BANDAR YASLAM BIN AFI

THE ROLE OF FINANCIAL METRICS IN SUPPLY CHAIN MANAGEMENT: EVIDENCE FROM MANUFACTURING SECTORS OF SAUDI ARABIA

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**NEAR EAST UNIVERSITY**

**INSTITUTE OF GRADUATE STUDIES**

**DEPARTMENT OF BUSINESS ADMINISTRATION**

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**M.Sc. THESIS**

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**Supervisor**

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**June, 2024**

# APPROVAL

We certify that we have read the thesis submitted by **Bandar Bin Afi** titled **"The Role of Financial Metrics in Supply Chain Management: Evidence from Manufacturing Sectors of Saudi Arabia''** and that in our combined opinion it is fully adequate, in scope and in quality, as a thesis for the degree Master of Social Sciences.

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# DECLARATION

I declare that all information presented in this thesis, **"The Role of Financial Metrics in Supply Chain Management: Evidence from Manufacturing Sectors of Saudi Arabia",** was gathered and discussed according to all academic rules and regulation as well as all the ethical codes of the Institute of Graduate School, Near East University. I also certify that in the preparation of this thesis, I have not presented any material that I know or suspect to be the unauthorized work of another person, nor have I fabricated or falsified any data; any materials used in supplementing any aspect of this thesis are accurately and fully cited, recognized, and sourced.

Bandar Yaslam Bin Afi

22/06/2024

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Bandar Yaslam Bin Afi

# ABSTRACT

## The Role of Financial Metrics in Supply Chain Management: Evidence from Manufacturing Sectors of Saudi Arabia

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Supply chain management is of great significance in the operations of manufacturing companies. It impacts both the costs and financial gain of produced goods, extending to the company's infrastructure and the manner in which suppliers and consumers engage with each other. Based on this, my research study investigates the link between the sales, cash conversion cycle (CCC), return on equity (ROE), and return on assets (ROA) and supply chain management (SCM) in case of 18 manufacturing firms of Saudi Arabia. To do so we have applied newly developed RASLEG cointegration test to assess the long run association among variables of study. Moreover, we employed Fully Modified Ordinary Least Square (FMOLS) and Dynamic Ordinary Least Square (DOLS) econometric techniques to estimate the coefficients of the variables. Our statistical analysis indicates a strong and positive relationship between sales, ROA, and SCM efficacy. However, the ROE and CCC are inversely associated with SCM efficacy. Moreover, we employed DH panel causality test to estimate the direction. We found that the sales, ROA, ROE, SCM have unidirectional link whereas, CCC and SCM has bidirectional link. The outcomes of the research provide direction to the Manufacturing sector of the Saudi Arabia to formulate and implement the SMC polices and strategies in link with sales, ROA, RAE, and CCC. Moreover, with these discoveries, it is possible to enrich the theoretical and analytical knowledge in identifying the dynamics of SCM and create a basis for further studies and practical developments.

***Keywords***: Supply chain management (SCM), Return on assets (ROA), Return on equity (ROE), Cash conversion cycle (CCC), Sales.

# ÖZET

## Tedarik Zinciri Yönetiminde Finansal Ölçütlerin Rolü: Suudi Arabistan İmalat Sektörlerinden Kanıtlar

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**Haziran, 2024, 82 sayfa**

Tedarik zinciri yönetimi, imalat şirketlerinin operasyonlarında büyük önem taşımaktadır. Şirketin altyapısına ve tedarikçilerin ve tüketicilerin birbirleriyle etkileşim biçimine kadar uzanan, üretilen malların hem maliyetlerini hem de mali kazancını etkiler. Buna dayanarak araştırma çalışmam, Suudi Arabistan'daki 18 imalat firması örneğinde satışlar, nakit dönüşüm döngüsü (CCC), özsermaye getirisi (ROE), varlık getirisi (ROA) ve tedarik zinciri yönetimi (SCM) arasındaki bağlantıyı araştırıyor. Arabistan. Bunu yapmak için, çalışmanın değişkenleri arasındaki uzun vadeli ilişkiyi değerlendirmek amacıyla yeni geliştirilen RASLEG eşbütünleşme testini uyguladık. Ayrıca değişkenlerin katsayılarını tahmin etmek için Tam Değiştirilmiş Sıradan En Küçük Kareler (FMOLS) ve Dinamik Sıradan En Küçük Kareler (DOLS) ekonometri tekniklerini kullandık. İstatistiksel analizimiz satışlar, ROA ve SCM etkinliği arasında güçlü ve pozitif bir ilişki olduğunu gösteriyor. Ancak ROE ve CCC, SCM etkinliği ile ters ilişkilidir. Ayrıca yönü tahmin etmek için DH panel nedensellik testini kullandık. Satış, ROA, ROE, SCM'nin tek yönlü bağlantıya sahip olduğunu, CCC ve SCM'nin ise çift yönlü bağlantıya sahip olduğunu bulduk. Araştırmanın sonuçları, Suudi Arabistan İmalat sektörüne satış, ROA, RAE ve CCC ile bağlantılı SMC politikalarını ve stratejilerini formüle etme ve uygulama konusunda yön sağlıyor. Üstelik bu keşiflerle SCM dinamiklerinin belirlenmesinde teorik ve analitik bilginin zenginleştirilmesi ve daha sonraki çalışmalara ve pratik gelişmelere temel oluşturulması mümkün olmaktadır.

***Anahtar Kelimeler***: Tedarik zinciri yönetimi (SCM), Varlıkların getirisi (ROA), özsermaye getirisi (ROE), Nakit dönüşüm döngüsü (CCC), Satışlar.

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# LIST OF ABBREVIATIONS

**SCM:** Supply Chain Management

**ROA:** Return on Assets

**ROE:** Return on Equity

**ROI:** Return on Investment

**CCC:** Cash Conversion Cycle

**ITR:** Inventory Turnover Ratio

**KPI:** Key Performance Indicator

**COGS:** Cost of Goods Sold

**DSO:** Days Sales Outstanding

**DIO:** Days Inventory Outstanding

**DPO:** Days Payable Outstanding

**RBV:** Resource-Based View

**TCE:** Transaction Cost Economics

**TOC:** The Theory of Constraints

**TQM:** Total Quality Management

**SCP:** Supply Chain Performance

# CHAPTER I

## Introduction

SCM plays a strategic role in organizations of all industries as it is a crucial process of delivering goods and services, plus distributing information from suppliers to consumers. An analysis of current environmental conditions reveals that companies use financial factors to evaluate such a network's performance. Of those indicators, the financial ratios are quantitative tools for measuring the SCM performance and their liquidity, profitability, and operation efficiency. Despite the existing popularity of financial ratios, the challenge of the validity of these measures for SCM performance evaluation is widely discussed and questioned. This study intends to address the gap apparent from the current literature, a comprehensive study on applying financial ratios as performance measurements in SCM in Saudi Arabia's manufacturing industry has not been carried out. The justification for this approach is rooted in the min-scored research done on this area in the Saudi context. There is extensive literature evaluating financial ratios as performance predictors in SCM globally. However, more research has to be initiated to be more pertinent to industrial enterprises' Saudi Arabian business environment (El-Garaihy, 2021). In addition, the current research employs complex analytical tools, including co-integration and causality analyses, that have not been adopted in any prior research about SCM performance in Saudi manufacturing organizations to the greatest of our knowledge. This new technique allows us to retain all information about the association between financial KPIs and SCM performance in this context.

### Statement of the Problem

Supply chain efficiency evaluation in a financial framework is the most challenging aspect of supply chain management. While financial tools help to observe the general organizations or a particular company's performance and financial standing, they may not be the best for evaluating SCM in different industries. Supply chain networks are not simple environments, making this challenge difficult. It highlighted various limitations concerning financial ratio constraints and biases that should be considered before planning, such as the deficit of information on the local characteristics of supply chain issues and deficiencies of the alternatives of using financial

coefficients to assess the efficiency of the supply chain, highlights a vast space for future advancements in the analyzed sector. Therefore, this gap needs to be closed with attempts to establish the best way through which financial metrics could be utilized to measure the supply chain in various firms. Thus, assessing the financial factors of SCM effectiveness in manufacturing sector is need of hour.

Saudi Arabian manufacturing business entities may require data for operational purposes to achieve goals within the supply chain and address intricate issues. However, the concept of ethical or measurable supply chain management indexes is lacking based on noneconomic values. It is time for the manufacturing industries to make society better, the environment cleaner, and suppliers ethical. Understanding financial metrics and why they have not been popular in supply chain management studies involving sustainability goals is crucial. For this reason, our study focusses on financial ratios' and SCM performance. This study presents meaningful and practical recommendations on supply chain management and global competitiveness to the manufacturing firms of Saudi Arabia.

**Purpose of the study**

The main research objective for this study focuses on exploring how to analyze the use of financial performance measures to evaluate the performance of SCM in the manufacturing industry of Saudi Arabia. Currently, the business world is filled with intense rivalry, which means that management uses results-oriented measures to comprehend the efficacy of all supply chain activities. Nevertheless, the significance of these financial metrics to the SCM within the special Saudi Arabian economic context has remained practically unstudied. However, these aspects remain largely uninvestigated in the existing literature. Thus, this research focuses on what remains an important gap, the CCC, ROA, ROE, and sales metrics. In this regard, applying the latest panel causality tests, the cointegration method, and long-run tests, we attempt to determine the impact of financial matrices on SCM practice. This approach will enable an understanding of causal factors, which are essential in identifying equilibrium states that can assist in the strategic management decisions of SCM for the benefit of all the stakeholders involved. Thus, our focus is set on the manufacturing companies operating in Saudi Arabia, and, therefore, our primary interest concentrates on how these financial indicators can be used to

evaluate the SCM performance of these businesses within the framework of their regional operations and economic environment. Moreover, it demonstrates how one may gain a deeper perception of how and in what manner one may compare the financial indicators to analyze SCM efficiency in various industries. The study will also provide policy implications for advising business organizations on aligning performance indicators with strategic SCM practices. Applying key performance indicators and the association of financial targets with SCM objectives demonstrates how companies can improve efficiency and gain competitive advantage. The conclusions drawn from this research would depict potential action plans that manufacturing firms could undertake to enhance SCM and performance. Additionally, the research recommends more research studies that are long-term, cross-sectional, and technologically integrated into SC management. Using those very complicated techniques, we aim to identify the initial direction of a more profound investigation in the field of SCM and the stochastic characteristics of the financial effect it produces. By doing so, we expect to develop useful actional implications for the manufacturing firms in Saudi Arabia and literature on financial indicators and supply chain efficiency. SCM is the coordination and control of various resources and activities ranging from the raw material processor down to the consumer end of the product or service delivered, making sure only the minimal costs, only efficient and effective processes, and doing all these while making sure the consumers are satisfied.

The criteria for sampling Saudi manufacturing companies are the perception of their respective planners for achieving high levels in managing the supply chain outstandingly across the kingdom to define Saudi manufacturing companies from other countries. Scrutinizing Saudi Arabian literature allows us to note that the country painted a rather strategic and appealing industrial sector vision to achieve its goal of becoming one of the world's best SCM practices. First, it is essential to note the absence of knowledge and articles on supply chain management, particularly in Saudi Arabia (Alahmad, 2021). It is also evident that the complex and practical network of the supply chain suffers from the predicament. Expanding on the prior logical confrontation of those looking into the implementation of financial measurements for assessing the effectiveness of SCM and those who doubt it, we conduct a study on the association between financial ratios and SCM performance. Moreover, it helps academia account for supply chain management despite increased attention to companies' monetary outcomes with little regard to the required functional activity. Composite measures of the overall financial performance will be

correlated with the SCM approach and outcome to test different partial moderating effects, change independent variables and standardized business industry scores. Thus, by using the SCM model recommended in this study, firms can determine to what level they are practicing what regards SCM objectives (Arda et al., 2021). SCM techniques help organizations to be efficient where they encounter procedural challenges stemming from the stochastic and complexity contexts of their existence and operation. Finally, it is essential to note that using supply chain financial ratios can be helpful when Analyzing companies and seeking supply chain development opportunities in any managerial decision-making process. All this also helps to improve the overall productivity and effectiveness of the production processes while at the same time ensuring that they keep a check on what they are spending and their risk exposure. Moreover, an improved understanding of how the performance of SCM impacts international industrial forces expands the body of economic discourses. The most important fact that needs to be appreciated is that the supply chain significantly impacts economic development, environmental sustainability and competitiveness. Supply chain industries require enhanced structural and cultural solutions to enhance their organization in various organizations around the globe (Alanazi, 2020). Today, various energy and petrochemical interest organizations are experiencing demands from investors, consumers, and authorities to minimize their environmental effects and become green supply chains and other related environmental concerns. As mentioned above, financial data and SCM can be used to increase understanding of a company's sustainability. The proponents of this study argue that there are big implications that should be taken into consideration by researchers, businesses, and even economists while coming up with their decisions. As for this research paper, I analyzed the relationship between the monetary variables of manufacturing industries and SCM measures. It also allows firms to improve supply chain management systems for development within the current world that is so adaptive to business.

**Research questions**

When it comes to evaluating SCM performance, we have designed the following four research questions for this research study:

How can financial parameter such as sales impacts the supply chain management in the manufacturing sector of Saudi Arabia?

What is the correlation or relationship between return on assets and supply chain management efficiency in Saudi Arabian manufacturing firms?

To what extent does the CCC impact the decisions and performance in the supply chain within Saudi Arabia's manufacturing industry?

What strategies can be implemented involving return on assets (ROA) and sales to improve supply chain management in manufacturing firms?

**Hypothesis**

Bases on the literature review we proposed following research hypotheses (Null and Alternative) to be tested by employing the econometric techniques use in this study.

$H_0$. Return on Equity does not significantly impact SCM performance of manufacturing sector of Saudi Arabia.

