Role of IT on the Effectiveness of Logistics and Supply Chain Management Systems in the Pharmaceutical Sector in Saudi Arabia Vision 2030

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Abstract

The main objective of this study is to evaluate how IT might improve the efficacy and efficiency of supply chain management and logistics systems in the pharmaceutical sector because the pharmaceutical industry is experiencing a transformation by the lofty objectives outlined by Saudi Arabia Vision 2030. The study was conducted using 150 executives working in the Saudi Arabian pharmaceutical industry's logistics and supply chain division. An open-ended survey questions were used to determine how IT technology affects pharmaceutical logistics and supply chain using non-probability sampling, logistics managers' LinkedIn accounts were selected for the sample, irrespective of the organization's size, location, or gender. SPSS statistical tools were used to analyse the data. It was found that the integration of IT tools and systems has emerged as a crucial enabler in this process. By harnessing the power of data analytics, IoT (Internet of Things), and automation, pharmaceutical companies can gain real-time insights into their supply chains. This, in turn, allows them to develop agile responses to changing market dynamics and customer expectations. Such strategic decisions, driven by IT, enable businesses to adapt quickly, reorganize their operations, and offer value-added services tailored to the specific needs of the market. Moreover, the creative application of IT solutions facilitates efficient inventory management, demand forecasting, and tracking of pharmaceutical products from manufacturing facilities to end consumers results also show that companies may simply increase the pace of the supply chain with the aid of innovative chances in major choices and judgments.

Keywords: *Information Technology, Logistics Management, Supply Chain Management, Pharmaceutical Company, Saudi Arabia Vision 2030.*

INTRODUCTION

Information technology (IT) is the term used to describe the management, storage, processing, and transmission of information using digital technologies, computers, and software. IT is essential for improving productivity, efficiency, and decision-making across a range of sectors, including healthcare, banking, and manufacturing. Operations are streamlined, work is automated, data analysis is made easier, and communication is enhanced IT helps speed up business processes that further reduce bottlenecks, and companies are close to on-time procurement, better efficiency, and shorter inventory. IT helps to magnify control of customers over the shipping process with increased logistics support that improves customer satisfaction (Chen et al. 2021). Underling "Saudi Arabia Vision 2030", the government of Saudi Arabia expanded private sector roles in providing healthcare services and imposed the "National Transformation Program (NTP)". This program supported by the government helps to increase medical facilities from 40 to 100 by 2020 (BLOOMBERG, 2021). Owing to the economic diversification in logistic services of the pharmaceutical industry, the expansion of the Red Sea corridor in Jeddah, the minerals hub in Yanbu, and the NEOM project are expected to drive freight of logistic operations in the pharmaceutical industry. Besides this, Tawfik et al. (2021) suggested, that localization in supply chain operations within the pharmaceutical industry plays a vital role in managing the resilience of the national healthcare system. It has already been contradicted that the lack of potential support of corporate governance in R&D activities has disrupted the supply chain portfolio of the pharmaceutical industry. The yearly growth rate of an investment or economic indicator is represented by the CAGR, or compound annual growth rate, over a certain time frame. The projected rise in CAGR in the pharmaceutical industry in Saudi Arabia is fuelled by rising healthcare expenditure and government encouragement of homegrown manufacturing, both of which assist the country's 2030 Vision for economic development. Therefore, it has been expected that the economic landscape in supply chain operations of Saudi Arabian pharmaceutical industries will shift compound annual growth by 6.7% in 2023 (EXPORT.GOV, 2020). In

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Saudi Arabia, Pfizer is working on developing innovative measurements to improve the supply chain and distribution and they have 11 logistics centers. It further helps to automate processes of supply chain management with better electronic data storage and data transfer processes over the Internet.

In terms of analyzing technology used in Saudi Arabia, "Pfizer" developed "King Abdul-Aziz City for Science and Technology (KACST)" as technology to develop the vaccine and strengthen the process of gene therapies. Owing to this technological aspect aimed to meet the aspiration of national priorities regarding R&D practices and introduce innovation in the development of vaccines for supporting the Audi Genome Program (GOV, 2022). Therefore, introducing a technological interface in the pharmaceutical industry within Saudi Arabia helped to foster progression in business performance management under Saudi Arabia Vision 2030.

Objectives

To understand the concept of IT affecting logistics and supply chain management systems in the pharmaceutical sector of Saudi Arabia.

To understand significanceofITforaffectinglogisticsandsupplychainmanagementfrom pharmaceutical industries of Saudi Arabia.

To identify challenges regarding using IT for Supply chain and logistics from pharmaceutical industries of Saudi Arabia.

To provide recommended strategies for mitigating challenges of using IT for logistics and supply chain management of pharmaceutical industries of Saudi Arabia.

Scope of the Study

This study is essential for understanding key aspects of IT services that are affecting business logistics and supply chain management in Saudi Arabia for their vision of 2030. It is further helpful for the understanding role of IT in business management for the pharmaceutical industry as well as their business profit margins. Multiple challenges like the cold chain system are identified in the study which helps to get better insights into this research domain.

