



## The Challenges and Opportunities in SCL Optimization of SME Cargo Companies in Muscat, Oman

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### Abstract

**Purpose:** the aim of this study was to identify the challenges faced by SME companies, to understand the opportunities and challenges in supply chain and logistics sector and to analyze best practices and techniques in optimization of supply chain and logistics.

**Design/methodology/approach:** this research follows exploratory research utilizing qualitative data collection method from secondary data through analysis of relevant prior academic literature in this field of study.

**Findings:** Based on the study, the major challenges faced by SMEs in Oman include lack of finance, lack of marketing knowledge, operational limitations, and Lack of entrepreneurial culture and managerial skills. The opportunities in supply chain sector included the Location, Infrastructure, Economic Opportunities and Economic Diversification of Oman along with challenges like Human Resource Competency, Competition and Connection, Technology and Transactions.

**Research limitations/implications:** Based on the results, it was recommended that SMEs should focus on improving their Human Resource Competency, gain competitive advantage through optimization of supply chain and logistics activities using technology and implementing optimization strategies.

**Social Implications:** The findings from this study have provided an academic and empirical contribution for the cargo and logistics companies and the SME community in Oman. Furthermore, provides a contextual and managerial contributions to the literature in optimization of supply chain logistics in SMEs.

**Originality / Value:** No prior studies were found addressing optimization challenges and opportunities faced by SME cargo and logistics companies. Through this theoretical study that researcher attempts to shed light and tackle this situation.

**Keywords:** SMEs Oman, Supply Chain and Logistics, SME Cargo Companies, Porter's Value Chain, SMEs Challenges, SMEs Opportunities

## 1.0 Introduction

The supply chain and logistics industry are a major player in providing customers with the best service in terms of transportation, storage, and is considered by most organizations at the forefront in delivery of the products. In their research, researchers (Uzorh & Innocent, 2017) define supply chain as an integrated process in which different entities of a businesses like distributors, manufactures, retailers, and suppliers work hand-in-hand to control, coordinate and plan the flow of finished goods, parts, and materials from suppliers to customers.

The recent research suggests that SMEs in Oman face numerous challenges when it comes to scaling and growing of the business. This is confirmed by (Al-Bulushi & Bagum, 2017), their research emphasized that eventhough 74% of the SMEs in Oman had the potential to expand and grow their business operations, they need high levels of support in terms of finance, managerial, and leadership. SMEs faced issues with increasing customer base as they did not have enough resources to properly manage this rise. Furthermore, Ramachandran and Al-Yahmadi (2019) emphasizes that the reluctant nature of the SMEs in utilizing modern technology along with lack of experience and expertise limits business growth. This is applicable to SME companies in the cargo and logistics sector as well.

In recent times with more than 30% rise in the number of SMEs in Muscat by the end of November 2021 compared to the year 2020, more and more SMEs are exploring various ways and advanced technologies available to add value to their business and enhance customer service to stay on top of the competition (The Arabian Stories, 2022).

Supply chain optimization is defined by (Kocaoğlu et al., 2018) as the process through which organizations can minimize operating cost, maximize gross profits, and ultimately be able to provide successful service to their customers. (Shahri et al., 2016) emphasizes on the supply chain practices of SMEs in Oman, where the researcher highlights optimization of supply chain activities and integrating IT technologies as the crucial aspect in adding value, enhancing customer experience, and gaining competitive advantage for SMEs in Oman. Furthermore, the researcher emphasizes that a well- executed optimization of supply chain can reduce a major chunk of operation cost in attribute to flow and material handling. Therefore, without a doubt, identifying various challenges and opportunities in the supply chain and logistics optimization is crucial so that SMEs will be able to address these challenges and make use of the opportunities present to them.

## 1.1 Research Questions

1. What are the current practices in optimizing supply chain and logistics activities in SME cargo companies?
2. What are the challenges in the primary activities and sub-activities of the SME cargo companies in Muscat in optimizing supply chain and logistics?
3. What are the major activities which add value in contributing optimization of supply chain and logistics activities?
4. What are the various opportunities for SME cargo companies operating in Muscat?
5. What are ways that help SME cargo companies to ensure that supply chain and logistics activity optimization is achieved?

## 1.2 Research Objectives

1. To identify and analyse the supply chain and logistics optimization across SME cargo and logistics companies in Muscat.

2. To examine and understand the challenges that SME cargo companies face in their supply chain and logistics activities optimization in the primary value chain activities and sub-activities.
3. To investigate the major activities that contribute value to optimization of supply chain and logistics optimization in SME cargo companies.
4. To evaluate and analyse opportunities for supply chain and logistics optimization in primary activities and sub-activities of Porter’s Value Chain in SME cargo companies.
5. To formulate recommendations to SME cargo companies on various measure to enhance supply chain and logistics activities optimization and add value across primary activities and sub-activities.

### 1.3 Statement of Research Problem

In recent years, there has been a significant rise in the number of SME companies in Muscat. In addition, the supply chain and logistics sector has been identified as one of the sectors the government of Oman is focusing on the shift from oil-based to diversified economies. However, there are certain challenges and opportunities for the SME cargo companies in optimizing their supply chain and logistics activities in Muscat. Eventhough, there has been some studies in the field of logistics and supply chain within Oman, there aren’t studies that focus on the challenges and opportunities faced by SMEs in Muscat as the key indicator being optimizing their logistics and supply chain performance on objective measures of in-bound logistics, operations, outbound logistics, marketing and sales, and services to increase profitability and efficiency.

## 2.0 Literature Review

There are many challenges faced by SMEs in Oman currently as discussed by Al-Bulushi and Bagum (2017). Furthermore, the challenges and opportunities in the supply chain and logistics sector still haven’t explore to an adequate extend. The following literature review shows that supply chain optimization at any level will help organizations reduce cost, increase efficiency, enhance competitive advantage, increase profitability, and customer satisfaction.

### 2.1 Theoretical Framework

The theoretical underpinning of this research is based on the Michael Porter’s value chain analysis theory. This was first introduced in 1985 in the book “Competitive Advantage” by Michael Porter. Michael Porter’s value chain was mainly aimed at analyzing the “internal activities” of any business to identify and understand the cost of each activity which adds value to the business. According to Porter’s value chain theory, this will help increase the efficiency and profitability of the business. Furthermore, the organization’s activities were mainly classified into two groups- primary and secondary activities (Sutarmin & Jatmiko, 2016). The activities which directly had an impact on the service or product is referred as the primary activities, while those activities which supported the primary activities is referred as support activities. In the following table (1), the researcher provides a brief description of the primary activities in the Porter’s Value chain analysis.