$H_1$. Return on Equity significantly impacts SCM performance of manufacturing sector of Saudi Arabia.

$H_0$. Sales do not significantly impact SCM performance of manufacturing sector of Saudi Arabia.

$H_1$. Sales significantly impact SCM performance of manufacturing sector of Saudi Arabia.

$H_0$. Return on Assets does not significantly impact SCM performance of manufacturing sector of Saudi Arabia.

$H_1$. Return on Assets significantly impacts SCM performance of manufacturing sector of Saudi Arabia.

$H_0$. Cash conversion cycle does not significantly impact SCM performance of manufacturing sector of Saudi Arabia.

$H_1$. Cash conversion cycle significantly impacts SCM performance of manufacturing sector of Saudi Arabia.

**Significance of the study**

This study expands the growing information available on SCM in the manufacturing sector in Saudi Arabia through the propositions outlined in the research hypotheses above. The research appears useful as it brings a new perspective to the literature by choosing the context of Saudi Arabia SCM's choice of financial performance measures that were not well explored in the earlier SCM research. Hence, this acute purpose is served in doing so and offers a valuable supplement that helps amplify the body of knowledge towards learning the efficiency of SCM in this specific kind of setting regarding financially acceptable ratios such as CCC, ROE, ROA, and sales. First, it applies more econometric techniques, including the panel causality test and the long-run co-integrated relationship estimation. Previous studies have never used these new techniques to determine the connection between financial performance and the SCM in Saudi manufacturing organizations. By adopting these methodological principles, short-run and long-run relationships may simultaneously be created. Furthermore, in the current research, a measure from the tribal standpoint is utilized to distinguish between multiple classifications of the sub-sectors of manufacturing industries, acknowledging the diverse approaches to business. Thus, it provides broad sectoral information to enhance better SCM strategies and proportionate strategic decisions supported by financially relevant indicators. Hence, deriving from the comprehension of the correlation that exists between specific financial metrics, namely the ROE, CCC, ROA, and sales that elucidate the performance of SCM, the overall enhancement of the practical applicability of this particular methodology is accomplished under which alternative changes within the SC pattern that exercises an influence upon the productivity of SCM and the requirement for competitiveness. For example, knowledge that the direct correlation between ROA/Sales and SCM makes investors take asset and sales figures more seriously. Moreover, the study also suggests that SCM needs to be given even more importance, and efforts must be made to develop a consistent and strategic approach that includes the financial and operations viewpoint.

**Scope of the study**

Within this context, this study focuses on the manufacturing sector within Saudi Arabia to investigate the impact of financial measures on supply chain management (SCM) performance. The study shall undertake several manufacturing sub-sectors: petrochemicals, metals, consumer

products, and automobiles, among others. The period for the study will be February 2024 to June 2024. In this period, statistical procedures such as extended econometric modelling shall be employed to analyze the information and define the correlation between the significant financial factors and SCM efficiency.

**Limitations**

Nevertheless, with as much effort of speaking the truth as ever, it may attempt to aim toward the right path, but it fails to hit it right on the mark. These limitations are valid only to enable proper assessment of results and studies used to go further. It is one of the major shortcomings of SCM efficiency estimation when using too many financial indicators, some things cannot be done, which is why you hear phrases such as ‘it can’t be done’. However, there have been some problems with handling financial measures in the supply chain management decisions. Still, there are many levels of operations and financial management that the problem may not be apparent. It means that performance studies should encompass more than one sort of research, such as qualitative case research, to fill knowledge gaps. However, the research mostly benefits manufacturing companies. The present study deals with the financial ratios as the unit of analysis of SCM efficiency; hence, the results can be useful for expanding research in the said area. That is why it is assumed that financial ratio analysis could be inefficient sometimes, especially regarding particular ratios.

Moreover, the investigation was limited to the years 2012 to 2022. Future research can explore more years starting their investigation early in order to have a better grasp of the patterns in the variables under this study. Limitation in availability, accuracy and comparability of data – Since secondary research involves data gathered from secondary sources, data is sometimes limited in availability, may not be very accurate and often not easily comparable. Some quality and coverage check controls were satisfactory. However, it may have some limitations that could require grounding in lesser effects to improve scrutiny of the efficacy of SCM across diverse settings in future studies. It implies that the applicability or the efficiency of an element of the model may affect SCM or may be affected by SCM to different degrees. One of the strong sides of the suggested method of measuring supply network health is implementing financial information. Moreover, it is important to understand that using the approach is crucial where it

could be important to realize that despite several advantages of the method, which implies the usage of financial data, some crucial operations can remain unnoticed easily. It implies that supply chain management should satisfy customer needs with a simultaneous regard for the impersonal aspect of social influence and sustainability. The study may have excluded these variables because the study centered only on financial performance. Financial ratios can be used to examine operational and business financial performance. Still, they can hardly capture the social responsibility of the supply chain management aspect and the strength of its influence on the environment. To scholars, the information concerning the performance of SCM should extend the free invitation to other stakeholders and non-financial performance factors. However, humane cost considerations should not be disguised when addressing the imperatives of the research job, particularly when it deals with the use of financial metrics in enhancing SCM. Therefore, research focusing on the future performance of SCM should identify these inadequacies to provide key use-optimization findings. Qualitative research that integrates monetary and non-monetary measures can assist the institutions of SCM in estimating the effectiveness of operations in SCM.

**Definition of terms**

Supply chain management, known as SCM, is the operational corporate functional field that involves the coordination of the processes of purchasing and obtaining resources and goods, their transformation into other forms through activities such as manufacturing or services delivery, and distribution and delivery of these products to institutions or consumers in exchange for a profit while fulfilling the requirements of the consumers and the retailers. SCM's strategic thrust aims to enhance value across the whole operation to reduce operational costs, optimize resources, and drive customer and overall supply system value.

Financial ratios are uniformly numbered; these analyses reference the income statement, balance sheet, and cash flow statement. These ratios give information on the liquidity position of the firm, its solvency, operational efficiency, profitability and the market value of the firm. The following ratios are employed for evaluating the supply chain management performance, to summarize this portion of the analysis, the ratios considered were ROE, ROA, and CCC.

ROA gauges a company's ability to produce profits from the overall assets of the business. Regarding what type of resources, it portrays the efficiency of management in terms of resource output for a profit. Thus, after analyzing the pros and cons of the company, we estimate the particular net profit of the enterprise and apply it to the sum of total assets. It is most advantageous if its ROA has a higher figure because it can be postured that the organization can utilize assets to generate profit.

$$ROA = \frac{Net\ Income}{Total\ Assets}$$

The ROE is an index showing the company's profitability in terms of shareholders' equity. It defines how effectively the business has been earning profits with the stocks it owns for its investors—returning to the ROE formula, which equates to net profit by the equity owned by company shareholders.

$$ROE = \frac{Net\ Income}{Shareholder's\ Equity}$$

Sales are the total receipts from manufacturing firms implementing different selling operations on various products and services. They use it to measure the efficiency of their business's supply chain management practices—higher sales normally mean improved operations, good outreach, and effectively meeting the markets' needs.

CCC is the financial ratio used to evaluate the period within which the resources or inventories of a business entity are converted to cash from sales. It measures how well a business entity uses the funds accessible in the short-term operation of the business and how efficiently they are being utilized. A shorter CCC is, therefore, viewed as positive because it represents the efficiency with which the working capital turns over its receivables and inventory.

$$CCC = DIO + DSO - DPO$$

# CHAPTER II

## Literature review

### Empirical Literature

The application of financial metrics to improve SCM performance has been thoroughly explored by academic studies analyzing different industries and geographical markets. Continued globalization and technological advancements have further an impact on competition, forcing the manufacturing sector in the country to relook at how to make the supply become effective on competition. The conceptual literature review of this study aims to identify and combine more empirical research that has explored a complex interdependence of financial indicators that include, but are not limited to, ROE, ROA, CCC, and sales alterations that affect the performance of SCM. The integration of these empirical studies will give a specific conclusion of how these financial measures act as SCM effectiveness indexes and enablers and what indices managers must consider enabling sustainable competitive advantage.

#### *Supply Chain Management Ratio*

The following proxy was integrated by Johnson and Templar (2011) to capture the supply chain and firm performance relationship. It is a cash-based measure that looks at and considers cash-generating and cash-using activities mainly because cash is made through the sale of goods and services made by the supply chain assets. Their current research presents empirical evidence proving that an increase in the proxy changes and affects the rate of return of capital employed (ROCE) and the rate of change in the CCC length, which are the common indicators of the effectiveness of SCM improvement. In addition, as the proxy change rate increases, the enterprise value increases statistically to support the hypothesis that enhanced supply change Management practice positively impacts enhanced firm performance (Johnson and Templar, 2011). According to Losbichler et al. (2008), also encouraged the above view as they provided some of the financial and non-financial tools that could be useful in evaluating the performance of a supply chain. Therefore, such insights have been revealed to obtain the link between this efficiency and KPIs, such as ITR, perfect order fulfillment, CCC, ROA, and ROI.

In contrast, the inventory turnover ratio was the third measure adopted by Georgise et al. (2012). in their research. Besides, the findings of this research suggest that these ratios, which present

information on the best practices of supply chain management, significantly impact the firm's profit. In a study conducted by Keebler and Plank (2009) on the relationship between logistics and financial performance concerning several supply chain indices, the authors found a positive and significant relationship between them. The variables that they used in the study, which include performance in logistics, particularly on-time delivery rate, the order fill rate, inventory cost, and financial performance in terms of the ratio of return on asset (ROA), and return on investment (ROI), their research indicated that there was a positive association between the independent and dependent variables. Hofmann and Locker (2009) presented studies on supply chain, the research found that the fundamental theoretical models and several key financial and non-financial performance indicators, including the cash-to-cash cycle time, days of inventory supply, and several others, were directly related to the firm's performance based on profitability and shareholder value.

***Sales and Supply Chain Management***

Several literature reviews and research studies have also been conducted concerning the relationship between sales and supply chain management. Similarly, Frohlich and Westbrook (2001) and Christopher (2005) examined how firms could realize better profit and operational costs through SC integration. The authors Christopher (2005) and Frohlich and Westbrook (2001) understood that managing supply chain collaborations to enhance the SCM efforts reduces overall costs, inventories, and time to market while boosting profits and looking at the context within supply chain management and the aspect of the firm performance, which was also considered by Roumantsiev and Netessine (2005), noting the significance of the sales factor. In the paper by Hult et al. (2007), the research under consideration involved a look at the link between supply chain management practices and firm performance to ascertain the mediating role of customer responsiveness and market performance. The studies they put forward suggest that SCM practices have a direct and positive correlation with customer responsiveness and boost market performance with a higher sales growth rate and sales market share.

Similarly, the power and supply chain management practices of Dröge et al. (2004) have concerned how the supply chain management practices impacted the overall performance of organizations regarding sales growth, market share, and overall business profit. Therefore, they also concluded that the overall supply chain management activities like information sharing,

supplier development, and customer relationships were positive for these performance indicators. The following studies, which were examined by Narasimhan and Jayaram (1998), were about the electronics industry: positive correlation between strategic supply chain management practices and the degree of sales satisfaction. They carried forward their analysis of the influence of SCM on that sales figure. They found that the firms with good SCM and those firms, which embraced JIT manufacturing, TQM, and supplier development initiatives, recorded improved sales and a better market share as well. Li et al. (2006) also undertook research, the main aim of which was to shed more light on the influence of SCM practices on firms' performance, especially the manufacturing industries in China. Therefore, based on the research that has been carried out, we find it reasonable to conclude that effects like strategic supplier partnership, customer relationship management and information sharing that affect Samsung's sales growth and market share were positive.

***Gross profit margin and supply chain management***

The gross profit margin is a well-known financial indicator that refers to a theoretical estimation of optimal supply chain management within a firm and characterizes a fundamental component within the research variables. Supply chain management practices were in the study conducted by Alsmadi et al. (2012) to examine its impact on gross profit margin within the manufacturing sector. Their research highlighted that while establishing the best supply chain management practices, such as strategic partnership, lean manufacturing, and total quality management, the company had a significantly higher gross profit margin, resulting in better organizational performance concerning cost leadership. Many works identified supply chain management as a key variable to supply chain gross profit margin, particularly in the electronics industry. Fynes et al. (2005) also saw that a company that implements the just-in-time (JIT) production system, TQM, and supplier development programs has relatively higher Gross profit margins than others, suggesting that organizational performance is better in these companies and that they have better control of costs.

Hamister and J.W (2012) used Gross profit margin to articulate the extent of financial performance measured using Return on Asset (ROA). They pointed out that their research confirmed the regression analysis, with the gross profit margin as a variable being critically influenced by supply chain management efficiency and the ROA as extensive utilization of the

firms' assets and increased profitability. Leuschner et al. (2013) in their study they observed that there is a positive relationship between internal and external supply chain integration, and articles with higher gross profit margin exhibit greater effectiveness more particularly in supply chain management cost reduction and the degree of effectiveness of supply chain. Heizer et al. (2014) particularly sought to understand the causes of variation in gross profit margin, taking a more definite interest in the supply chain management of manufacturing industries. While undertaking their research, they observed that improvement of gross manufacturing profitability and, therefore, improved organizational and supply chain performance was prominent in firms with lean production, JIT production and TQM systems.

***Return on Assets (ROA) and supply chain management***

Another measurement formula adopted from Hendricks and Singhal (2003) and used to measure the performance of firms based on the disruptions included return on Assets (ROA). Hendricks and Singhal (2003) approved this study; supply chain disruptions are unfavorable; they significantly reduce the stockholder value of a company in the short run besides growing concern, decrease the sales growth rate, increase the cost, and lastly, bring down the average of the existing current assets. Among the studies conducted to understand the workings of supply chain performance (SCP), Gaur et al. (2005) also investigated the connection between SCP and the dependent variable, ROA. Thus, this work established that supplier relationships, and customer management significantly influence ROA, as hypothesized above.