CONCEPTUAL FRAMEWORK

Saudi Arabia's Vision 2030 heavily relies on the pharmaceutical industry to drive economic diversification and improve healthcare. Within this industry, information technology (IT) is a key component that is transforming supply chain management and logistics.

Pharmaceutical firms guarantee efficient operations by utilizing IT solutions. Medication delivery timeliness is ensured by real-time tracking, which also reduces stockouts and increases supply chain effectiveness. IT-driven inventory management also minimizes losses from perishable items, lowers inventory expenses, and optimizes stock levels.

IT-powered data analytics provide important insights that help with risk management and well-informed decision-making. Strong documentation, traceability, and quality control procedures guarantee adherence to strict pharmaceutical standards.

IT is still essential even in the face of obstacles like opposition to change and cybersecurity risks. It integrates theoretical frameworks like as general systems theory and principal-agent theory, acting as a fulcrum. IT facilitates supply chain coordination and adaptation by improving communication, accountability, and transparency.

IT also makes it easier for pharmaceutical companies to innovate. Revenue creation is strengthened by utilizing AI and multi-channel marketing techniques, and business and operational tasks are streamlined by automation. As an example of the transformative impact of IT, consider Pfizer in Saudi Arabia. With improved production and logistical capabilities, the company is able to distribute vaccines globally to 165 nations.

LITERATURE REVIEW

In line with the aspirational goals of Vision 2030, Saudi Arabia, the largest pharmaceutical market in the Gulf Cooperation Council (GCC), it has a number of opportunities and problems in the pharmaceutical industry. The government wants to increase local production to at least 40% of the market share by 2030 to promote home manufacturing and lessen dependency on imports (Alkhenizan, 2014). This strategic move, which reflects a larger change in the nation's economic approach, emphasizes how vital it is to promote domestic pharmaceutical manufacturing. Because of the rising incidence of chronic illnesses and the high cost of pharmaceuticals, pharmaceutical expenditures in Saudi Arabia make up around 20% of total healthcare spending (Assad, 2007; Vasisht et al., 2016; Tawfik et al., 2022).

According to Akram et. al (2024), Blockchain-based pharmaceutical supply chain management enables the tracking of medicinal drug transactions from raw materials suppliers to end consumers. They also observed that the pharma blockchain has the potential to enhance the security, integrity, data provenance, and functionality of the supply chain due to its transparency, immutability, and audibility.

Even so, Saudi Arabia is confronted with issues including medicine shortages brought on by narrow profit margins, poor supply chain management, and antiquated market regulations, even though it is the biggest pharmaceutical market in the Arab world (Alruthia et al., 2018; Alkhenizan, 2014;). These difficulties highlight how crucial it is to improve domestic pharmaceutical production to guarantee medication security and satisfy the strict requirements established by the Saudi Food and Drug Authority (SFDA)

The Saudi Arabian pharmaceutical industry is regulated by a collaborative public-private framework, in which the Ministry of Health (MoH) and the SFDA play crucial roles (Khan et al., 2016). To maintain market equilibrium and reliable market analysis, the SFDA is in charge of licensing and inspecting producers as well as managing the registration, sales, and pricing of pharmaceuticals (Al-Jazairi et al., 2011; Khan et al., 2016). According to Y. AlRuthia, N. Almutiri, R. Almutairi, O. Almohammed, H. Alhamdan, S. El-Haddad, et al, (2023), the traditional procurement of pharmaceuticals for public health institutions is fraught with shortcomings that resulted in disruptions in essential medicines supply chain according to the majority of surveyed supply chain professionals working in different health sectors. These disruptions might have been exacerbated in the last five 5 to 10 years with the requirement of all public health sectors to request their needs of prescription drugs and medical supplies through a single procurement body that is overseen by different oversight bodies with sometimes conflicting objectives. Therefore, the public centralized pharmaceutical procurement needs to reform its procurement and purchasing practices and align them with Vision 2030. Additionally, the researcher explained that serious efforts should be made to reform different healthcare institutions' inventory management and demand forecasting to avoid frequent and unfortunate shortages of essential medicines.

METHODOLOGY

Research Design

A systematic framework that connects philosophical presumptions with suitable methods for gathering and analyzing data is known as research design. Melnikovas (2018) states that it falls into two primary categories: descriptive and exploratory designs. While descriptive design uses action to confirm the essence of a condition, exploratory research seeks to provide insights into a particular circumstance. To support suggested IT solutions in Saudi Arabia's pharmaceutical supply chain, this study uses a descriptive research design. To improve long-term supply chain feasibility, it enables the development of industry- and region-specific IT solutions without the need for the laborious exploratory research process.

Sampling Method and Size

150 managers from the pharmaceutical industry in Saudi Arabia's logistics and supply chain management division participated in the study. In the study open-ended survey questions were used to determine how IT technology affects pharmaceutical logistics. Using non-probability sampling, logistics managers' LinkedIn accounts were selected for the sample, irrespective of the organization's size, location, or income. Lehdonvirta et al. (2021) emphasize that this strategy provides impartial selection from a broad group as well as flexibility. Because non-probability sampling reduces the business and time-related concerns associated with probability sampling, it allowed for a concentrated observation of IT technology effectiveness in Saudi Arabian pharmaceutical logistics.