*Table 1. Porter’s Value Chain Activities, Source:(Vattikoti, 2018)*

Porter’s Value Chain Activities		
Primary Activities		
1	Inbound Logistics	All the business processes related to receiving, storing, and distributing inputs internally falls under this sub-activity. For creating value, supplier relation is key factor.

2	Operations	Business transformational processes which converts inputs into outputs where operational systems create value.
3	Outbound Logistics	These activities are the storage, collection, and delivery systems which deliver your service to customer. These activities can be external or internal to your business.
4	Marketing and Sales	These are activities through which your business persuades clients to choose your service over competition- benefits offered, efficiency in communication are key factors in creating value.
5	Service	The activities offered to customers after delivering of product or service.

The following diagram depicts the Porter’s value chain and its activities.

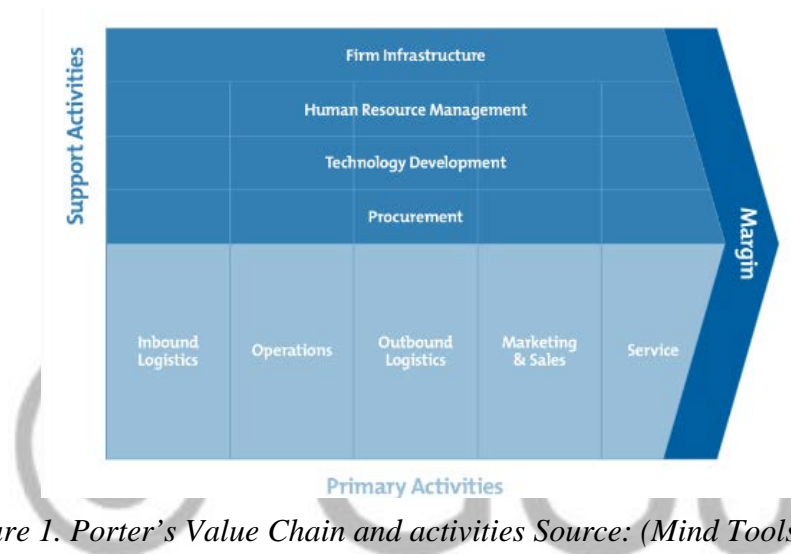


Figure 1. Porter’s Value Chain and activities Source: (Mind Tools, 2022)

In the research by (Kumar & Rajeev, 2016) the researchers have emphasized value chain depends on the cost structure and pricing strategy. Furthermore, they concluded that it helps businesses to reanalyze their pricing on services or products encouraging them keep their competitive advantage high. For businesses to conduct a porter’s value chain analysis, there are three steps according to Michael Porter (1985). Firstly, analyzing the amin activities involved in providing service or product. Then, each products value must be assessed and checked if provides a cost differentiation or advantage to business. Finally, the business must develop strategies which can be used in supporting weak areas in supply chain and used to double competitive advantage.

## 2.2 Overview of SMEs in Oman

### 2.2.1 SME Definitions

According to (Thanh, 2022), there is no definition given to SMEs that is accepted universally as among countries there are differences in the social, cultural, and economic factors. Many entrepreneurs have started small business organizations, also known as small and medium enterprises, due to challenges related with the ease of getting resources for use in beginning a firm (SMEs). The number of employees working for a company and the total amount of income the company generates are the only factors used to classify small and medium-sized firms (Doran et al., 2018). In Oman, the Supreme Council for Planning defines medium enterprises as businesses having up to 100 employees with an annual sale of RO 250,000 and RO1.5 million, small enterprises as businesses with five to twenty employees with annual sale between RO

25,000 and RO 250,000, while microenterprises as having up to five employees (Pauceanu, 2016). According to (Times of Oman, 2022), the total number of SMEs registered in Oman reached 73,741 at the end of March 2022 compared to 51,663 in 2021 during the same period with an increase of 42.7 per cent. The statistics report also showed that according to NCSI, the largest number of SMEs is in Muscat at 24,977.

*Table 2. Classification of SMEs in Oman, Source:(Zainab, 2020)*

Category	Number of Employees	Financial Revenue (RO)
Micro establishments	1 to 10	Less than 150,000
Small establishments	11 to 50	150,000-1,250,000
Medium establishments	51 until 150	1,250,000 to 5m

### **2.3 Challenges and Opportunities for SMEs in Oman**

SMEs globally play a crucial role in fueling the economic growth. Promoting SMEs especially in Oman is crucial to maintain a thriving and stable economy in the long run as they act as the backbone for any long-term success and sustainability of economy. Eventhough SMEs benefit the economy in a crisis or recession by innovating and adapting as per circumstances changes, in Oman SMEs can be most vulnerable in part due to lack of resources to adapt to changes and provide services to customers (Cherian, 2020). SMEs in Oman has seen an increase of 46.9 per cent by 2022. However, there are various challenges faced by SMEs and these challenges if not addressed could limit growth of SMEs and even lead to shutting down before they cross the five-year threshold.

In considering the challenges for SMEs in Oman, Mubarak and Mondal (2019) observe that SMEs are facing some serious challenges in terms of lack of skill and administrative knowledge, access to finance, and administrative challenges. The study was conducted using both qualitative and quantitative data which targeted around 250 SME. The study established that 34% of SMEs agreed to having lack of competent and adequate management and managerial skills. These SMEs have been deploying their strategies through trial and error based on operational procedure rather than strategic plans. SMEs are not able to acquire or retain qualified personnel due to lack of resources. This is because SMEs most of the time find it difficult to meet minimum requirements stipulated by the bank or banks are not willing to extend credit facilities as SMEs lack collateral to guarantee loans. The period taken for approval of loan is also relatively high. Furthermore, the study also addresses lack of marketing strategy, changing government policies, lack of entrepreneurial culture, and lack of morale support as key challenges faced by SMEs in Oman

As for Ramachandran and Al-Yahmadi (2019) , their study aimed to identify challenges faced by SMEs in Oman identified the main challenges of SMEs as lack of basic business knowledge, adequate finance, market information and knowledge, and the delay and complicated procedures in loan disbursement. The study investigated on the reason for failure of acquiring a bank loan and identified poor business performance and inadequate business planning as the main hurdles. Furthermore, the researcher emphasized on the SME needs in terms of adequate finance, training, and teaching of entrepreneurial culture within students.

In a study by Al-Bulushi and Bagum (2017) on Growth strategies of SMEs in Oman, aim to determine the major challenges and issues related to growth strategies in SMEs. Through qualitative and quantitative approach, the researchers emphasized on four major constraints of growth including constraints in human resource, marketing, financial and operational

management. The research concluded the following as factors that create challenges for SME's growth and if dealt with will increase value of SME businesses.