In a cross-sectional study that Chakravarty et al. (2022) carried out among manufacturing sectors to ascertain the use of Supply Chain Management Practices that are highly related to the firm's performance with the assistance of ROA and Tobin Q, it was identified that Supplier Integration, Customer Integration, and operational flexibility improve firm's financial and market performance. Supply chain integration was measured based on the study conducted by Vickery et al. (2003), which divided the supply chain based on information exchange, cooperation, and communication. The independent variable considered was the Return on Assets. Having established the above hypotheses, they observed that organizations with high internal and external supply chain integration scores had a better actualized ROA, so supply chain integration enhances asset and realized Return on Asset utilization. Wagner et al. (2012) also described such

types of effectiveness and outlined the effect of supply chain integration, business performance, and financial performance. They argued that where there is proper alignment of the supply chain and business strategic plans, supply chain management had a larger and possibly in the poor fit organization, a smaller, positive impact on the returns on asset results, suggesting that practices of supply chain management should closely match the strategic orientation of the particular business to achieve high productivity and tangible financial returns on organization's assets.

### *Returns on Equity (ROE) and Supply Chain Management*

Barth et al. (2001) attempted to confirm or verify the relationship between ROE and firm performance. They also argued that the explained increase in ROE in the high ROE companies outperformed rivals in terms of value, growth, and profitability; therefore, it is observed that knowledge of finances is enhancing ROE but not only that, at the same time generating superior shareholder value is also crucial for overall and competitive firm health (Barth et al., 2001). The study by Li et al. (2006) also sought to establish the correlation between SCM practices and financial performance with a particular focus on profitability, with the help of which it sought to explain the relationship between SCM and a selected number of ROEs. Their analysis discovered that timely supply chain management activities such as strategic supplier partnership, customer relationship management, and information-sharing were outstanding indicators with a positive, significant correlation to the measured company's ROE.

Manikas and Gupta (2021) have also used the ROE index to establish whether the organizations engaging in the process of SCP are getting better financial outcomes. Hence, regarding the findings of this study, the authors surmised that, on balance, the measured SCP practices like environmental responsibility and ethical purchase for the compared firms benefited them in the studied manner, meaning that sustainable performance might enhance financial performance and stakeholders' value. Similarly, Hult et al. (2006) aimed to establish the correlation between SCM and the performance of firms, mainly in terms of ROE. As a result, their studies supported a hypothesis that business supply chain management strategies such as strategic supplier relations, customer relations, and effective information share a positive effect on ROE. It confirmed a hypothesis that supply chain management does help enhancing the organization's profitability and share value.

Wisner (2003) analyzed the impact each practice in the supply chain context has on the firm's financial performance. As per the results of the study, we found that all those supply chain management factors, like lean manufacturing, JIT production, supplier integration, and others, have improved ROE; therefore, we can also say that supply chain management is meaningful in improving the effectiveness and financial results of the organizations.

### *Cash Conversion Cycle (CCC) and Supply Chain Management*

Farris and Hutchison established a supply chain management measure called CCC in 2002. Similarly, regarding liquidity, the authors also suggested that raw materials may be converted quickly to cash when CCC is low. On the other hand, a high CCC suggests supply chain limitations. Focusing on the societies shown by Farris and Hutchison (2002) and Deloof (2003), it has similarly come out that in working capital management, a short outstanding CCC is valuable for a firm’s increase in profitability, fund soundness, and even during recessionary phase due to reduced dependency on external funds and higher fund turns.

Looking at the impact of the supply chain operations management strategy on the cash conversion cycle, Randall and Farris conducted their research in 2009. They found that the companies that adopted sound vendor practices possessed better SCP, indicated better working capital management, and more efficient cash flow management.

To make the above relationships concrete, Hofmann and Kotzab (2010) attempted to check the effect of SCP on CCC, and SC financing opportunities like reverse factoring and dynamic discounting, based on the industry, may be reduced to fifty percent of CCC, improving liquidity and financial results for buyers and sellers. The samples of Gill et al. (2019) also filled in the corresponding questionnaires of different industries, and the authors also did the corresponding analysis to elaborate the research about the SCM practices and the cash conversion cycle. All in all, according to this study, this was the result: The evidence presented in this paper also shows that any enhancement of CCC leads to the enhanced revelation of profitability and Firm value.

Losbichler et al. (2008) tried to determine the relationship between supply chain management practices and working capital employing the cash conversion cycle. They also discovered that organizations engaging in beneficial supply chain management accompanied by demand forecasting, inventory, and supply management strategies had relatively faster cash conversion cycles, better-working capital management and improved ability to control cash flow. Kroes and

Monfardini (2021) chose to address this knowledge gap by tracking the extent to which the digitalization of supply chains influences the cash conversion cycle. They argued that the firms that have digitized their supply chain using IoT, big data, and blockchain will likely have shorter cash conversion cycles since such technologies boost the visibility of the supply chain, coordination, and efficiency in the cash conversion cycle.

### *Inventory Turnover (IT) and Supply Chain Management*

Inventory turnover is considered one of the most frequently used performance metrics when evaluating SCM practices, and it holds an important place in the research variables. In particular, Capkun et al. (2009) looked at the correlation between managing the entire supply chain and IT. They also concluded their study based on the fact that those companies who have implemented efficient SCM practices like JIT production had high inventory turnover ratios which were also perceived as efficient stock management or efficient utilization of business assets. For the research conducted by Chen et al. (2005), the authors opted to examine the hypothesis, which deals with the relationship between supply chain integration and inventory turnover. Their study showed that the two variables, namely supply chain integration and internal integration, contributed positively to inventory interaction, meaning that the internal management of the supply chain of inventories was enhanced.

Koumanakos (2008) allocated and wanted to know the effect of inventory turnover on business performance and proposed that it could be measured by return on assets. Thereby, they affirmatively verified the relationship between inventory turnover and return on assets – this means that inventory handling leads to high turnover and proper control of its assets to generate higher profitability ratios. In their article, Kolias et al. (2011) analyzed how supply chain management influences inventory turnover of foods and beverages. Their research also shows that firms adopting supply chain practices such as collaborative forecasting had a higher stock turnover. Therefore, the management of the supply chain has received a facelift. Eroglu et al. (2011) also looked at the relationship between IT and performance, looking at the ROE as a proxy for the performance indexes. They created a positive link between IT and ROE, which means that effective management of inventories improves IT, the resultant effect is positive or more favorable to the shareholders' profitability as captured by ROE.

## Theoretical framework

There are still lots of firms requiring supply chain management. Transportation, assembly, and acquisition are among the activities that are covered. SCM subfields have also been heavily researched regarding the performance of the supply chain across various industries and building customer satisfaction. These are among the tasks that will be accomplished by the esteemed institution. Rooted from the overview of the literature regarding supply chain management, the subsequent literature is going to explain the basics of SCM, ideas, theoretical and empirical how financial ratio might describe the measure of success in SCM. The theoretical framework must contain theoretical referents that research requires and the framework of an organization. It regulates its ideas, theories, frameworks, and principles in the contexts of its research design, execution and analysis. Supportive of these measurements are strategic management, finance, and supply chain management. Theories and ideas precede the study's orientation and results. The theoretical context of the study presents the facts regarding how financial ratios assess supply chain management by analyzing finance and strategic management concepts and theories. The research uses various theories to analyze financial statements, business performance indicators, supply chain management approaches, and dynamics.

### *Agency theory*

Agency theory, which investigates manager-shareholder relations, underpins this topic. Agency theory suggests information asymmetry, conflicting goals and incentives, and other variables can lead agents and principals to collide. The branch of knowledge that deals with interactions between business managers and shareholders. Agency theory suggests that, due to information imbalance between agents and principals, the possibility of a lock-in scenario exists (Javaid et al., 2017). Agency theory also reveals why the tools of third parties, like financial ratios applied in assessing operations and performance, help the supply chain managers integrate the shareholders' requirements and other characteristics of the organization while deciding on the allocation of funds, priorities of investments and evaluation of functioning. Sociologically, agency theory could probably be useful when looking at the financially related issue within the context of SCM. Therefore, for organizations to align their financial measures like ROE and ROA with strategic SCM objectives, they must analyze the impacts of the relationship between principals and agents. This connectedness helps in easing conflicts of interest and reduce agents'

costs to improve efficiency in the supply chain (Wang et al., 2018). A key framework in understanding managerial behavior in principal-agent relationships is divided into two primary areas: the principal-agent theory and the positive agency theory. According to what has been postulated in positive agency theory, agents in the environment do not require a prescription on what they should do but an understanding of observed actions. Principal-agent investigation focuses on issues such as the restricted approach to risk and reward indicated by limited rationality, self-interest, and prudential risk avoidance inherent in the agent model. In a case where the agent is definable and functional in the scheme of SCM, ownership variation can blur the agent's form in the institution within the chain (Beal Partyka, 2022). Such works as Gligor et al. (2019) will suggest that the active engagement from the theories duly identified in the course of SCM research-related studies is helpful. For instance, such insight could be gained by examining the experience of sustainable strategy where the relations between internal agencies are the key concern. It relates especially to corporations like Amazon, Adidas, and Nike, who have been once accused of using suppliers' services such as Foxconn, violating labor conditions, and polluting textures with certain textile producers. These practices are useful to the direct company regarding its performance, as postulated in Shafiq et al. (2017). Additionally, because of a supply chain, the lower-tier firms pay attention to their first-tier suppliers but not second or third-tier ones. According to the agency theory, this is done through monitoring and ensuring that there is a way of punishing the opportunists. Although this provides precautions against such incidences, it may not always be enough. Moreover, the issues related to the form and nature of the contract enforcement, the peculiarity of incentives and the regulation of principal-agent relations are most significant. Agency theory, therefore, draws attention to issues of information, inequality of objectives, and self-interest exploitation. This duality highlights the need for cooperation and enticements, starting from the direct player and going up to the source and supply levels of the chain (Beal Partyka, 2022).

***Resource-based view (RBV)***

The RBV hypothesis is a concept that works as a catalyst for research. It proposes that organizational performance and competitive advantage are evaluated by the firm’s unique resources, skills and strategic competencies. RBV theory states that it is about an organization’s efforts to try and outcompete rivals in an organization, both in terms of resources and capabilities,

to meet needs for profitable and valuable alteration (Agus Zainul Arifin, 2020). Net profit margin and the gross profit margin, together with CCC, show that in the supply chain process, an operating corporation can create greater worth from the chain and drive-up costs to benefit all of its stakeholders. From a different angle, Dickson (2001) notes that the best practices in SCM enable a firm to offer better internal operations and reduce supply costs for enhanced service provision. Operation efficiency-oriented financial data such as return on assets (ROA), return on equity (ROE), profit margin, and other similar ratios help ascertain how much profit the firm has earned using the available resources. SCM is applied in strategic thinking about managing chains to attain competitive edges out of chain management, making it an important study area for business entities. For instance, improving an inventory management system or a manufacturing cycle, which leads to a lower CCC, is good as it has positive implications for the liquidity and the company's overall financial position.

As the RBV explains, a spectrum of technological and organizational factors facilitates firms' sustenance of this distinctiveness. These include organizational knowledge, managerial skills, back-end integration, technology and production facilities. As observed from the work of Dong et al. (2009) and others, they have determined these to be valuable resources that authors advocate for manufacturers. Furthermore, the supply chain management activities, including supply management and environmental perspective, are accepted as the overview before boosting the operation performance (Kamboj et al., 2015).

***Transaction cost economics (TCE)***

When viewing the economic transaction supply chain organizational system's pros and cons, transaction cost economics (TCE) can offer some significant revelations. Regarding the TCE theory, supply chain management involves a willingness to outsource or supply various tasks in-house in light of the requirements of investment-specific transaction costs, degree of asset specificity, and unpredictability. The overall flow of supply assessment involves supply chain, logistics, sourcing, and inventory. Detailed analysis of the efficiency of the cash-conversion cycle, ROA, and inventory turnover have been disclosed using financial ratios. Transaction Cost Economics is most useful for SCM since the theory aids in understanding the conditions under which firms decide whether to produce a specific component, service or capability themselves or to source it, a decision commonly referred to as the 'make-or-buy decision'. Firms apply TCE to

assess when they should invest in producing goods on their own or outsource the production from elsewhere. If the transaction costs of outsourcing are higher than the total derivative internal production cost, then the firms should retain the production process in-house. Compared to more general restructuring theories, it is more about managing transactions and exchange relationships rather than specifically competing competencies or power relations. Another specific use of the TCE theory is to solve the "make-or-buy" problem. Thus, it connects directly to questions about how companies regulate their supply chains. Nonetheless, there appears to be partial misunderstanding and hasty usage of TCE's purpose, premises, and reasoning among general management and operation scholars. Conversely, TCE is mainly centered on efficient government, ensuring that transactions are processed with the least possible cost (Ketokivi et al., 2020).

