo in Oman the flexibility to accommodate market needs.	1	2	3	4	5
5.2	The location and the advanced seaports of Oman would give a sea-to-air transportation hub an advantage over others who have developed pure air cargo.	1	2	3	4	5
5.3	Adopting a sea-to-air transportation hub would support the transshipment of goods.	1	2	3	4	5
5.4	Adopting a sea-to-air transportation hub would support manufacturers to assemble raw materials coming by sea and ship final products by air.	1	2	3	4	5
6	Promotion and Marketing					
6.1	Marketing incentive packages such as financial incentives, access to airports, free trade zones, and a bonded corridor would attract foreign manufacturers, e-commerce businesses, and air cargo carriers to operate in Oman.	1	2	3	4	5
6.2	Promoting Oman's geographical location as a logical distribution hub for nations in East Africa and the Indian subcontinent and as the gateway to the Gulf would promote Oman's air cargo sector.	1	2	3	4	5
6.3	Marketing through organising and participating in international air cargo events would attract air cargo carriers to choose Oman as a hub.	1	2	3	4	5
6.4	Working with international advertising agencies would attract air cargo carriers, e-commerce businesses, and foreign manufacturers to choose Oman as a hub.	1	2	3	4	5
6.5	Promoting the new facilities would encourage foreign manufacturers, air cargo carriers, and e-commerce businesses and to choose Oman as a hub.	1	2	3	4	5
6.6	Developing marketing departments for air cargo would attract more foreign manufacturers, e-commerce businesses, and air cargo carriers to operate in Oman.	1	2	3	4	5
7	Strong Coordination Between Air Cargo Stakeholders					
7.1	Strong coordination between air cargo stakeholders would provide a clear interface and handover process between different air cargo entities.	1	2	3	4	5
7.2	Strong coordination using one platform to operate between air cargo stakeholders would allow air cargo entities to ease the business and reduce the time and cost.	1	2	3	4	5
7.3	Strong coordination by mandating a common governance committee would ensure the alignment of air cargo stakeholders.	1	2	3	4	5
7.4	Strong coordination by adopting a regulatory framework would ensure the alignment of air cargo stakeholders.	1	2	3	4	5
8	Improving Customs and Government Agencies					

8.1	Improving customs and government agencies by creating an easy transshipment process would attract more air cargo volume.	1	2	3	4	5
8.2	Improving customs and government agencies by creating business-oriented customs policies (e.g., bonded corridor policy, free trade zone policy, airport cargo terminal policy, and clearance policy) would attract more air cargo volume.	1	2	3	4	5
8.3	Improving customs and government agencies by increasing working hours to 24/7 for customs facilities would attract more air cargo volume.	1	2	3	4	5
8.4	Improving customs and government agencies by reducing taxes and customs charges would motivate more e-commerce businesses, foreign manufacturers, and air cargo carriers to operate from the hub of Oman.	1	2	3	4	5
8.5	Improving customs and government agencies by making customs regulations homogeneous with international regulations would enable e-commerce businesses, foreign manufacturers, and air cargo carriers to operate from the hub of Oman.	1	2	3	4	5
9	Development of Specialised Infrastructures					
9.1	Developing specialised infrastructures such as facilities for perishable goods, pharmaceuticals, agriculture, hazardous goods, and live animal goods would enable e-commerce businesses, foreign manufacturers, and air cargo carriers to operate from the hub of Oman.	1	2	3	4	5
9.2	Developing specialised infrastructures by locating a bonded warehouse near the airport would enable e-commerce businesses, foreign manufacturers, and air cargo carriers to operate from the hub of Oman.	1	2	3	4	5

For any ideas to develop the Oman air cargo sector please add below

THANK YOU FOR YOUR COOPERATION

Appendix G Permission to Conduct Case Study Research

**OMAN
AVIATION
GROUP**
المجموعة العمالية للطيران

Ref: OAG - SCM - 1492 -2018

Date: 9th December 2018

Khalid AL Balushi

Lead – ICV

Subject: Permission to Conduct Case Study Research

This letter confirms that there is no objection to your proposal to undertake case study research at Oman Aviation Group(OAG) and its Business Units (Oman Air, Oman Airports, Oman Aviation Services) in order to fulfil the requirements of your Doctoral degree on the Topic: Role of Developing Oman Aviation Sector on Sultanate of Oman Logistics Strategy (SOLS 2040).

The main objectives of this research are understood to be:

1. To determine the factors affecting Oman to achieving the SOLS 2040 Objective as Global logistics hub;
2. To determine the actions and strategies to be undertaken in order to develop Oman as a Global logistics hub;
3. To determine the contribution of the Oman aviation sector towards achieving the SOLS 2040 Objective of developing Oman as a logistics hub.
4. To determine the contribution of the Oman Aviation Sector on employment growth, GDP, and investment.

All interviews, questionnaires, surveys and documents analyses are approved providing they are conducted in full adherence to OAG and University of Northampton research ethics and integrity protocols.

Sincerely,



Mustafa Mohammed Al Hinai
Group Chief Executive Officer

414-2018



Appendix H Summary Study Diagram