*Table 3. SME growth strategies factors, Source: (Al-Bulushi & Bagum, 2017)*

Major constraints	Challenges and issues
Finance	- Lack of long-term loans and credit facility - Cost of finance - Working capital management
Marketing	- Lack of marketing knowledge and budget - Inability to identify new markets due to lack of R&D
Operations	- Lack of basic business function knowledge - Technological limitations - Environmental Issues
HR	- Lack of entrepreneurial culture and managerial skills - Lack of professionalism - Lack of resources and knowledge to hire related employees

The literature shows that there is some shared agreement among various researchers and scholars on the existence of certain challenges for SMEs. The main challenges identified by researchers include lack of finance as SMEs find it hard to secure loans due to lack of assets or other constraints, delays cause by lengthy process in attaining financial support, limitation in marketing due to lack of budget or knowledge of market, training, and limitations in operations with outdated technology, and lack of basic knowledge on business functions and entrepreneurial culture among local youth.

## **2.4 Opportunities in the Supply Chain and Logistics Sector in Oman**

In the next few years especially with infrastructure integration in various crucial sectors, it is expected by many economists that Oman will emerge as a leader in the logistics and supply chain sector. As in addition to Oman government outlaying billions in optimizing and advancing SCL sector to reach the nations targets, and Oman already having excellent trade agreements and international economic relations with most vital world countries of business, this allows Oman to advance its SCL sector even further.

**Location:** With connections from the Indian subcontinent to the east, and Middle East to Pakistan, Africa to the south, and Iran to the north Oman has long been recognized as a major trading hub. But Oman has only recently begun to fully capitalize on its advantageous location and seize the opportunities afforded by positioning itself as a major Middle Eastern logistics hub with hopes of becoming a significant worldwide player in this industry, following the implementation of the "Tanfeedh" program (Simpson, 2018).



*Figure 2. Oman's Strategic Location, Source: (Taderera et al., 2018)*

As for (Taderera et al., 2018), in their study aimed at analyzing the supply chain practices in Oman vs global best practices describes Oman's location as the jewel of the Middle East and strategic location of GCC on the Gulf of Hormuz which is involved heavily in supply chain. In addition, the importance of Oman's location is emphasized by Ba-Awain and Daud (2018) as Oman is the only member of the GCC to be located beyond the Gulf of Arabia and thus avoid passing via the politically sensitive Strait of Hormuz is crucial to the country's standing in this regard. Thus, Oman has a substantial opportunity with its unique location, geopolitical allocation, strong economic relations, global investments, and the economy being naturally into the seaport logistics and global supply chain.

**Infrastructure:** Several mega projects have been implemented by Oman related to infrastructure development. Infrastructure networks have become increasingly important in recent years enabling its logistics connectivity through connecting a nation's territorial and economic system (Bulletin, 2017). The construction of infrastructure that enables the development of various industries, private sectors, and regions is one of the pillars of economic growth (Azolibe & Okonkwo, 2020). According to Virgilli (2018), the logistics sector was granted the status of infrastructure in November 2017. A significant qualitative shift in the SCL sector was undertaken in providing road networks linking all parts of region. By building a road network that connects all the country's regions and portions, the logistics and supply chain sector in Oman participated in a significant qualitative transformation. New Muscat Airport, Salalah Airport Improvements, and Duqm & Sohar Ports are the most important recent projects. In the year 2016, Oman's infrastructure grew by 3.4% compared to 2015 (Al-Ghassani et al., 2018). In the report by Mark (2017), illustrated that heavy investment has led to a steady flow of projects in non-oil industries like infrastructure for rail, transport, power, and construction.

**Economic Opportunities:** Creating more employment opportunities is one of the key objectives of Oman government in the process of shifting towards SCL and boosting economic diversification. According to Virgilli (2018), this shift creates growth in specific sectors by 15-40% per year and employ over 45 million people across the nation. Furthermore, as per (Al-Ghassani et al., 2018) creation of more job opportunities and providing low costs in export and import activities will be possible. Moreover, the OSS initiative in the freezones helps SMEs set up and operate their businesses effectively and efficiently. OSS offers several essential services through a single window with improved resources to provide high-quality services (Mark, 2017). Free zones in four different locations that are connected to modern ports, accurate, flexible, and quick clearance of goods, all present business potential for SME freight and logistics operations.

**Economic Diversification:** As there exists fluctuations in oil prices last few years, high production cost, and deterioration in production capacity Oman economy was described as

dangerous in the book by (Al-Ghassani et al., 2018).to enhance economy and settle earnings economic diversification is crucial. According to (Mubeen et al., 2017), Oman must employ plans and policies on economy diversification, employment opportunities, controlling inflation, and creation of new technologies. This is beneficial for SMEs as they have the capacity to undertake this requirement.

The literature shows that there is some shared agreement among various researchers and scholars on the opportunities in the logistics sector in Oman. The main opportunities include geographical advantage of Oman in terms of location, heavy investments in non-oil sectors and constant flow of new infrastructure projects resulting recent growth in infrastructure, economic opportunities through increase in number of ports through initiatives like OSS (One-Stop-Shop) and enhanced economic diversification through plans and policies.

## **2.5 Challenges in the Supply Chain and Logistics Sector in Oman**

**Human Resource Competency:** There are various challenges existing in the SCL sector in Oman. These challenges pertain as a hurdle in achieving the establishment and growth of SMEs in the logistics sector. The lack of qualified workers with expertise and training in the logistics and supply chain industry is Oman's first challenge. In the study by (Al-Wahaibi & Humaiyid, 2019) aimed to investigate the relationship between logistics hubs in Oman and political uncertainty in Gulf, the author emphasized on the logistics sector not being an attractive field for the local population due to long working hours, poor wages, and lack of automation in the industry. This is applicable to SMEs as they will be facing these same challenges with lesser resources. (Taderera et al., 2018) justifies this as the shortage of educational institutions in Oman and lack of link between career environment and higher education intuitions. Furthermore, he added that without a supporting university to provide a constant flow of highly skilled personnel and to exchange international research expertise, no industry can prosper.

**Competition and Connection:** Oman faced several external and internal challenges in the logistics sector. The competition and connection in the SCL services has increase over the past years. There are many numbers of players in the sector both SMEs, large organizations, and MNCs. This has led service providers to provide steady and attractive offers. One of the main internal challenges is the connection of network of roads, freezones, and ports. This was confirmed by Tanfeedh (2017) when the report described the existing challenge of limited connections to freezones, airports, and ports in Oman than other GCC countries. Furthermore, (Al-Ghassani et al., 2018) also shed light on the poor land transport connectivity in Oman with other GCC countries. Therefore, the external global and internal competitive and connective challenges affect in the development and growth of SMEs.