***Lean supply chain***

A Lean Supply Chain can be defined as an offshoot of the Lean Manufacturing concept of supply chain management wherein the objective is to eliminate all kinds of waste to create greater value. Established by Toyota Motor Corporation in the mid-20th century, lean principles focus on increasing operational performance and profits, decreasing expenses and satisfying customers by implementing constant change to remove non-essential activities. Performance is the optimum utilization of resources with the complete removal of waste, including Personal Productivity out of wasted time. It is based on the fundamental principles of just-in-time production in that it seeks to deliver materials only when required to the area that requires it. Furthermore, recognizing waste reduction as central to lean supply chain practice leads to enhanced ROI, ROA, and a decrease in logistics costs involving storage, delivery, and warehousing, amongst others. Lean supply chains reduce incidences of poor quality since supply chain events are well-monitored, making it easier to correct any quality deficits whenever they occur. This strategy seeks to attain efficiency by increasing the economic intensity of resources rather than the volume of resources available to an organization, avoiding mere duplication of resource quantity without care being taken to see what adds value to the business. In turn, customers get their products where and when required, and satisfying the customer is usually the key goal of any organization. Also, the direct costs of manufacturing are reduced through the low level of stock, which enhances the business's working capital. To note, vital performance measures in a lean

supply chain problematic include profit per piece, logistics costs, total cycle time, number of days in purchase order cycle time, production time per piece, and delivery lead time. It means that the organization aims to achieve the best sufficient quality necessary to carry long, effective customer value-added processes, often known as lean strategies, which may be identified through process mapping (Dahinine et al., 2024). In the study conducted by Salah et al. (2023), it was established that there is a significant and positive relationship between lean practices implementation and supply chain manage integration as well as the overall organizational financial performance.

### *The Theory of Constraints (TOC)*

The Theory of Constraints can be described as a management method that focuses on improving a system's specifically identified bottlenecks to achieve better results. TOC cites that there is one undiscovered constraint that every organization has, which limits the organization's vision of attaining even higher levels of success. In the first place, the role of stakeholders involves getting a business venture to make a profit; nonetheless, there are necessities that they need the business to go forward. TOC centers around three interconnected areas: Key authorities include The Wentworth Logistic with Performance Measurement Course and the application of logical thinking. Scheduling techniques fall under logistics, including the drum-buffer-rope, buffer management, VAT analysis, etc. Measures of throughput relate to accumulation; measures of inventory, ranked work; and measures of the financial job of production express productivity. This aspect involves various thinking processes. In the literature, a considerable amount of work has provided different applications and advantages of TOC across many sectors over the last few decades. Thus, while TOC was largely used to apply to the individual supply chain organization, the new behavior differs. However, the advantages of using TOC in the collaborative supply chain process, where individual companies unite, have not been the subject of much research (Simatupang et al., 2004).

The first action of the Theory of Constraints is identifying a constraint, which is done by learning which step of your process is responsible for most of the time wastage. After that, do more with the found constraint to get maximum working, implying it cannot be idle. After that, subordinate all other processes to make other processes work for this bottleneck and regenerate the stopping

point by changing the workflows and resources so that pressure is not removed from the bottleneck. However, the constraint's capacity still stays high. Regarding the above explanation, if the constraint appears as an issue, it is solved by finding how it could work more. Thus, the possibility involves getting new equipment, hiring more employees, and making policy changes. Finally, repeat the process. Another problem is pursued as the next constraint whenever the incumbent issue is overcome, so the procedure continues (Al Amin et al., 2019).

# CHAPTER III

# Methodology

## Introduction

Following the chosen research methodology, the influence of financial measures on supply chain management performance is examined quantitatively in the context of Saudi manufacturing companies. The paper relies on secondary data, given the limited data availability from the targeted firms from 2012 to 2022 and the significance of the Saudi manufacturing industry. The targeted firms include 18 manufacturing enterprises listed on the Tadawul website.

## Data collection and sources

Based on the above methodology, this study relied on secondary data, information collected and documented by other people, research firms, organizations, or government departments. Consequently, this research employs secondary data due to some main advantages, including availability, cost, time, comparability, and ethics. The use of already accumulated data sets proved advantageous in increasing the celerity of the research and the credibility of the findings. Although this selection is limited and only briefly explains a few Saudi manufacturing companies, the above points make it insightful. Saudi Arabia's manufacturing scene is remarkable due to the nation's strategic investments and global aspiration. It is given so much attention because it is one of the economy's major activities, especially regarding issues such as supply chains.

These were measured as four independent variables in this research: CCC, ROE, ROA, and sales. A common ratio used in similar research studies has been developed by Johnson and Templar (2011); I employed this proxy known as the supply chain management ratio (SCM). In line with the understanding of Johnson and Templar, SCM is viewed as the dependent variable in my research. The information needed for analysis was obtained from various financial statements and returns from the selected manufacturing firms. Predominantly, interest-related measures, including but not limited to return on assets (ROA), return on equity (ROE), cash conversion cycle (CCC), and sales, are of interest. Such factors were considered related to supply chain

adaptability and business profitability. The sample includes manufacturing firms on the Tadawul website, which is the population of this study's Saudi Arabian manufacturing firms. Tadawul's website will be used to sample companies for the study because it is a directory listing all firms listed on the Saudi Arabian Stock Exchange. Manufacturing firms form the population in question, and this population is made up of organizations that belong to different sectors of the economy, such as the petrochemicals, energy, textile, and automobile sectors. The general sampling used a convenience sample to choose 18 Saudi Arabian manufacturing firms from the study's population. This subset was selected due to research feasibility and the importance of the Saudi manufacturing sector in answering the research questions. Many industries and sectors exist in the population of Saudi Arabian manufacturing firms. Yet, the selected subsample indicates a broad range of industries that form the foundation of the manufacturing sector in Saudi Arabia and can be used to identify significant patterns associated with SCM performance.

As earlier pointed out, specific considerations were employed in selecting 18 manufacturing firms that the research has analyzed. Some of the driving factors that shaped the choice of the sample include, the ability to obtain the financial data, especially the balance sheet, income statement, and cash flow statement. Larger companies are employed where much information regarding the financial reports to evaluate the results is easily obtainable. The sample also pointed out that, because of the variety inherent to the context, it is feasible for the research findings to exhibit the various SCM across the sectors of the industrial setting. These firms are identified in the sample to understand the general nature and direction of the Saudi manufacturing industry, and therefore, their inclusion gives an insight into the targeted sector. It can be about the large organizations that maintain significant control over the structural form and push factors of markets and the new organizations with the potential for fast growth and development into large specific organizational actors in the economy.

The sample restricts the research to only the participating firms. Where firms source materials, acquire supplies, transport materials, and deliver finished products. It helps disembark some firms whose supply chain management is not so central or essential and thus not very relevant to the firm in a way that may skew the findings in the research study. It means that the survey has confined itself to only 18 manufacturing firms, and this ensures that the study gives a clear distinction between the good manufacturing firms as well as the poor manufacturing firms and,

therefore, the findings of the efficiency of the SCM in the manufacturing enterprises under study, deserve a worthy conclusion. Since companies from different sub-sectors were involved in the study, the requirements ranging from data availability to supply chain management meet this study's research objective and hypotheses. In addition, the quota sampling employed here cannot keep more than 18 firms on average, which is sufficient for quantitative analysis and generalizable conclusions. However, if the sample size were greater, it would have higher statistical significance for the purpose and intention of contributing to the goals of this study and for the presentation of the conclusion as to what extent financial ratios impact the performance of SCM in Saudi manufacturing firms, the active sample size suffices.

Within this study, obtaining data plays a significant role in obtaining the necessary information on the relationship between the independent and dependent variables and the financial ratios and Supply Chain Management performance in Saudi Arabia's manufacturing organizations from 2012 to 2022. The data collection techniques and resources refer to the tools and methods needed to obtain the relevant data from a selected sample of manufacturing firms. This group of financial documents, which include balance sheets, income statements, and cash flow statements, form the basis for this research work. The reports profile the manufacturing firms in terms of their financial performance by showing figures on their Return on Assets (ROA), Return on Equity (ROE), Cash Conversion Cycle (CCC), and sales. The financial reports are compiled from the firms' annual reports on the firms' websites and the Tadawul website.

Furthermore, only data analysis software EViews has been employed to analysis the collected data and to perform statistical tests. Altogether, the data collection instruments and equipment used in this research endeavor are substantiated to acquire sound data concerning Saudi Arabian manufacturing companies' financial informativeness and supply chain management measures. In light of the above objectives, the study shall use a combination of economic reports, industry reports, secondary data sources, as well as data analysis software to ensure that the views expressed in the study provide a comprehensive insight into the research problem as it pertains to the Saudi manufacturing industry.

The data collection study used the following procedures in data collection: The first procedure involved identifying and selecting manufacturing firms from the set population of the Saudi Arabian companies listed on the website by the name Tadawul. The given web resource called

Tadawul is the official website, offering customers all the data on companies introduced and operating in the Saudi stock exchange and manufacturing companies. Such standards involve sampling the firms based on the industrial category, firms' size and financial health and the relative importance of the firms to the Saudi economy of the manufacturing firms to be selected. The second procedure intended during the research is the acquisition of the balance and income statements, as well as the cash flow statements of the manufacturing firms. From these reports, one can also outline the performance of the firms in terms of returns and disclose their ROA and ROE, CCC, and even their sales figures. When the samples of the financial reports for the firms in question have been compiled, the data necessary to complete the study variables is obtained and placed within a data set. It means data churning, especially for financial ratios, sales aspects, and the like. Patterns are then developed from the extracted data or can be identified and formatted for statistical analysis. After the data is collected, the outcome is usually statistically analyzed using appropriate statistical tools and software, and EViews 13 was applied in this research study. Finally, the research conclusions are coherent with intent regarding grammar, punctuation, and syntax in the presentation and writing sections. The results of the data analysis were presented. Then, a brief interpretation and discussion of the results occurred based on the objective and hypotheses of the study, as well as an exploration in light of the theoretical frameworks. Tables are essential in enhancing clarity and comprehension of the findings, as the latter is being stated.

In summary, the participants in this study were the Saudi Arabian manufacturing enterprises restricted to those for which data were available. The industries selected were those industries that are random and overall representative of the critical sectors important for supply chain management in the Saudi Arabian manufacturing setting, and the industries and enterprises selected are strategically important to the Saudi Arabian manufacturing supply chain management. The kind of manufacturing firms chosen makes it easier to come up with a conclusion. The dependent variable is the SCM ratio, while the independent variables include sales, ROE, CCC, and ROE. A sample of 18 manufacturing firms allows for differentiating each financial ratio to SCM performance. A conceptual understanding of SCM, its performance, and the ratios drive supply chain management in the Saudi manufacturing industry.

**Variables description**

Supply chain management (SCM) is a term used to describe the proper management of various activities that relate to acquiring resources, conversion of resources into goods and services, and total logistics management up to the point when the end consumer consumes the goods and services. SCM seeks to ensure that all the organizational operations are streamlined and expenses are cut down in the overall supply chain network while at the same time ensuring that the customer value proposition is achieved. Johnson and Templar (2011) constructed a proxy for supply chain management ratio. This research adopts the framework formulated by Johnson and Templar (2011), whereby SCM is considered the dependent variable in my analysis.

$$Supply\ chain\ ratio = \frac{Net\ cash\ inflow\ from\ operations}{Total\ Assets\ less\ current\ liabilities}$$

ROA gauges a company's ability to generate profits from the overall assets of the business. Regarding what type of resources, it portrays the efficiency of management in terms of resource output for a profit. Thus, after analyzing the pros and cons of the company, we estimate the particular net profit of the enterprise and apply it to the sum of total assets. It is most advantageous if its ROA has a higher figure because it can be postured that the organization can utilize assets to generate profit. In my study, I used ROA as an independent variable.

$$ROA = \frac{Net\ Income}{Total\ Assets}$$

The ROE is an index showing the company's profitability in terms of shareholders' equity. It defines how effectively the business has been earning profits with the stocks it owns for its investors—returning to the ROE formula, which equates to net profit by the equity owned by company shareholders. In my study, I used ROE as an independent variable.

$$ROE = \frac{Net\ Income}{Shareholder's\ Equity}$$

CCC is the financial ratio used to evaluate the period within which the resources or inventories of a business entity are converted to cash from sales. It measures how well a business entity uses the funds accessible in the short-term operation of the business and how efficiently they are being utilized. A shorter CCC is, therefore, viewed as positive because it represents the efficiency with which the working capital turns over its receivables and inventory. In my study, I used CCC as an independent variable.

$$CCC = DIO + DSO - DPO$$

Sales are the total receipts from manufacturing firms implementing different selling operations on various products and services. They use it to measure the efficiency of their business's supply chain management practices—higher sales normally mean improved operations, good outreach, and effectively meeting the markets' needs. In my study, I used sales as an independent variable.

Here is the function:

$$SCM_{it} = f(ROA, ROE, CCC, Sales) \quad (1)$$

SCM denotes the supply chain management ratio, ROA for return on assets, ROE for return on equity, CCC for cash conversion cycle, and Sales for revenue or sales.

From an econometric perspective, this can be expressed as follows:

$$SCM_{it} = \beta_0 + \beta_1 Sales_{it} + \beta_2 ROA_{it} + \beta_3 ROE_{it} + \beta_4 CCC_{it} + \mu_{it} \quad (2)$$

Where $\boldsymbol{i}$ is for the cross-section (The 18 manufacturing companies in Saudi Arabia), $\boldsymbol{t}$ denotes time period of the study (2012 – 2022), $\boldsymbol{SCM_{it}}$ denotes supply chain management ratio, $\boldsymbol{\beta_0}$ denotes intercept, $\boldsymbol{\beta_{1,2,3,4}}$ denote coefficients, $\boldsymbol{Sales_{it}}$ denotes revenue or sales of the 18 companies from 2012 to 2022, $\boldsymbol{ROA_{it}}$ denotes return on assets of the 18 companies from 2012 to 2022, $\boldsymbol{ROE_{it}}$ denotes return on equity of the 18 companies from 2012 to 2022, $\boldsymbol{CCC_{it}}$ denotes cash conversion cycle of the 18 companies from 2012 to 2022, and $\boldsymbol{\mu_{it}}$ denotes error term.

Table 1.

*Data table*

| VARIABLES NAME | ABBREVIATIONS | MEASUREMENT | SOURCE |
|---|---|---|---|
| Return on Assets | ROA | $\frac{Net\ Income}{Total\ Assets}$ | |
| Return on Equity | ROE | $\frac{Net\ Income}{Shareholder's\ Equity}$ | |
| Cash Conversion Cycle | CCC | $DIO + DSO - DPO$ | Company's financial statements |
| Supply Chain Management | SCM | $\frac{Net\ cash\ inflow\ from\ operations}{Total\ Assets\ less\ current\ liabilities}$ | |
| Sales | Sales | Total revenue | |

**Descriptive statistics**

In this line of research, where data analysis mainly involves sectioning, the aim is to use descriptive statistics to give a general picture of the nature of the variables of interest. It provides information on the location of the set data in terms of the mean, median, mode, or mid-point and the spread of data in terms of variability or dispersion in the set data, which is described by measures such as standard deviation or range. In plain language, descriptive statistics can help

make the patterns more understandable by defining the characteristics of the variables and considering whether there is any need to look for some doubts in the given data set. This study aims to determine the extent to which the Supply chain management ratio, the selected independent variable, relates to other independent variables, which include return on assets, return on equity, cash conversion cycle, and sales; the data collected from the year 2012 up to 2022. It pertained to 18 manufacturing enterprises that were contacted from the official website of Tadawul.

**Panel unit root test**

The RALS-ADF unit root test is pivotal in determining whether a time series variable follows a unit root process or not. If it does, it indicates a non-stationary series. A unit root indicates a stochastic trend in the series, indicating long-term unpredictability. To determine if the unit root's null hypothesis may be accepted or rejected, the test compares the t-statistic to critical values. "Level" denotes the original series, while "1st Difference" denotes the differenced series, which is frequently utilized to attain stationarity. Concerning the contribution to the methodological approach, variables of interest have been evaluated using the established RALS-ADF unit root test in order to identify the stationarity of the data and the long-run co-integration. Following the studies conducted by Im et al. (2014), we go on to establish the reliability of the results that preceded through conducting the residual augmented least squares ADF (RALS-ADF) stationary tests.

**Panel cointegration test**

In time series analysis cointegration is an important statistical property that arise when two or more variables on stationery may be related over time though they are not stationary. It shows that the variables are having a long-run co-integration and that they tend to adjust continually in the long run to the deviations from the equilibrium status. On the other hand, the RALS-EG test is used specifically for the purpose of testing the cointegration in case of panel data. thus, extending the basic Engle-Granger cointegration test to a panel data setting, this approach further adjusts for possible cross-sectional dependence and heteroscedasticity. The test results can be more reliable and accurate when conducting analysis of long-term co-integrated variables in

panel datasets because these concerns are considered by the test. In the RALS-EG Cointegration test concerning the variables analyzed, it can be seen that there is a statistically significant amount of cointegration present among the parameters studied. Moreover, to establish the long-run relation and difference between variables, to calculate the presence and strength of the trend with regard to the variables of long-run relation, Lee et al. (2015)'s RALS-EG co-integration test was used. The EG is a two-step co-integration because of the residual characteristic and a conventional t-statistic is used in the second stage of the test. Therefore, in the 1st step, the stationary integration level and in the 2nd step, ordinary least square (OLS) is estimated if variables are I (1) as summarized under:

$$y_t = \omega\rho_t + \epsilon_t \tag{3}$$

Subsequently, the ( $\widehat{\boldsymbol{\varepsilon}}$ ) residuals were extracted, and the ADF unit root test was done to determine the integration level with associated residuals as follows:

$$\Delta\hat{\varepsilon}_t = \alpha_0 + \alpha_1\hat{\varepsilon}_{t-1} + \sum_{i-1}^{r} \alpha_{i+1}\,\Delta\hat{\varepsilon}_{t-1} + \tau_t \tag{4}$$

The information on the residual's higher moments enables the description of non-normal residuals when the errors within the equation are non-normal. Therefore, the newly developed RALS co-integration econometric approach developed by Im and Schmidt in 2008 is applied to gain more accurate, robust, strong, and detailed data that usually exist in non-normal errors under the linear model. The RALS model is adopted from Lee et al. (2015) and employed as a supplementary co-integration econometric to affirm the EG co-integration test. RALS is used as a supplement co-integration econometric to verify EG co-integration test outcomes. By combining the 2nd and 3rd moments of the residuals, new terms from traditional co-integration approaches in RALS co-integration test will be created. RALS co-integration is obtained from Eq. (4) as follows:

$$\widehat{\vartheta}_t = v(\hat{\varepsilon}_t) - \hat{\theta} - \hat{\varepsilon}_t\hat{\partial}_t,\ t = 1,2,3\ldots\ldots\ldots, T$$

(5)

Where $\hat{\varepsilon}_t$ denotes the residual derived from equation (4), however

$$v(\hat{\varepsilon}_t) = [\hat{\varepsilon}_t{}^2, \hat{\varepsilon}_t{}^3]$$

(6)

$$\hat{\theta} = \frac{1}{T}\sum_{i=1}^{T} v(\hat{\varepsilon}_t)$$

(7)

$$\hat{\partial}_t = \frac{1}{T}\sum_{i=1}^{T} p'(\hat{\rho}_t)$$

(8)

Additionally, the equation presented below show the RALS term Meng et al. proposed in 2017.

$$\widehat{\vartheta}_t = [\hat{\varepsilon}_t^2 - j_2, \hat{\varepsilon}_t^3 - \mathrm{j}3 - 3j_2\hat{\varepsilon}_t]$$

(9)

Where $j_i = \mathrm{T}^{-1}\sum_{i=1}^{T}\hat{\varepsilon}_t^n$. Then, the RALS cointegration test equation is shown in equation (10) by placing a value of $\widehat{\vartheta}$ in equation (4).

$$\Delta\hat{\varepsilon}_t = \alpha_0 + \alpha_1\hat{\varepsilon}_{t-1} + \sum_{i-1}^{r}\alpha_{i+1}\Delta\hat{\varepsilon}_{t-1} + \widehat{\vartheta}_t\omega + \tau_t$$

(10)

The standard t-test is done to test the null hypothesis ($\alpha_1 = 0$), which states that there is no Co-integration between examined variables. Furthermore, equation (11) provides three asymptotic distributions for the t-statistics.

$$t^* \rightarrow \varepsilon.t + \sqrt{1 - \varepsilon^2}.K \tag{11}$$

**Kao Residual Cointegration**

The Kao Residual Cointegration test is designed to test for the presence of cointegration in panel data settings. Cointegration indicates a long-run equilibrium relationship between time series, where, despite individual series being non-stationary, a linear combination of them is stationary. The Kao Residual Cointegration test is advantageous for its applicability to panel data, providing multiple statistics for robust results. The test is widely used in econometrics and applied research to investigate long-run relationships in large panel datasets, making it a valuable tool for empirical studies.

**Panel dynamic Ordinary Least Square (DOLS) estimations**

The panel dynamic ordinary least square estimations are vital in regression analysis because they estimate short run relations among variables in cases of a panel data set. To rid the biases, this approach applies feasible generalized least squares and instrumental variables which addresses problems like endogeneity and serial correlation. Large coefficients present the relationships of the variables in the short-run and it helps in assessing the DOLS results (Feldman, 2023). Thus, information concerning the short-run response of a variable to changes in one or more other variables can be obtained using the panel dataset containing cross-sectional data for different periods that provides information about dynamic relationships. The following functional form is as follows to examine the DOLS estimations that are identified as follows:

$$\Delta S_t = \pi(S_{t-1} - \gamma_0 - \gamma_1 L_{t-1}) + \sum_{i=1}^{r-1} \omega_i \Delta S_{t-1} + \epsilon_t \quad (12)$$

Where $\Delta S_t$ is the first difference of the dependent variable, $S_{t-1}$ and $L_{t-1}$ are lagged values of the variables, $\pi$ is the coefficient on the error correction term, $\gamma_0$ and $\gamma_1$ are the coefficients of the cointegration vector, $\omega_i$ are coefficients of lagged differences, and $\epsilon_t$ is the error term.

**Panel Fully Modified Ordinary Least Square (FMOLS) estimations**

The panel fully modified ordinary least square estimations or the panel FMOLS estimations of the regression indicate that the variables used capture the long run relations among them. FMOLS with instrumental variables include a technique of accounting for endogeneity or serial correlation as pointed out by Feldman. There is evidence of powerful outcomes of the research regarding the enduring relationships identified between different variables, which is facilitated by accurate and bias-free estimates that are useful when analysing times-series data that have cross-sectional characteristics. The functional form which follows is to assess the FMOLS estimations.

$$\Delta A_t = \ni A_{t-1} + \cap R_t + \emptyset_1 A_{t-1} + \ldots + \emptyset_{n-1} \Delta A_{t-(n-1)} + \mathsf{C}_t \quad (13)$$

Where $\ni$ represents the matrix of long run coefficients, $\cap$ represents the matrix of short run coefficients, $\emptyset$ represents the adjustment to the long run relationship, n is the number of lags included in the error correction model (ECM), and $\mathsf{C}_t$ is the error term.

**Dumitrescu Hurlin Panel Causality Tests**

Hurlin panel causality test is important to analyse the causality relationship between the variables in use in panel data. It extends the original bivariate Granger causality structure to the panel data by incorporating both the features of cross-sectional dependence and cross-sectional heterogeneity. Due to this, the effectiveness of the test is higher due to biased potential identification (Feldman, 2023). It helps the researchers to identify the order and magnitude of correlation between the variables in Panel datasets which plays an important role in forming policies and decisions by checking for causality between the involved parameters. The DH panel causality test is one of the most commonly used approaches in empirical research to test the causality in fields like economics or finance because of its framework for the analysis of the panel data.

**Variance Inflation factor (VIF)**

The findings of VIF are significant in establishing the extent of multicollinearity for the independent variables. Larger numbers depict higher levels of multicollinearity and a VIF of 1 shows that there is almost no multicollinearity at all. It is suitable to apply VIF for the econometrics and regressive analysis to control the high multicollinearity among the factors in the model which enhances the authenticity of the regression coefficients and makes them easier to comprehend.

# CHAPTER IV

## Findings and Results

### Introduction

This chapter presents the findings of the diverse econometric procedures employed in the analysis of the data in this investigation. This chapter presents an exposition and interpretation of the tools discussed in chapter three, encompassing their respective discoveries. Out of 41 Saudi Arabian manufacturing enterprises listed on the Tadawul website, data were collected from a subset of 18 of these businesses. Constrained data availability played a role in the decision to concentrate on this subset. This selection provides insightful information about the Saudi manufacturing industry despite its narrow focus. Due to the nation's strategic investments and aspirational global goals, Saudi Arabia's manufacturing scene is noteworthy. Manufacturing plays a major role in the economy, especially when it comes to supply chain dynamics, which is why it is given so much attention. The study presents unique ideas that have not yet been explored in the existing literature, marking a notable departure from the norm. With respect to Saudi manufacturing, this research is unique in that it covers a wide range of enterprises and is thoroughly examined through the use of multiple statistical tests.

### Descriptive statistics

Descriptive statistics provide information about the variables' distributional properties. The SCM mean of 0.136 points to a central tendency, but the positive skewness and high kurtosis point to a distribution that is heavily skewed to the right and contains large tails, raising the possibility of outliers. Conversely, Sales display a mean of 14.653, skewness near zero, and modest kurtosis, suggesting a distribution that is closer to normal. Nonetheless, ROA and ROE exhibit strong kurtosis along with positive and negative skewness, respectively, indicating distributions with heavy tails and possible outliers at both ends (George & Mallery, 2018). Finally, CCC has a mean of 4.739, a modest kurtosis, and skewness near zero, suggesting a distribution that is somewhat closer to normal than Sales. The dispersion of variables is revealed by descriptive statistics. First, SCM shows moderate variability with a median of 0.121 and a standard deviation of 0.191. Turning now to sales, there is greater variation around the median, with a median of 13.946 and a standard deviation of 3.826. With a standard deviation of 0.099 and a median of

0.055, ROA appears to have a relatively low dispersion around its median value. Comparably, moderate variability is shown around the median of ROE, which has a median of 0.096 and a standard deviation of 0.193. Finally, the median value of 4.853 and the standard deviation of 1.135 obtained from the CCC indicate a moderate level of variability around the median value.

Table 2.

*Descriptive statistics estimations*

| | SCM | SALES | ROA | ROE | CCC |
|---|---|---|---|---|---|
| Mean | 0.136 | 14.653 | 0.071 | 0.101 | 4.739 |
| Median | 0.121 | 13.946 | 0.055 | 0.096 | 4.853 |
| Maximum | 2.222 | 24.419 | 0.529 | 0.972 | 10.911 |
| Minimum | -0.383 | 8.122 | -0.214 | -1.175 | -0.002 |
| Std. Dev. | 0.191 | 3.826 | 0.099 | 0.193 | 1.135 |
| Skewness | 7.000 | 0.364 | 1.548 | -0.755 | 0.003 |
| Kurtosis | 77.267 | 2.820 | 6.980 | 17.780 | 8.554 |
| Jarque-Bera | 44503.210 | 4.372 | 198.054 | 1719.928 | 240.369 |
| Probability | 0.000 | 0.112 | 0.000 | 0.000 | 0.000 |
| Sum | 25.508 | 2740.086 | 13.286 | 18.825 | 886.156 |
| Sum Sq. Dev. | 6.808 | 2722.697 | 1.821 | 6.938 | 239.567 |
| Observations | 187.000 | 187.000 | 187.000 | 187.000 | 187.000 |

Source: Authors compilation data retrieved from EViews 13, Note: SCM = Supply Chain Management, ROA = Return on Assets; ROE = Return on Equity; CCC = Cash Conversion Cycle

**Variance Inflation factor (VIF)**

VIF results are key in showing the multicollinearity degree for the independent variables. While larger numbers indicate higher levels of multicollinearity, a VIF value of 1 indicates minimal multicollinearity. In this instance, the VIF values for Sales and CCC are 1.043954 and 1.012562, respectively, which are both relatively close to 1. These variables appear to have negligible multicollinearity, based on these near-unity VIFs, which suggests that they are relatively independent of one another in the regression model (Feldman, 2023). As a result, Sales and CCC's low VIF values suggest that adding them to the model will unlikely cause multicollinearity-related problems, which will increase the dependability of each of their respective contributions to the regression study. Furthermore, the ROE and ROA VIF values are 3.235313 and 3.178605, respectively. Despite being somewhat greater than 1, they remain reasonably small, suggesting comparatively modest multicollinearity. This implies that ROE and

ROA contribute to the model as well without having a major effect on the other variables' independence. As a result of this, the VIF values of ROA and ROE, while still over 1, show acceptable levels of multicollinearity, strengthening the validity of their contributions to the regression analysis.