**Technology and Transactions:** According to (Ilin et al., 2019), resistance to change when a new technology is introduced in an organization due to need to transform working habit and process is almost inevitable. Several scholars also pointed out that the global economy had been significantly and successfully shaped by technological development and digital transactions. Referring to one of the most important infrastructures for the logistics trade, the changes in business practices & how they affect all of it. As for (Dębkowska, 2017), he stated that the growing competition and increasing demand of the market has forced technology based innovative solutions to support processes maximally in SCL.

Eventhough technology such as automation helps companies build competitive advantage and create new opportunities, (Virgilli, 2018) indicated that adopting modern technology and transection to new market trends is one of the most considerable challenges for organizations. Furthermore, the report emphasized that market trends and challenges need to be accepted by logistics companies. As (Al-Wahaibi & Humaiyid, 2019) pointed out that logistics operations by



2040 will be heavily relied on technology to stay competitive and cut costs. It is important that SME logistics companies also drive towards technological adoption within their SCL activities so that they are not let out of the action. According to (Chaudhari, 2019) in SCL, automation technologies, information, and communication have significantly boosted the speed of data processing, identification, transmission, and analysis while maintaining high accuracy. Hence, with increasing number of new SMEs and competition from already existing logistics companies adopting technology for various SCL activities and sub-processes is crucial to gain advantage over competition.

The literature shows that there is some shared agreement among various researchers and scholars on the existence of certain challenges in logistics sector in Oman. The main challenges identified by researchers are in terms of Human Resource Competency due to lack of qualified workers with expertise and training, Competition and Connection due to external global and internal competitive and connective challenges affecting development and growth of SMEs, Technology and Transactions as implementation of technologies such as NPL, warehouse management tools help in reducing costs, improves efficiency, and maintains high accuracy.

## **2.6 Overview of SCL Optimization and Best Practices**

Supply chain optimization can simply be defined as operating a supply chain at peak efficiency. In a study by (Pečený et al., 2020) aimed at addressing the optimization of transportation process within the logistics chain, they emphasize that the main goal of supply chain optimization is delivering products to customers at the highest level of profit with the lowest cost. The study is mainly based on secondary sources of data collected through an extensive review of academic literature already available. When there is a significant event, like a merger or acquisition, or when there are concerns about financial performance, businesses frequently think about supply chain optimization. Optimization of business processes such as In-bound Logistics, Operations, Out-bound logistics, warehousing, marketing, sales, and services will help the organization manage resources more efficiently and reduce the cost of operations. Furthermore, the study concludes that optimization is more focused around effective utilization of technology, human resource, and transportation means.

In Oman however, the increasing competition, limited resources, and the need for better standards within SME cargo and Logistics companies brings up the need for optimization of supply chain for having the competitive advantage, increased profits, lower costs, and better customer services (Syverson, 2020).

## **2.7 SCL Optimization Techniques**

In recent years, there has been significant developments and breakthroughs in the field of SCLM to make it more effective and efficient. However, there will always be room for more improvements as logistics is considered the backbone industry having direct or indirect effect on everything within any nation. This can include improvements that need long term commitments or are quick wins. The entire flow in supply chain, from the procurement of raw materials to the delivery of goods to final consumers, is included in the scope of logistics optimization. In the study aimed at systematically reviewing published papers on optimization strategies integrating production, inventory, and distribution by (Mirabelli & Solina, 2022), the authors emphasize more on the potential of transportation and warehousing improvements. The study is purely using qualitative methods for analysis. In the study the author separates optimization levels into one of the most classical ways for understanding the opportunities. These are as follows.

**Strategic Level Optimization:** The aim of this level is to identify solutions that are long term which generates highest impact within a period of 3-5 years. These are usually done by consultancy firms externally or the in-house strategy department. In larger context, the project

involves everything from logistics benchmarking research to evaluating market entry potential and deciding whether to outsource or insource certain tasks.

One most common type among all strategic level projects is Supply chain network optimization (NO) where complete supply chain nodes like manufacturers (MFG), flow of goods, and distribution centers (DC) are evaluated. This will help organization to solve pain points and become more transparent with SCL.

One of the main challenges of this level is poor data quality and companies need to allocate enough resources and budgets for data collection. In addition, understanding and defining constraints of optimization is important which is a challenge to most companies.

**Tactical Level Optimization:** The aim of this level is more focused about specific business unit or regions within a period of 1-3 years. This is crucial as it can contribute to regional or departmental excellence eventhough there is no dramatic SCL changes. One of the typical challenges of tactical level is how to get buy-in from other departments (internally and externally). For example: waiting for a container to fill up might delay the order but also will reduce the shipping cost.

**Operational Level Optimization:** This level is relatable as it addresses most people in warehousing, transportation, planning, customer service, and others. This section explains how the strategy will be implemented in practical terms through policies, plans, and programs. In order to increase operational efficiency, the plan assigns resources and measures performance. Operational planning includes activities that are scheduled and kept track of on a daily, weekly, or monthly basis, depending on the activity.

There are three main challenges in this level. First is lack of relevant skillsets and knowledge. Secondly, excessive dependence on experience by professionals especially experienced professionals. Finally, the employee's willingness and desire to change and improve quality of operations.

The analysis concludes that generation of positive results is inevitable no matter which level of optimization is embarked by company such as lower logistics costs, loyal customers, improved and efficient processes, more revenue, and enhanced customer satisfaction. Therefore, SMEs need to deploy and implement suitable strategies to ensure optimization of SCL.

### 3.0 Research Methodology

The researcher employed a deductive research approach and pragmatist philosophy. An exploratory, descriptive research design with quantitative and qualitative methods were utilized. Furthermore, both primary and secondary data was gathered by the researcher. The sampling technique used was non-probability judgmental technique and the sample size was 43 SME cargo & logistics companies. Also, interviews with four executive level professionals from SME cargo companies was conducted. Lastly, a reliability score of 0.87 was received.

### 4.0 Findings

**Table 4. Demography of the respondents**

Characteristics	Category	Freq.	%
Organizational Level	Executive	16	37%
	Managerial	18	42%
	Supervisor	9	21%
Age	Below 25 Years	4	9%

	Between 25 to 35	29	67%
	Above 35	10	23%
Experience	Less than 2 Years	4	9%
	2 to 5 Years	16	37%
	More than 5 Years	23	54%
Company size	Micro or Small	26	60%
	Medium	17	40%

Most of the respondents were from executive and managerial levels from between the age 25 – 35 with experience from 2-5 years and more than 5 years. It is also can be seen that most of the respondents were from Micro and small-scale companies.