Table 3.

*Variance Inflation factor*

| Variable | Variance | VIF |
|---|---|---|
| Sales | 0.00026 | 1.043954 |
| ROA | 0.083663 | 3.178605 |
| ROE | 0.013204 | 3.235313 |
| CCC | 0.000202 | 1.012562 |

Source: Authors compilation data retrieved from EViews 13, Note: SCM = Supply Chain Management, ROA = Return on Assets; ROE = Return on Equity; CCC = Cash Conversion Cycle

**RALS-ADF unit root test**

The RALS-ADF unit root test is pivotal in determining whether a time series variable follows a unit root process or not. If it does, it indicates a non-stationary series. A unit root indicates a stochastic trend in the series, indicating long-term unpredictability. To determine if the unit root's null hypothesis may be rejected, the test compares the t-statistic to critical values. "Level" denotes the original series in the table, while "1st Difference" denotes the differenced series, which is frequently utilized to attain stationarity. T-statistics are contrasted with significance thresholds (1%, 5%, and 10%) with critical values (here, -3.75, -3.30, and -3.05). We reject the unit root's null hypothesis and indicate stationarity if the t-statistic is more negative than these critical levels. Table 3 shows outcomes of RALS-ADF unit root test. The outcome shows that CCC is not stationary at level as t-statistics is 2.030 which is more than critical value of RALS-ADF which is -3.05 at 10%. However, CCC is stationary at 1st difference as t-statistics -8.942 is less than critical value of RALS-ADF which is -3.75 at 1%. SCM is not stationary at level as t-statistics is -1.996 which is more than critical value of RALS-ADF which is -3.05 at 10%. However, SCM is stationary at 1st difference as t-statistics -3.801 is less than critical value of RALS-ADF which is -3.75 at 1%. Sales is not stationary at level as t-statistics is 1.174 which is more than critical value of RALS-ADF which is -3.05 at 10%. However, Sales is stationary at 1st difference as t-statistics -10.827 is less than critical value of RALS-ADF which is -3.75 at 1%.

ROA is not stationary at level as t-statistics is -2.391 which is more than critical value of RALS-ADF which is -3.05 at 10%. However, ROA is stationary at 1st difference as t-statistics -3.145 is less than critical value of RALS-ADF which is -3.05 at 10%. ROE is not stationary at level as t-statistics is 2.849 which is more than critical value of RALS-ADF which is -3.05 at 10%. However, ROE is stationary at 1st difference as t-statistics -4.145 is less than critical value of RALS-ADF which is -3.75 at 1%.

Table 4.

*RALS-ADF unit root test*

| | Level | | 1st Difference | |
|---|---|---|---|---|
| | T-Statistics | Rho | T-Statistics | Rho |
| ccc | 2.030 | 0.573 | -8.942 | 0.752 |
| scm | -1.996 | 0.189 | -3.801 | 0.457 |
| sales | 1.174 | 0.604 | -10.827 | 0.585 |
| roa | -2.391 | 0.145 | -3.145 | 0.214 |
| roe | 2.849 | 0.127 | -4.145 | 0.558 |

Source: Authors compilation data retrieved from EViews 13, Note: SCM = Supply Chain management, ROA = Return on Assets; ROE = Return on Equity; CCC = Cash Conversion Cycle; The 1%, 5%, and 10% critical values for the RALS-ADF are -3.75, -3.30 and -3.05 respectively.

**RALS-EG Cointegration**

In time series analysis, cointegration is a crucial statistical characteristic that occurs when two or more on-stationary variables move together across time even when they are not stationary individually. It indicates that the variables have a long-term equilibrium relationship and that they respond steadily to deviations from this equilibrium. The RALS-EG test, on the other hand, is created to determine cointegration in the panel data. This particular method makes the EG cointegration test more flexible to account for cross-sectional dependence and heterogeneity, making it an extension of the former to a pooled data setting. Since the test factors in such concerns in estimating the long-term equilibrium relationships among the variables in panel datasets, the results thus produced are more reliable. Thus, the results of the RALS-EG Cointegration test indicate a statistically significant level of cointegration of the examined variables. Based on the results of table 5 there is strong evidence against the null hypothesis of no cointegration is shown by the T-statistic value of -5.2518, where this value is less than critical value of RALS-EG which is -4.80 at 1%. Cointegration is further supported by the Rho value of

0.845614 and this number indicates a high level of correlation between the variables. Also, it is revealed that the optimal lag length (K), as estimated by recursive statistics is zero. From this one gets the impression that no lag factors were used in the development of the cointegration model (Yussuf, 2022). Altogether, these findings all together work in a manner that is reflected in the test results for the examined factors and show a proved long-term correlation.

Table 5.

*RALS-EG Cointegration*

| Methods | K | T-statistics | Rho |
|---|---|---|---|
| RALS-EG | 0.000 | -5.2518 | 0.845614 |

Source: To compile the data, Authors used EViews 13; the critical values of the RALS-EG test for the present analysis at 1% 5% and 10% are -4. 80, -4. 19, and -3. 88 respectively; K shows the optimally determined lag length based on the recursive statistics.

**Kao Residual Cointegration**

The Kao Residual Cointegration Test shows that there is a statistically significant link between the variables being investigated, indicating long-term association despite temporary changes. The T-statistics of -2.94937 confirm that there is good evidence against the null hypothesis of no cointegration. Furthermore, the probability value for test statistic is 0.0016, lesser than traditional level of significance at 0.05 which adds credence to null hypothesis' rejection and support for existence of cointegration (Yussuf, 2022). These results from the Kao Residual Cointegration Test essentially imply strong long-term ties between these variables.

Table 6.

*Kao Residual Cointegration Test*

| | t-Statistic | Prob. |
|---|---|---|
| ADF | -2.94937 | 0.0016 |

Source: Authors compilation data retrieved from EViews 13

**Panel dynamic Ordinary Least Square (DOLS) estimations**

Regression analysis is one of the most important tools in econometrics. In panel data, DOLS estimates are very important because it helps identify the short-term relations between variables. The feasible generalized least squares and instrumental variable approaches used here correct for endogeneity and serial correlation to ensure unbiased estimates (Badi, 2023). If we have a

significant coefficient, it can be useful in interpreting our DOLS results as we analyze them. Thus, these findings help in understanding how changes in one variable affect another within a panel dataset shortly. Systematic errors such as endogeneity and serial correlation are corrected through feasible generalized least square estimation and instrumental variables techniques employed by this approach for unbiased estimations. On the other hand, from the relevance coefficients of Sales (0.062) and ROA (1.227), both with too low p-values (0.000) at 1% level of significance, it indicates that sales and ROA have positive impacts on SCM which is the dependent variable. Therefore, if we increase either sales or ROA by 1%, SCM will rise respectively by 0.062% or 1.227%. Additionally, the p-value (0.000) at 1% level of significance for ROE and the coefficient is (-0.338) implying that there exists inverse relationship with the dependent variable. It implies that if you raise your ROE by one percent, your SCM drops by -0.338%. Moreover, the CCC shows a statistically significant negative relationship with SCM and has a coefficient of (-0.017) with p-value of 0.002; this implies that if CCC is increased by 1% then SCM will decrease by 0.017%. Therefore, it can be concluded that ROE and CCC are negatively related to the dependent variable whereas Sales and ROA have positive impacts on SCM in the short-term as suggested by these findings. Increased income and improved operational efficiency are the main causes of the positive correlation between Sales and ROA with SCM. On the other hand, increasing in the equity base much faster than profit and slower cash conversion with financial limitations are probably the causes of ROE and CCC's detrimental effects on SCM, respectively. These interactions show how operational and financial aspects can help or hurt SCM efficacy in a business.

Table 7.

*Panel dynamic Ordinary Least Square (DOLS) estimations*

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| Sales | 0.062 | 0.006 | 10.673 | 0.000 |
| ROA | 1.227 | 0.108 | 11.396 | 0.000 |
| ROE | -0.338 | 0.079 | -4.271 | 0.000 |
| CCC | -0.017 | 0.005 | -3.205 | 0.002 |

Source: Authors compilation data retrieved from EViews 13, Note: SCM = Supply Chain management, ROA = Return on Assets; ROE = Return on Equity; CCC = Cash Conversion Cycle

**Panel Fully Modified Ordinary Least Square (FMOLS) estimations**

Panel fully modified ordinary least square (FMOLS) estimations show the long-term correlations between variables are revealed by panel FMOLS estimations in regression analysis. The use of FMOLS with instrumental variables allows for the accounting of endogeneity and serial correlation (Feldman, 2023). Robust findings about the long-term associations between variables are ensured by its efficient and objective estimations, which are particularly useful when evaluating time series data with cross-sectional dimensions. The results show strong correlations between the covariates and the dependent variable in the long run in the panel FMOLS estimate, a popular method for panel data analysis. The results show that sales and ROA have positive and significant effects on the dependent variable SCM, with respective coefficients of (0.056379) and (1.487584), both having extremely low p-values at 1% level of significance. In other words, if we increase sales or ROA by 1% then the SCM will rise by 0.056379% and 1.487584%. On the contrary, there is a statistically significant negative relationship between ROE as shown by its low p-value 0.000 at 1% level of significance and coefficient of (-0.46507) with the dependent variable SCM. It means that if we increase ROE by one percent, then it will lower SCM by -0.46507%. Finally, CCC has a (-0.04724) coefficient and a p-value of 0.001, therefore it implies that it has a negative impact on the SCM which is statistically significant. It means that if we increase CCC by one percent, then it will lower SCM by -0.04724%. Meanwhile, Thus, these findings indicate that ROE and CCC have an adverse effect on SCM. However, sales and ROA are beneficial in long run perspective since they exhibit positive relationship with the latter when panel data analysis is done using FMOLS approach.

Table 8.

*Fully Modified Ordinary Least Square (FMOLS) estimates*

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| Sales | 0.056379 | 0.016128 | 3.495758 | 0.001 |
| ROA | 1.487584 | 0.289246 | 5.142969 | 0.000 |
| ROE | -0.46507 | 0.114908 | -4.04733 | 0.000 |
| CCC | -0.04724 | 0.014217 | -3.32269 | 0.001 |

Source: Authors compilation data retrieved from EViews 13, Note: SCM = Supply Chain management, ROA = Return on Assets; ROE = Return on Equity; CCC = Cash Conversion Cycle

**Dumitrescu Hurlin Panel Causality Tests**

Hurlin Panel Causality Test is critical in to examine causal relationships between variables in panel data. By taking into account both cross-sectional dependence and heterogeneity, it expands the Granger causality test to panel data. Taking into account cross-sectional dependence and heterogeneity, the Granger causality test is extended to panel data. Accounting for possible biases, the test delivers more dependable results. It assists researchers in understanding the direction and strength of correlations in panel datasets, which is crucial for informed policy and decision-making, by testing causality between variables. A noteworthy W-Stat. of 3.260 and a p-value of 0.006 support the tests' clear rejection of the null hypothesis, which asserts that SALES does not cause SCM. These findings indicate a causal connection between SALES and SCM. Conversely, there is adequate evidence to uphold the null hypothesis that SCM does not cause SALES, evidenced by a Zbar-Stat. of -0.190 and a p-value of 0.849. A causal link between ROA and SCM is also indicated by a p-value of 0.008 and a W-Stat. of 3.200, supporting the rejection of the null hypothesis that ROA does not cause SCM. Alternatively, there is a lack of evidence to reject the null hypothesis that SCM does not cause ROA, as shown by a Zbar-Stat. of -0.100 and a p-value of 0.921. Additionally, substantial evidence indicates ROE causing SCM with a significant W-Stat. of 16.127, and an extremely low probability value of 0.000, the null hypothesis that ROE does not cause SCM is firmly rejected. In contrast, the null hypothesis, which is indicated by a Zbar-Stat. of -0.414 and a likelihood of 0.679, indicating the evidence of the null hypothesis that SCM does not cause ROE, and this null hypothesis cannot be rejected. furthermore, with a W-Stat. of 3.001 and a probability value of 0.018 indicating evidence of CCC causes SCM, the null hypothesis about CCC does not cause SCM is rejected. moreover, there is strong evidence that SCM causes CCC, as shown by the null hypothesis being firmly rejected with a high W-Stat. of 3.606 and a very low probability value of 0.001. Based on the data, it is revealed that that there is unidirectional causality between ROA, ROE, Sales and SCM. however, there is bidirectional causality between CCC and SCM.

Table 9.