**Table 5. Network planning tools in SMEs**

<i>Q5</i>	
Mean	1.744186047
Standard Error	0.06732529
Median	2
Mode	2
Standard Deviation	0.441481448
Sample Variance	0.194905869
Kurtosis	-0.688262195
Skewness	-1.160173601
Range	1
Minimum	1
Maximum	2
Sum	75
Count	43

**Table 6. Warehouse management tools in SMEs**

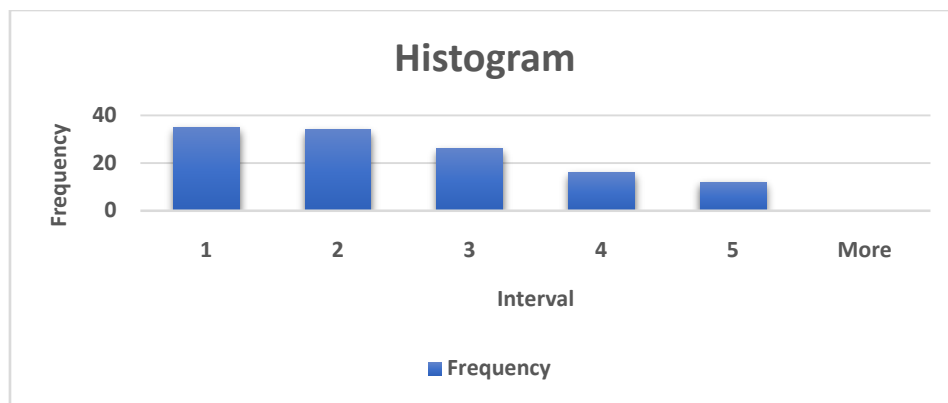
<i>Q8</i>	
Mean	1.604651163
Standard Error	0.075442841
Median	2
Mode	2
Standard Deviation	0.494711791
Sample Variance	0.244739756
Kurtosis	-1.893499614
Skewness	-0.44371733
Range	1
Minimum	1
Maximum	2
Sum	69
Count	43

In the tables 5 and 6, the respondents were asked if they use any network planning or warehouse management tools in their company. The value of the mean reached "1.744" and "1.604", which indicates that the majority of the responses related to both question is "No". The mode value in

this question is "2", which means that the most repeated response was "No" for both questions. Additionally, more than 50% of the respondents of the sample says "No", as the skewness also demonstrates a negative value of "-1.16" and "-0.443" respectively. The above descriptive statistical analysis results shows that most of the SMEs does not use Network planning or warehouse management tools. Findings from prior studies where researchers point of lack of technology being major challenge in SMEs due to high cost of implementation and employing trained and knowledgeable professionals to implement such technology is a challenge for SMEs (Ramachandran & Al-Yahmadi 2019).

**Table7. Main Challenges faced by SMEs**

<i>Interval</i>	<i>Frequency</i>
<b>1</b>	<b>35</b>
<b>2</b>	<b>34</b>
<b>3</b>	<b>26</b>
<b>4</b>	<b>16</b>
<b>5</b>	<b>12</b>
<b>More</b>	<b>0</b>



*Figure 3. Histogram Analysis Chart for Main Challenges faced by SMEs*

The results about "the main challenges faced by SME cargo and logistics companies in optimization" is demonstrated in the above table and chart. The responses of all the 43 respondents from the sample is analyzed by "Histogram Analysis". Through the analysis it was observed that, "35" respondents have identified Lack of resources (option 1), "34" respondents have identified Lack of Technology (option 2), and "26" respondents have identified Lack of Knowledge (option 3) as the main challenges 3 challenges faced in optimization of SCL activities. The literature provides insights into the reason for lack of resources, technology as the lack financial backup and delay in loans. The lack of knowledge is due to lack of training and entrepreneurship culture among local youth in Oman (Mubarak and Mondal, 2019).

**Table 8. Main primary activities of SME cargo companies**

<i>Interval</i>	<i>Frequency</i>	<i>Cumulative %</i>	<i>interval</i>	<i>Frequency</i>	<i>Cumulative %</i>
<b>1</b>	<b>13</b>	<b>30.23%</b>	<b>1</b>	<b>13</b>	<b>30.23%</b>
<b>2</b>	<b>11</b>	<b>55.81%</b>	<b>3</b>	<b>13</b>	<b>60.47%</b>
<b>3</b>	<b>13</b>	<b>86.05%</b>	<b>2</b>	<b>11</b>	<b>86.05%</b>

<b>4</b>	<b>2</b>	<b>90.70%</b>	<b>5</b>	<b>4</b>	<b>95.35%</b>
<b>5</b>	<b>4</b>	<b>100.00%</b>	<b>4</b>	<b>2</b>	<b>100.00%</b>
<b>More</b>	<b>0</b>	<b>100.00%</b>	<b>More</b>	<b>0</b>	<b>100.00%</b>

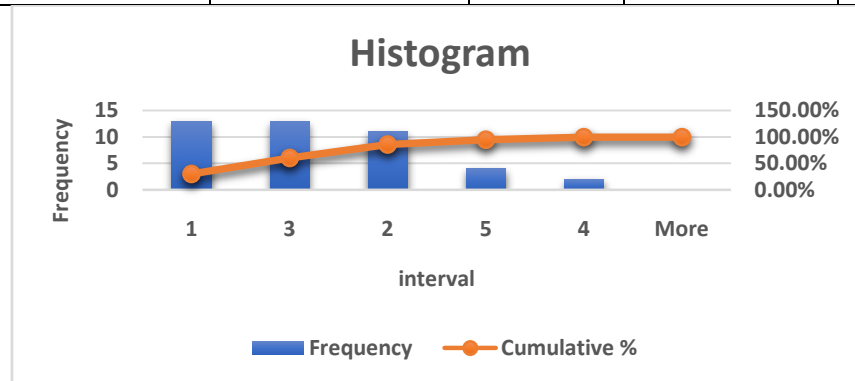


Figure 4. Histogram Analysis Chart for Main primary activities of SME ca

Based on the responses, In-bound (option 1) and Out-bound (option 3) logistics are the most frequent response with frequency of “13” each. Furthermore, In-bound logistics (option 1), Out-bound logistics (option 3), and operations (option 3) cumulates to “86.05%” of the total responses from the sample. Hence, it was concluded that Inbound logistics, Outbound logistics, and operations are the main three primary activities that that contribute value to optimization of SCL activities. Therefore, further analysis of these three main activities is demonstrated below.