*Dumitrescu Hurlin Panel Causality Tests*

| Null Hypothesis: | W-Stat. | Zbar-Stat. | Prob. |
|---|---|---|---|
| SALES does not homogeneously cause SCM | 3.260 | 2.266 | 0.006 |
| SCM does not homogeneously cause SALES | 1.271 | -0.190 | 0.849 |
| ROA does not homogeneously cause SCM | 3.200 | 2.651 | 0.008 |
| SCM does not homogeneously cause ROA | 1.332 | -0.100 | 0.921 |
| ROE does not homogeneously cause SCM | 16.127 | 21.687 | 0.000 |
| SCM does not homogeneously cause ROE | 1.119 | -0.414 | 0.679 |
| CCC does not homogeneously cause SCM | 3.001 | 2.358 | 0.018 |
| SCM does not homogeneously cause CCC | 3.606 | 3.248 | 0.001 |

Source: Authors compilation data retrieved from EViews 13, Note: SCM = Supply Chain management, ROA = Return on Assets; ROE = Return on Equity; CCC = Cash Conversion Cycle

# CHAPTER V

## Discussion

Throughout this study, the primary aim was to explore the efficacy of using financial metrics to evaluate the performance of supply chain management in Saudi Arabian manufacturing enterprises. By examining key financial metrics such as return on assets (ROA), return on equity (ROE), and cash conversion cycle (CCC), the study sought to understand their implications for SCM effectiveness. Additionally, the study aimed to fill the gap in existing literature by investigating the applicability of financial ratios across different industrial sectors and their potential as standardized performance indicators for SCM. A panel regression analysis shows varying interdependencies. Understanding threshold and coefficient significance is crucial to understanding how each variable affects SCM. It can be asserted that financial metrics play a crucial role within the context of supply chain management (SCM) with specific regard to the manufacturing industry. In this discussion, we will compare this study for the manufacturing sector in Saudi Arabia with other studies.

The findings of this study show that CCC negatively affect the SCM. Thus, it can be concluded that enhancing the efficiency of the SCM can minimize the CCC and vice versa. It is not far from the research conducted by Hosseini et al. (2017), who called for further discussions concerning working capital and cash flow. Comparatively, this study presents a relatively more focused analysis of CCC. Moreover, the former examines the effects of CCC through other financial measures and the consequences on cash flows and working capital management. In addition, Johnson and Templar (2011) also established that changes in the proxy for SCM efficiency significantly and negatively affect the cash-to-cash cycle, meaning that efficient supply chain management Shortens the time inventory is held and enhances cash flow. It supports the importance of CCC in SCM performance since both studies propose that the management of CCC is vital in improving supply chain performance. The study by Hong et al. (2020) identified correlations with our research. Both studies stress operational efficiency ratios, such as the CCC. The CCC also negatively affects the SCM in this study. Additionally, Hong et al. note that days-sales-outstanding (DSO) and days-inventory-outstanding (DIO), elements of CCC, are vital for assessing the supply chain capability (SCC). They discover that super excellent SCC firms have

very low DSO and DII, a sign of good operations and low inventory holdings. This alignment implies that both studies support the idea that CCC and its sub-constructs, namely DSO and DII, are vital for improving supply chain performance. From both analyses, operational efficiency is among the most critical factors influencing supply chain performance regarding CCC, DSO, and DII. Therefore, the findings of this study imply that these metrics should be well managed to enhance the performance of the supply chain.

In this study, I noticed that the ROE negatively affects the SCM in the Saudi manufacturing sector. In the study of the finance performance and supply chain management performance based on BSE 100 stocks from 2005 to 2015, Hosseini et al. (2017) explored the linkage between finance and SCM. Hosseini et al. also investigated the relationship between ROE and SCM ratio, concluding that there is a negative association for manufacturing firms and a positive association for service firms. This affected the manufacturing firms, and its impacts were more prominent from 2010 to 2015. Working capital investments have shown considerable changes during 2010-2015 after the financial crises, impacting the SCM performance. These findings indicate a negative influence of ROE on the SCM ratio in the manufacturing industry, both in the case of this study and in the previous study. It implies that this sector may receive higher returns on equity because of a less efficient supply chain, sometimes because of high working capital and other factors. Similarly, findings from Johnson and Templar (2011) also support this by revealing a robust relationship between improvements in SCM and ROE because of enhanced operations efficiency and effective management practices. Johnson's findings indicate that the efficiency improvement of SCM has a positive relationship with the ROCE. This aligns with what we found in the present study, that ROE negatively relates to the SCM ratio. Each of the findings supports the study's proposition that there is a strong connection between equity returns and supply chain performance and that the two are not always positively associated because operation efficiency could be offset to achieve higher returns in the manufacturing sector.

This research, as well as the work done by Hosseini et al. (2017), suggest that enhancing sales enhances the performance of SCM since sales volumes are associated with the effective use of resources in the supply chain. Thus, both the present study and the study by Hosseini et al. reveal that financial metrics are crucial to the success of SCM in the manufacturing industry. Also, there is a positive relationship between sales and the SCM, which implies that increasing sales volumes enhances supply chain management. Johnson and Templar (2011) reaffirm this by

establishing that sales have a positive relationship with enterprise value (EV) and they are affected by the enhancement of SCM practices. It also implies that increased sales resulting from proper supply chain management improve the firm's and its operations' worth. Likewise, Hong et al. (2020) also revealed a positive correlation between revenue changes and Shareholder value (SHV). This implies that SCC benefits from increased sales.

The findings of this research are consistent with the hypothesis that indicates a positive effect of ROA on the SCM; that is, efficient usage of assets can improve supply chain management. Hong et al. (2020) revealed that profitability indexes such as ROA and Return on Sales (ROS) are positively associated with SCC. It coincides with this study since both confirm that profitability metrics affect the supply chain performance. As for Hosseini et al. (2017), though they do not discuss ROA directly, their results regarding enhancing operational earnings are consistent with the tendency observed in the study. Also, in this research, ROA positively influences SCM. It means that the efficiency of asset deployment leads to better supply chain results. Johnson and Templar (2011) did not directly examine ROA; however, the author of this study revealed that enhancing the SCM practices results in better financial performance in terms of sales and total assets, which in turn supports the relationship between ROA and SCM performance identified in the present research.

The results concerning the negative link between ROE and SCM and the effects of CCC, ROA, and sales are consistent across all the studies. This comparative analysis contributes to the literature by expanding the analysis and description of the relationship between financial metrics and supply chain management. From the findings of this study and the other studies, the following recommendations may be helpful for managers in the manufacturing sector to enhance SCM and, thus, their organizations' financial performance. To reduce the adverse effects of ROE, managers should work on the following to enhance working capital management. It includes adopting just-in-time inventory systems to reduce inventory levels, improving receivables management by offering early payment discounts or better credit terms and implementing cost control measures. Some of the measures that can be taken include investing in technology and process control, improving the supply chain negotiation and automation of some of the processes. Sales forecasting improvement will thus help improve supply chain management since demand will be predicted more accurately.

To reduce the effects of CCC, managers can lengthen the payment time taken with suppliers, using factoring or invoice discounting to get cash from the sales invoice sooner and improve the inventory turnover by adopting specific measures. Some of the key concepts that define efficient inventory management include the employment of sophisticated techniques in determining the inventory requirements about the actual consumption patterns as well as the cultivation of close relationships with suppliers to enhance the lead time; it is critical to maintain and develop the assets to use them effectively and efficiently with the help of proper schedules to realize the positive consequences from ROA. Within strategic investments, there should be a focus on high return projects such as advanced manufacturing technologies and efficient logistics systems. At the same time, asset rationalization requires the divestiture of underutilized or non-performing assets in order to release capital for better use. Thus, to maximize the positive effect of sales, managers should increase sales by expanding the market geographically or demographically and by offering new products or services related to the existing ones. Expanding customer relations through loyalty programs and feedback will lead to higher satisfaction levels and, thus, increased sales. Other strategies, such as digital marketing and sales promotions, can also increase sales. Holistic supply chain management is crucial and entails integrating supply chain systems to improve the chain's visibility and coordination and the culture of improvement to address the dynamic market environment. Diversification of suppliers and conducting supply chain analysis for risks will help ensure the continuity of supply. Sustainability measures such as using sustainable supply chain management and green technologies will increase efficiency, decrease costs and increase the company's image. Thus, using these strategies will enable managers in the manufacturing sector to apply financial metrics to improve the supply chain and, therefore, the financial results.

Connection coefficients indicate strength and trend. Sales, ROA, ROE, CCC, and SCM correlated strongly. Sales increase SCM performance due to the positive correlation. High SCM performance decreases ROE, which decreases CCC as well. We can evaluate the coefficient's dependability using significance. Data with p-values below 0.05 is considered significant and random variation-free. Statistical significance of coefficients makes regression results and linkages trustworthy. Consider variable linkages' direction and strength in panel regression. Positive coefficients mean the dependent variable rises with the independent. The two variables have a negative coefficient because the dependent variable drops as the independent variable

grows. Sales and ROA are positively correlated, so larger sales money and ROA improve SCM performance. Supply chain management boosts sales and profits, corroborating these findings. ROE and CCC have negative coefficients, hence high levels may hinder SCM. Capital shortages, inventory mismanagement, or both limit supply chain efficiency. Coefficient size shows how tightly dependent and independent variables are linked. Higher coefficients indicate a greater impact on SCM performance.

Our findings confirm previous research associating profitable supply chain management to sales growth. Well-managed, profitable supply networks are more efficient, study shows. Both theoretical and practical research suggest that ROE, CCC, and SCM performance are inversely connected. Cointegration tests that are statistically significant indicate long-term equilibrium. Statistically significant cointegration tests reveal variables are always balanced. When one variable changes, the others do too, showing consistency.

Variable cointegration shows supply chain dynamics. Cointegration study ties SCM performance to sales, financials, and long-term profitability. Sales or revenue variations can significantly affect supply chain operations due to their strong relationship. To fulfill demand, distribution networks, manufacturing capacities, and inventory management may need to be modified. Liquidity and financial success effect supply chain management dynamics through ROA, ROE, and CCC. Good cash flow management or profitability promotes supply chain management performance and profitability despite budgetary limits or operational inefficiencies.

Consider these long-term equilibrium relationships when selecting a supply chain strategy. Examining sales, financial performance, and supply chain results can improve efficiency, risk, and resource utilization. A causality test shows how panel data components interact. Causality tests demonstrate how variables are related, so we can determine what affects SCM effectiveness and other supply chain aspects. Dumitrescu-Hurlin panel causality tests demonstrate varying relationships' nature and direction. Significant links illuminate SCM metrics and strategic decision-making. Sales and SCM are strongly correlated in the causality test. Sales income greatly affects supply chain management. Sales predictions and SCM operations assist companies fulfill consumer demand, manage inventories, manufacturing schedules, and on-time delivery.

Shorter CCCs boost supply chain liquidity, cash conversion, and working capital. Cash flow management issues, late accounts receivable, and excess inventory can prolong CCC and

diminish supply chain efficiency. Better risk, earnings, and time to market with CCC. Understanding how sales, financial performance measures, CCC, and SCM results relate may improve supply chain efficiency, risk management, and resource management. Sales projections help supply chain planners manage inventory, schedule production, and predict consumer demand. Storage costs, customer satisfaction, and stockouts may be reduced by organizational cooperation.

Supply chain management and ROA show how profitability affects supply network efficiency. A company should focus in the operational efficiency, cost control, and revenue generation to increase supply chain profits and compete. Technology, process optimization, and personnel training can increase resource utilization, waste reduction, and supply chain efficiency. SCM and CCC are related, thus optimizing working capital keeps a supply chain running smoothly. To reduce CCC and boost liquidity, businesses should streamline cash conversion, receivables collection, and inventory turnover. Working capital management can boost financial flexibility, reduce liquidity difficulties, and lessen borrowing costs. These strategies boost supply networks' competitiveness. Understand causation to improve supply chain management, performance, and resource allocation. These insights decrease risk, prioritize investments, and highlight supply chain management success factors, helping companies develop sustainably and competitively.

Finally, integrating the study's objectives and data helps us understand financial metrics and supply chain management success. By establishing causal linkages between variables, this research advances supply chain management, profitability, cash conversion cycle, and sales theory and practice. The study's limitations aside, these findings lay the framework for future research on supply chain efficiency's financial impacts on organizational success.

# CHAPTER VI

## Conclusion

Manufacturing enterprises rely heavily on supply chain management. It has an effect on both the costs and financial gain of things produced, as well as the company's infrastructure and how suppliers and consumers interact with one another. This research focuses on the assessing the impact of financial matrices such as sales, ROA, ROE, and cash conversion cycle on the supply chain management of Saudi Arabian manufacturing sector. This research employed the data for the time period ranging from 2012 to 2022, which author extracted from the financial statement of the 18 selected manufacturing companies of the Saudi Arabia. Moreover, this research employed the newly developed RALS-ADF test to assess the unit root problem in the data. The RALS-EG cointegration test estimator is used to examine the long run association among the variables of the study. Additionally, this research thesis employed FMOLS and DOLS to estimate the coefficients of the variables. Finally, we employed the DH causality to investigate the direction among the facets of this study. DH causality test shows that sales, ROA, and ROE have unidirectional association with SCM. However, CCC has a bidirectional association with SCM. Moreover, the outcomes of FMOLS and DOLS show that Sales and ROA have positive and significant effects on the dependent variable SCM. It shows that if we increase sales and ROA then SCM will similarly increase. However, the outcomes also show that ROE and CCC have negative and significant effects on the dependent variable SCM. It shows that if we increase ROE and CCC then SCM will decrease.

This study examined Saudi industrial firms' SCM effectiveness financial indicators. Key SCM indicators are ROE, CCC, sales, and ROA. Many financial variables affect supply chain efficiency and effectiveness, showing that financial management tactics affect operational performance. These measures increase supply chain efficiency. A company's first strategic financial management goal should be supply chain efficiency. SCM objectives include revenue, profitability, and cash conversion cycle efficiency. Managers must weigh operational and financial factors while making decisions. Finance and supply chain management goals align to boost performance and collaboration. Review financial and SCM performance ratios regularly. This helps us identify issues and offer customized solutions. Companies may grab supply chain

opportunities and avoid pitfalls by monitoring key performance measures as financial ratios may help quantify SCM success.