**Table 9. Main Inbound Logistics Sub-activity**

<i>Interval</i>	<i>Frequency</i>	<i>Cumulative %</i>	<i>interval</i>	<i>Frequency</i>	<i>Cumulative %</i>
1	19	44.19%	1	19	44.19%
2	11	69.77%	2	11	69.77%
3	6	83.72%	3	6	83.72%
4	4	93.02%	4	4	93.02%
5	3	100.00%	5	3	100.00%
More	0	100.00%	More	0	100.00%

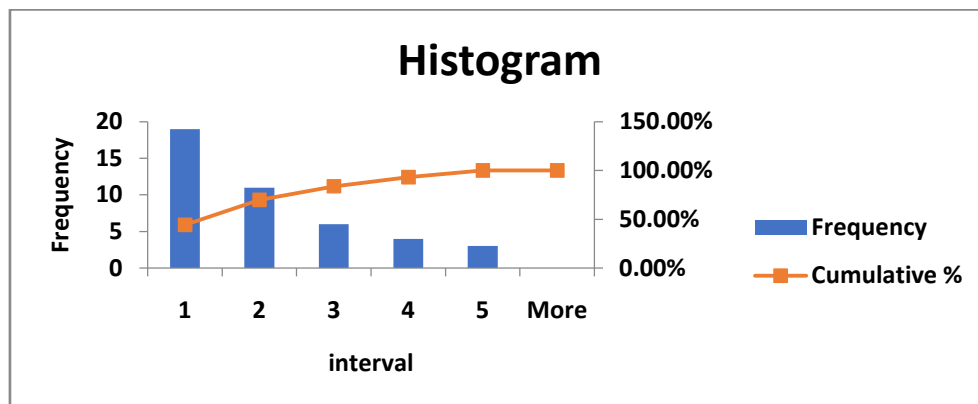


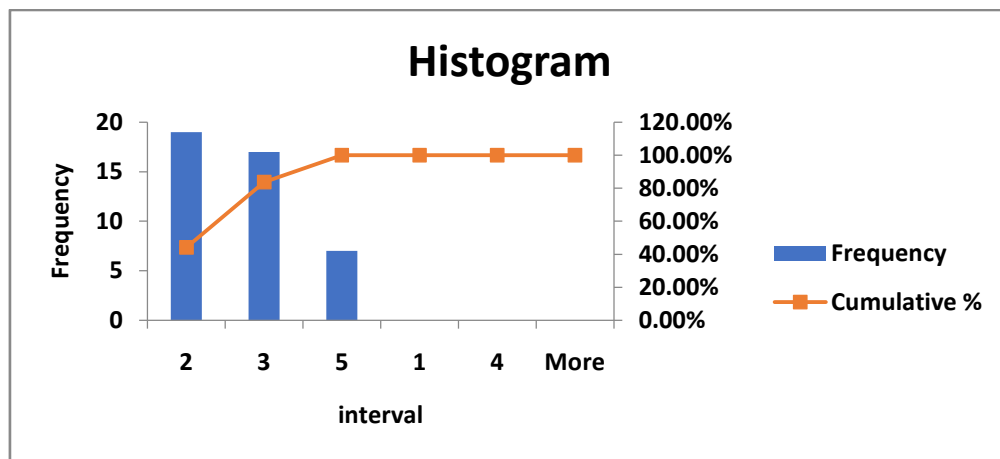
Figure 5. Histogram Analysis Chart for Main Inbound Logistics Sub-activity

The results about “the main inbound logistics sub-activity that contribute value to optimization of SCL activities” is demonstrated in the above table and graph. The responses of all the 43 respondents from the sample is analyzed by “Histogram Analysis”. Through the analysis it was observed that, Material Handling (option 1) and Warehousing (option 2) cumulates to “69.77%”

of the total responses from the sample. Hence, it was concluded that Material Handling and Warehousing are the two main inbound logistics sub-activity that contribute value to optimization of SCL activities.

**Table 10. Main Operations Sub-activity**

<i>Interval</i>	<i>Frequency</i>	<i>Cumulative %</i>	<i>interval</i>	<i>Frequency</i>	<i>Cumulative %</i>
1	0	0.00%	2	19	44.19%
2	19	44.19%	3	17	83.72%
3	17	83.72%	5	7	100.00%
4	0	83.72%	1	0	100.00%
5	7	100.00%	4	0	100.00%
More	0	100.00%	More	0	100.00%



*Figure 6. Histogram Analysis Chart for Main Operations Sub-activity*

The results about “the main operations sub-activity that contribute value to optimization of SCL activities” is demonstrated in the above table and graph. The responses of all the 43 respondents from the sample is analyzed by “Histogram Analysis”. Through the analysis it was observed that, Packaging (option 2) and Shipment Consolidation (option 3) cumulates to “83.72%” of the total responses from the sample. Hence, it was concluded that Packaging and Shipment consolidation are the two main operations sub-activity that contribute value to optimization of SCL activities.

**Table 11. Main outbound logistics sub-activity**

<i>interval</i>	<i>Frequency</i>	<i>Cumulative %</i>	<i>interval</i>	<i>Frequency</i>	<i>Cumulative %</i>
1	4	9.30%	3	17	39.53%
2	14	41.86%	2	14	72.09%
3	17	81.40%	4	5	83.72%
4	5	93.02%	1	4	93.02%
5	3	100.00%	5	3	100.00%
More	0	100.00%	More	0	100.00%

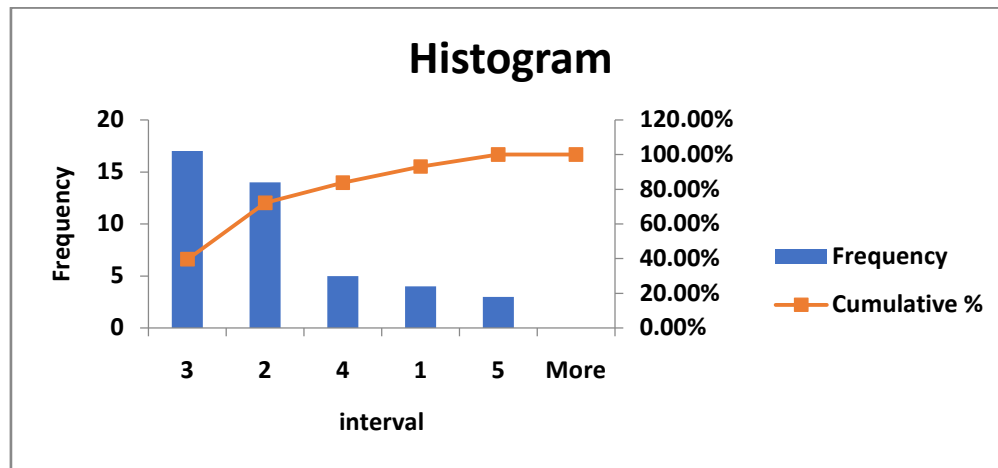


Figure 7. Histogram Analysis Chart for Main Outbound Sub-activity

The results about “the main outbound logistics sub-activity that contribute value to optimization of SCL activities” is demonstrated in the above table and graph. The responses of all the 43 respondents from the sample is analyzed by “Histogram Analysis”. Through the analysis it was observed that, Delivery (option 3) and Material Handling (option 2) cumulates to “72.09%” of the total responses from the sample. Hence, it was concluded that Delivery and Material handling are the two main outbound logistics sub-activity that contribute value to optimization of SCL activities.

From the above histogram analysis results, it is observed that the least focused primary activity of SME cargo and logistics companies are marketing and sales. Findings from prior studies where researchers point challenges of marketing is that SMEs often does not have the required marketing budget, knowledge, or the lack of R&D to identify new markets (Al-Bulushi & Bagum, 2017). Due to lack of financial backup SMEs often find it difficult to provide services like follow-up (Cherian, 2020).

Table 12. Impact of optimization on overall efficiency

Anova: Single Factor				
SUMMARY				
Groups	Count	Sum	Average	Variance
Micro or Small	26	119	4.576923	0.653846
Medium	17	76	4.470588	0.514706

ANOVA						
Source of Variation	SS	Df	MS	F	P-value	F crit
Between Groups	0.116226	1	0.116226	0.193857	0.662038	4.078546
Within Groups	24.58145	41	0.599548			
Total	24.69767	42				

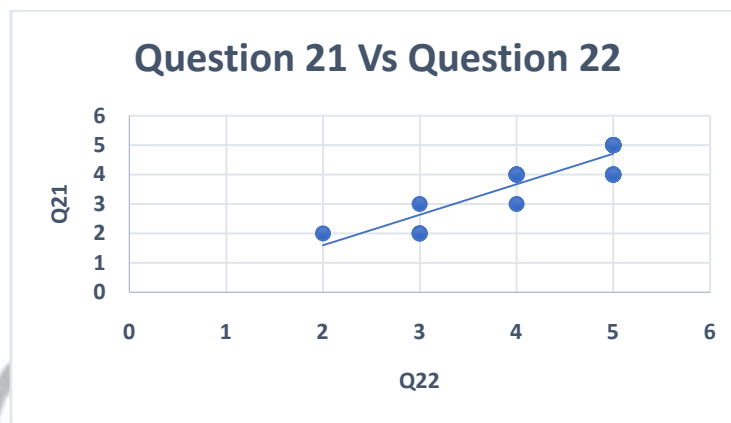
The respondent’s response to if optimization of SCL activities will create more value to your business and help in improving overall efficiency, was analyzed through the "Anova Analysis" and the table above shows results of the question such as the p-value reached "0.662" which is more than "0.05". hence, it was concluded that there is no significant difference between the

opinions of the options among respondents of the Micro, small and medium scale companies about question 21.

In the above analysis, results show that no difference in opinion of SMEs that optimization of SCL improves overall efficiency. The findings from Mirabelli and Solina (2022) also suggests that optimization improves overall efficiency generating positive results no matter level of optimization or company size.

**Table 13. Correlation**

	Q21	Q22
Q21	1	
Q22	0.864173	1



*Figure 8. Correlation analysis chart*

The respondents' responses were analyzed by the "Correlation Analysis" and a positive value of "+0.864" which means that there is a positive correlation between both questions. Furthermore, majority of respondents agreed to statement optimization of SCL activities will help improve overall efficiency also agreed to statement on optimization of SCL activities will help reduce cost.

The above result from analysis suggests that no difference in opinion of SMEs that optimization of SCL improves overall efficiency. The findings from Mirabelli and Solina (2022) suggests that optimization reduces logistical operation cost generating positive results no matter level of optimization or company size.

**Table 14. t-Test Analysis on Marketing Activity**

t-Test: Two-Sample Assuming Unequal Variances		
	<i>Micro or Small scale</i>	<i>Medium scale</i>
Mean	4.153846154	4.235294118
Variance	0.855384615	0.691176471
Observations	26	17
Hypothesized Mean Difference	0	
Df	37	
t Stat	-0.300309227	
P(T<=t) one-tail	0.382811099	



t Critical one-tail	1.68709362	
P(T<=t) two-tail	0.765622198	
t Critical two-tail	2.026192463	

From above table, it was observed that P value =0.76 (Two Tail) is greater than 0.05. Hence, it is observed that there is no significant difference of opinion observed about marketing increases value of business by both Micro/Small and Medium scale business. Furthermore, t Stat= -0.30, it is observed that Micro/small scale are less agreed that marketing increases value of business compared to medium scale responders. Hence, it is concluded that Micro, small, and medium scale responders Strongly agree/agree that marketing helps improve optimization and increases value of the company.

**Table 15. t-Test Analysis on Service Activity**

t-Test: Two-Sample Assuming Unequal Variances		
	<i>Micro or Small</i>	<i>Medium</i>
Mean	3.807692308	4.176470588
Variance	1.361538462	1.404411765
Observations	26	17
Hypothesized Mean Difference	0	
Df	34	
t Stat	-1.003764232	
P(T<=t) one-tail	0.161291442	
t Critical one-tail	1.690924255	
P(T<=t) two-tail	0.322582885	
t Critical two-tail	2.032244509	

From above table, it was observed that P value= 0.3 (Two Tail) is greater than 0.05. Hence, it is observed that there is no significant difference of opinion observed about services increase value of business by both Micro/Small and Medium scale business. Furthermore, t Stat= -1.003, it is observed that Micro/small scale are less agreed that marketing increases value of business compared to medium scale responders. Hence it is concluded that both Micro, small, and medium scale responders “Strongly agree/agree” that services help improve optimization and increases value of the company.

The above result from analysis suggests that no difference in opinion of SMEs that marketing and services increase value of business and help improve optimization. The findings from Al-Bulushi and Bagum (2017) suggests that marketing and services are challenges face by SME and has the potential to create value for SME if they are executed with efficiently.

#### **4.1 Presentation and Analysis of Interview findings**

The researcher conducted interviews with four executive level professionals working in the cargo and logistics sector in Muscat. The aim of the interviews was to gather information related to research objectives. The interviewees were from the executive level and are identified in the following as I1, I2, I3, and I4 due to confidentiality of the interview. Furthermore, I1 and I2 represent interviewees from small-scale companies with 13- and 14-years’ experience respectively whereas I3 and I4 are from medium scale companies 23- and 35-years’ experience respectively.

**Research question 1:** this was regarding current practices in optimization of SCL where all the interviewees agreed that optimization levels could be improved in many levels. According to I1 and I2, most of the small-scale companies do not utilize technologies and tools such as warehouse management tools or network planning tools. Furthermore, utilization of such tools was not feasible for them as cost for implementation and utilization of such tools demands additional HR and financial backing. Additionally, these tools come with abundance of features, most of them are not useful for them. The small-scale companies collaborate with other medium scale companies in process of shipment consolidation which helps them optimize activities to some extent. In case of medium scale companies, I3 and I4 stated utilization of such tools are more feasible and can utilize such tools to full extend.