**Recommendations**

This research has offered insights into how financial metrics are used to assess supply chain management performance. However, there are areas for exploration that could enhance our comprehension of this field. The recommendations below suggest topics for study providing direction for researchers and companies looking to advance knowledge in supply chain management.

Exploring Longitudinal Studies: One promising area for investigation involves conducting studies to observe how financial ratios and performance metrics change over time in response to shifts in supply chain strategies, market conditions, and organizational factors. By monitoring firms' supply chain performance over a period, researchers can uncover trends and patterns influencing SCM effectiveness. Gain insights into the long-term impact of various SCM practices.

Undertaking Comparative Analysis: Another productive avenue for research is conducting analyses to compare supply chain performance across sectors, regions, and organizational environments. By examining variations in SCM practices across contexts researchers can identify benchmarks and lessons learned that can inform the enhancement of successful SCM strategies and processes. Comparative studies can also illuminate the factors driving differences in SCM performance and help pinpoint areas for improvement.

Impact of Technology Adoption: Artificial Intelligence; blockchain; and the IoT are among the most significant technologies which can revolutionize supply chain dynamics in the near future. Future research could build on this study by specifically looking at the relationship between technology adoption and SCM performance in terms of efficiency, agility, and resilience. With an emphasis on analyzing how organizations apply technology in supply chain management, researchers can discover tactics and trends that are valuable in the technology advancement of SCM procedures.

Integration of Financial and Operational Planning: Another area of focus is the combination of the value and activity-based planning initiatives to increase the linkage between strategy and resources. Evaluating the financial aspect in SCM decision-making helps organizations to

identify the costs of different initiatives in supply chains and invest in the projects with high returns. It can also help to enhance the cooperation between the finance and the operations departments since both aspects would be managed under the same process.

Adoption of Performance-Based Metrics: It will be beneficial for organizations to incorporate performance-based metrics on the functionality of SCM in order to determine it's efficiency and possible areas for optimization. Originally, organizations can avoid using a number of factors among which the most common financial measures don't always suit the context of SCM and may not be efficient to evaluate the performance of the activity; however, SCM-specific measures should be employed in case of performance evaluation including order fulfillment ratios, inventory turnover, and lead time. These KPIs help organizations to observe the supply chain performance in real-time and make necessary adjustments in case of existing flaws in the supply chain's functioning.

Investment in Technology and Automation: Another significant recommendation that needs to be made to improve SCM effectiveness and flexibility is the acquisition of technologies and automation tools. With the help of technologies, like AI, firms can enhance the flow of different operations in their supply chain, increase demand forecasting efficiency and decrease the lead time. Tasks like order input, storage of inventory details and transport planning and scheduling are also other areas whereby automation of these activities would further assist in eliminating boredom, lessen possibilities of error, and increase efficiency.

Collaboration with Supply Chain Partners: This is important while seeking to attain the best in SCM as it involves not only the logistics provider but also the suppliers and distributors. An organization needs to engage in cooperation that is characterized by trust, disclosure, and the mutual pursuit of value for the purposes of generating novel solutions that would decrease costs and minimize risk within the supply chain. Through the cooperation and exchange of information and materials with stakeholders, the organizations can define areas of improvement, optimize stock and supply chain recovery.

Continuous Improvement and Adaptation: Applying systems improvement and integration is an essential strategy used in SCM as a management practice. The idea is that organizations must become learning organizations and continuously adapt to market changes and customers' needs, wants, and expectations. Through the periodic assessment of SCM performance, gathering

feedback at the firm level, and integrated improvement cycles, firms enhance their competitiveness and adaptability in today's rather skeptical and uncertain environment.
Talent Development and Training: To strengthen the working force that can effectively and efficiently advance the tenets of SCM, training and development of talents are crucial. Employers should make those opportunities and resources that will enhance the technical competence, analysis skill, and knowledge of the current schemes in the organization. When organizations invest on their employees they promote the spirit of innovation, teamwork, and organizational performance in the implementation of the various changes in the SCM practices.
Risk Management and Resilience Planning: The supply chain disruptions hurt the organizations, and to minimize their impact, the organizations should consider risk management and business continuity planning. Thus, through effective risk analysis included the assessment of risks, major areas of exposure to risks, as well as the establishment of measures to be taken in case of risks, organizational risks can easily be managed. Also, they need to extend the list of suppliers, create extra capacities for supply chains, and forecast possible risks with the help of big data analysis.
Since sustainability and corporate social responsibility (CSR) are gaining more attention in organizations, the future research could focus on sustainability strategies and its link with SCM performance. In examining how organizations have implemented sustainability into their strategic supply chain management, the researchers can evaluate outcomes of sustainability initiatives on overall SCM, stakeholders' perception, and organizational results. Furthermore, research may look into how CSRs improve various supply chain relations, decrease pressure on the environment, and increase trust and customer loyalty. Thus, in the context of risk SCM, it is possible to address the fact of the increased interdependence and complexity of the supply chains all over the world, which makes efficient risk management a crucial factor. Future research also might be aimed at further investigation of ways, methods, approaches, tools and techniques for supply chain risk management with the possible use of predictive analytics, various forms of scenario analysis, supply chain mapping, and financial approaches. Such an analysis of how organizations identify and manage supply chain risks can enable researchers to generate knowledge on how to create sustainable SCM and practices. It is crucial to acknowledge that people aspect also plays a crucial role in SCM. Future research should also consider human factors like leadership and culture as factors which would affect the performance of SCM. Thus, when exploring the levels of organization culture, leaders' behaviors, and employees'

involvement concerning SCM practices and results, the researchers can define potential avenues for improving organizational performance and guaranteeing constant enhancement in SCM. Researchers should study financial and non-financial SCM performance metrics to understand supply chain dynamics. Due to regional and industry-specific market dynamics, regulatory contexts, and firm practices, financial ratio transferability studies are essential.

The impacts of sustainability, digitization, and globalization on SCM success evaluation need additional study. Supplier chain environmental and social responsibility is becoming more important to companies. Measure supply chain management strategies to evaluate their full sustainability impact. With IoT, AI, and blockchain, supply chain visibility, agility, and efficiency are easier than ever (Sallam et al., 2023). However, these technologies may require new performance monitoring methods.

We stress the importance of financial measurements for SCM effectiveness evaluation and improvement area identification after the literature study. Financial ratios can show supply chain efficiency, but complexity, sector specificity, and volatility limit them. Research on these issues should evaluate each company's environment, supply chain management trends, and monetary and non-monetary measures. Academics and industry leaders can increase organizational performance, supply chain efficiency, and stay ahead in today's fast-paced business world by learning about SCM performance evaluation.

Effective supply chain management is critical for enhancing organizational competitiveness and sustaining long-term success in the fast-paced corporate environment of today. Building upon the findings of this study, several recommendations are proposed to help organizations optimize their SCM strategies and improve overall performance.

The recommendations offer guidance for businesses looking to improve overall performance and optimize their supply chain management procedures. By integrating financial and operational planning, adopting performance-based metrics, investing in technology and automation, fostering collaboration with supply chain partners, embracing continuous improvement and adaptation, investing in talent development and training, and prioritizing risk management and resilience planning, companies can create competitive, adaptable, and agile supply chains that can fulfill the needs of the fast-paced business world of today.

The recommendations provided above show the possibility of development of new directions in the sphere of supply chain management. Thus, by utilizing these approaches, researchers can

enhance the knowledge of SCM practices, reveal possible enablers and areas for enhancement, and help build the enhanced and better supply chain models. Ultimately, the insights gained from future research efforts can help organizations enhance their SCM capabilities, drive competitive advantage, and achieve long-term success in today's complex and dynamic business environment. In conclusion, this study complements supply network and financial management literature. This study shows how financial ratios affect efficient SCM, which can aid academics and specialists. Building on this findings, future research could go many paths. Similarities between sector, more financial measurement and supply chain management research across industries illuminates specific organizations' dynamics and difficulties. Longitudinal research can illuminate how financial management affects supply network performance. Financial and supply chain management metrics are studied. By providing context for financial management and supply chain management results, case studies can enhance quantitative analysis. Strong financial management is stressed in this study's final suggestions for organizations looking to optimize supply chain management. Every company should consider critical performance measures and financial variables when making decisions to grow and compete in the quick-paced corporate environment of today.

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# APPENDICES

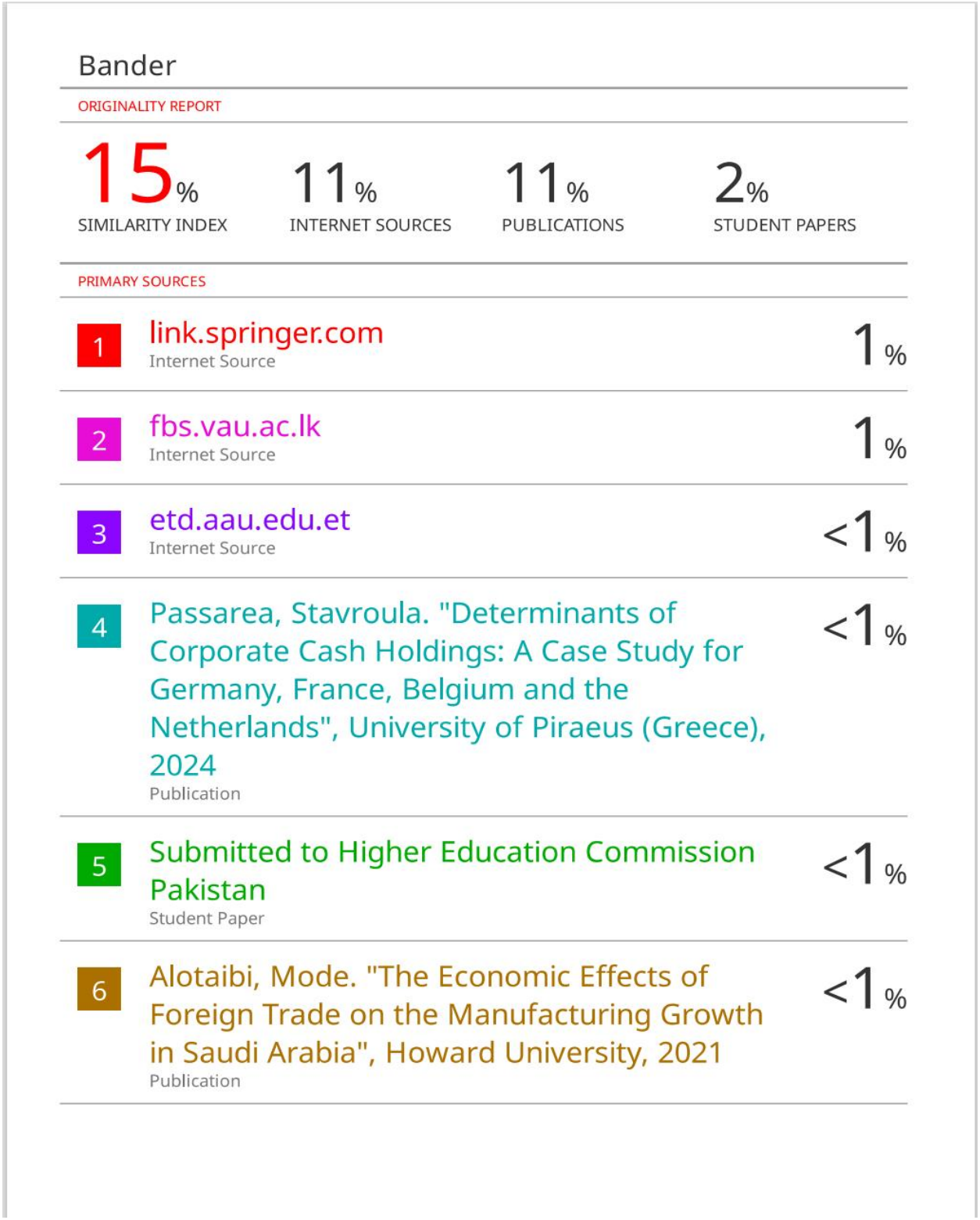
## Appendix A

## Table of Companies

| NO. | Company name |
|---|---|
| 1 | Petro Rabigh |
| 2 | Middle East Paper Co |
| 3 | Basic Chemical Industries Co |
| 4 | Alujain Corp |
| 5 | Saudi Arabian Mining Co |
| 6 | Arabian Pipes Co |
| 7 | National Industrialization Co |
| 8 | Saudi Basic Industries Corp |
| 9 | Sahara International Petrochemical |
| 10 | sabic agri-nutrients co |
| 11 | Saudi Kayan Petrochemical Co |
| 12 | Qassim Cement Co |
| 13 | Hail Cement Co |
| 14 | Eastern Province Cement Co |
| 15 | Saudi Ceramic Co |
| 16 | Thob Al Aseel Co |
| 17 | Savola Group |
| 18 | Almarai Co |

**Appendix B**

**Turnitin Similarity Report**



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| 4 | Passarea, Stavroula. "Determinants of Corporate Cash Holdings: A Case Study for Germany, France, Belgium and the Netherlands", University of Piraeus (Greece), 2024<br>Publication | <1% |
| 5 | Submitted to Higher Education Commission Pakistan<br>Student Paper | <1% |
| 6 | Alotaibi, Mode. "The Economic Effects of Foreign Trade on the Manufacturing Growth in Saudi Arabia", Howard University, 2021<br>Publication | <1% |

**Appendix C**

**Ethical Approval**

NEAR EAST UNIVERSITY

**SCIENTIFIC RESEARCH ETHICS COMMITTEE**

11.06.2024

Dear Bandar Bin Afi

Your project **"The role of financial metries in supply chain management: Evidence from Manufacturing sectors of saudi Arabia"** has been evaluated. Since only secondary data will be used the project does not need to go through the ethics committee. You can start your research onthe condition that you will use only secondary data.

Prof. Dr. Aşkın KİRAZ

The Coordinator of the Scientific Research Ethics Committee