**Research question 2:** this was regarding challenges in primary activities and sub-activities. In the case of small-scale companies, both I1 and I2 states that lack of resources (financial and acquisition of experienced human resource) and technology are the main challenges faced. In frequent instances they faced delays in acquiring customs clearance from airports and ports which causes delays in their operations. Furthermore, obtaining loans from banks is a lengthy and difficult process. In case of medium-scale companies, I3 and I4 stated that lack of knowledge and experienced professionals in SCL with respect to the GCC market are the main challenges faced. Finding experienced professionals who are willing to work long hours is often a challenge. Furthermore, I4 emphasized that the technology and tools used are mostly old and stand alone. Thus, integration of all the processes within SCL through such tools will improve efficiency and reduce overall cost. Also, will provide competitive advantage.

**Research question 3:** this was regarding major activities which add value in SME optimization. All the respondents stated that inbound logistics, operations, and outbound logistics are the main three activities they focus on. However, I1 and I2 stated material handling and warehousing are the main inbound sub-activities, packaging and shipment consolidation are the main operation sub-activities, and material handling and delivery are the main outbound sub-activities. This was similar to responses from I3 and I4, however they also focus on sub activities such as order processing and vehicle scheduling. Furthermore, I4 emphasized these sub-activities help in increasing operational efficiency and improve customer relations.

**Research question 4:** this was regarding various opportunities for SME cargo companies. Interviewees I1 and I2 stated that small-scale companies should focus more on creative ways to market their service portfolios; and they should improve technology and tools used for SCL optimization. They should explore various custom tools and software available that are less expensive and provide training to employees. Furthermore, providing services such as follow-up, compensation for damages while transportation, insurance options, increased warehousing capacity are all the areas small-scale companies should focus on to improve optimization and overall efficiency. Meanwhile, in the case of medium-scale companies, I3 and I4 stated that more focus should be given in implementation of order management, document control, performance management, network planning, service-level optimization, and safety-first culture.

## 5.0 Discussion

In the following, the researcher aims to summarize research findings from analysis per objectives to come up with conclusions and recommendations.

**As per objective 1,** the SCL optimization across SME cargo and logistics companies were found to be limited. From the review of literature challenges such as lack of resources and technology

seem to be among the main challenges (Mubarak & Mondal, 2019). In the objective 1, the researcher tried to understand the level of optimization across cargo and logistics SMEs. Through the questionnaire survey SMEs were asked if they utilize tools such as warehouse management or network planning tools. The descriptive statistical analysis results of survey data emphasized SME cargo and logistics companies do not use tools like network planning or warehouse management tools. However, in-depth interview indicated that challenge in cost of implementation could be tackled through customization of tools based on the features required and company size. Furthermore, small-scale companies' practices shipment consolidation with other small- and medium-scale companies to ensure optimization of SCL.

**As for objective 2**, through the survey questionnaire the three main challenges faced by SME cargo and logistics companies in optimization was lack of resources, technology, and knowledge. Furthermore, lack of experienced professionals to deploy and execute strategies and lack of prior data on SCL optimization were also some of the challenges identified by respondents of questionnaire. This was in agreement with the findings from interview as interviewees I1 and I2 from small-scale companies identified lack of resources (financial and human resource) and technology whereas, interviewees I3 and I4 identified lack of knowledge and experienced professionals to deploy and successfully execute SCL optimization as main challenges. These results are also in agreements with prior studies by Ramachandran and Al-Yahmadi (2019) where the researcher emphasized on lack of market information and knowledge, adequate finance, and delay in securing a bank loan. Furthermore, in the study across 250 SMEs conducted by Mubarak and Mondal (2019) observed that SMEs find it difficult to acquire or retain qualified personnel due to lack of resources and face challenges like lack of skill and administrative knowledge, technology, access to finance, and administrative challenges. The study also observed that SMEs have been deploying strategies based on operational procedure rather than strategic plans through trial and error due to lack of prior data.

Furthermore, **objective 3** focuses on the major activities that contribute value to optimization of supply chain and logistics. According to Porter's Value Chain, the activities were divided into primary and secondary activities. This research focuses on the main primary activity and sub-activity of Porter's Value Chain in SME cargo and logistics companies in Muscat. The primary activities include Inbound and outbound logistics, operations, marketing, and services (Sutarmin & Jatmiko, 2016). Through histogram analysis of questionnaire survey data, Inbound and outbound logistics were the most frequent responses. Furthermore, cumulative percentage of inbound logistics, outbound logistics and operations constitute to "86.06%". Hence, the researcher carried out further analysis of these three main primary activities. In inbound logistics, the main sub-activities material handling and warehousing cumulated to "69.77%" of the total responses. In operation, the main sub-activities packaging, and shipment consolidation cumulated to "83.72%" of the total responses. Finally, in outbound logistics, cumulative of "72.09%" identified delivery and material handling. Findings from the questionnaire are in-line with the interview conducted however interviewees I3 and I4 from medium scale companies emphasized they also focus on sub-activities such as order processing and vehicle scheduling.

**As per objective 4**, it focused on opportunities for SME cargo and logistics companies in optimization of SCL. The results from questionnaire analysis indicated that there is no significant difference between Micro, Small and Medium companies on agreeing optimization of SCL activities will help improve overall efficiency and reduce cost. Similarly, the t-Test analysis indicated that SMEs agree marketing and services helps in optimization and increases value of company. However, it is also observed that SMEs mainly focus on outbound, operations and inbound logistics. Therefore, the researcher emphasizes SMEs should focus more on opportunities in marketing and services. Furthermore, the findings from the interviews are in-line

with these findings as interviewees I1 and I2 states small-scale companies should focus more on creative ways to market products and services, improve technology by using tools like warehouse management tools and customized network planning tools. Also, interviewees I1 and I2 emphasized the need to expand the services provided such as real-time tracking, follow-up, increased warehousing capacity, compensation for damages while transportation, and insurance options. Meanwhile, interviewees I3 and I4 stated that medium scale companies need to focus on performance management, order management, network planning, document control, service-level optimization, and safety-first culture. Further, opportunities in the SCL sector were identified through literature review such as economic opportunities and diversification (Al-Ghassani et al., 2018), location (Taderera et al., 2018), and infrastructure (Al-Ghassani et al., 2018).

### 5.3 Conclusion

In conclusion, the findings of this descriptive-exploratory research can be utilized for enrichment of future research in this field of study. The interpretation of the questions has successfully addressed the challenges and opportunities along with the main activities and sub-activities of SME cargo and logistics companies in Muscat.

### 5.2 Suggestions

The following suggestions are drawn by the researcher based on quantitative and qualitative analysis findings on ways to optimize SCL in SME cargo and logistics companies. Effective and successful implementation of initiatives to outsource business activities, use centralized management software, consolidation of inbound freight deliveries, track-and-trace of goods and, regularly optimize supply chain can help SMEs improve optimization across their SCL activities.

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