Data Analysis Process

The Primary Quantitative Data Collection process was observed in this study for gathering practical viewpoints related to IT technology implementation in the pharmaceutical supply chain. Responses from the primary survey were analysed through SPSS mode, Correlation, and Regression models. Pilot Tests through regression analysis and the Pre-Test Method observed in Correlation analysis were conducted. Quantitative data analysis performed in this study helped in identifying operational, financial, and managerial efficacy related to the implementation of IT technology in supply chain operations.

Reliability and Validity

Effective utilization of Correlation and Regression Analysis has helped in justifying positive, negative, and neutral relationships present between IT technology and supply chain improvement. The validity of the presented information and determined by the fact that main concentration was proposed on the Saudi Arabian pharmaceutical industry. ANOVA Test method was utilized for deriving predictive value in regression analysis. Dwelling with a primary focus on the involvement of solutions for improving supply chain and logistics operations had determined reliability with the proposed aim and objectives.

RESULT AND DISCUSSIONS

When it comes to obtaining the necessary particular findings, data analysis is essential. Accuracy is guaranteed by statistical analysis, which raises the standard of evidence-based information. Through the evaluation of supply chain efficiency, Saudi Arabia's pharmaceutical sector may meet the objectives of Vision 2030 and promote dependable and adaptable data handling for knowledge development.

Table 4.1. Analysing or acknowledging gender.

Statistics

Gender

N	Valid	150
	Missing	0
Mean		1.5333
Median		1.0000
Mode		1.00
Std. Deviation		.62031

Gender

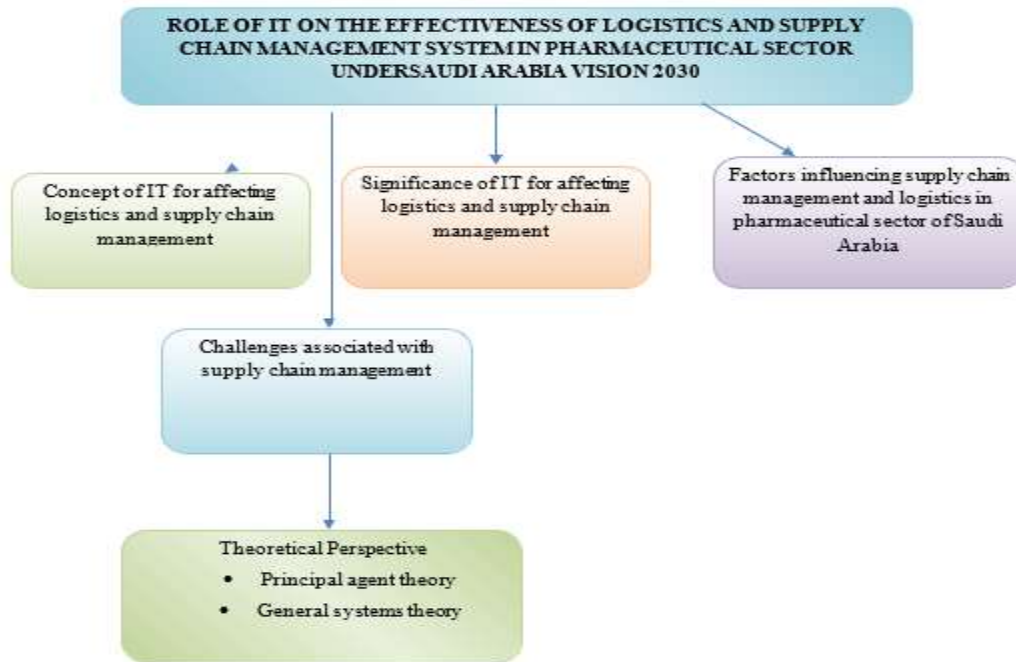|		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	80	53.3	53.3	53.3
	2.00	60	40.0	40.0	93.3
	3.00	10	6.7	6.7	100.0
	Total	150	100.0	100.0	

Figure 4.1. Analysing or acknowledging gender.

This question is considered an important demographic question revealing the gender of research participants as managers working in pharmaceutical industries within Saudi Arabia. As shown in Table 4.1, the value of standard deviation obtained as 1.00 which indicated consideration of "Option 1" as male participants. Likewise, as shown in Figure 4.1, it was observed that 40% of participants out of 150 are female and 50% are male participants. Apart from this, less than 10% (10 out of 150) are not willing to share their gender during this survey process.

Logistics operations creating a beneficial impact on supply chain management for pharmaceutical industries in Saudi Arabia.

Table 4.2. Logistics impacted positively on the supply chain in pharmaceutical industries in Saudi Arabia.

Statistics

Logistic_impact_positively_impact_supply_chain

N	Valid	150
	Missing	0
Mean		1.9400
Median		2.0000
Mode		1.00
Std. Deviation		1.18282

Logistic_impact_positively_impact_supply_chain

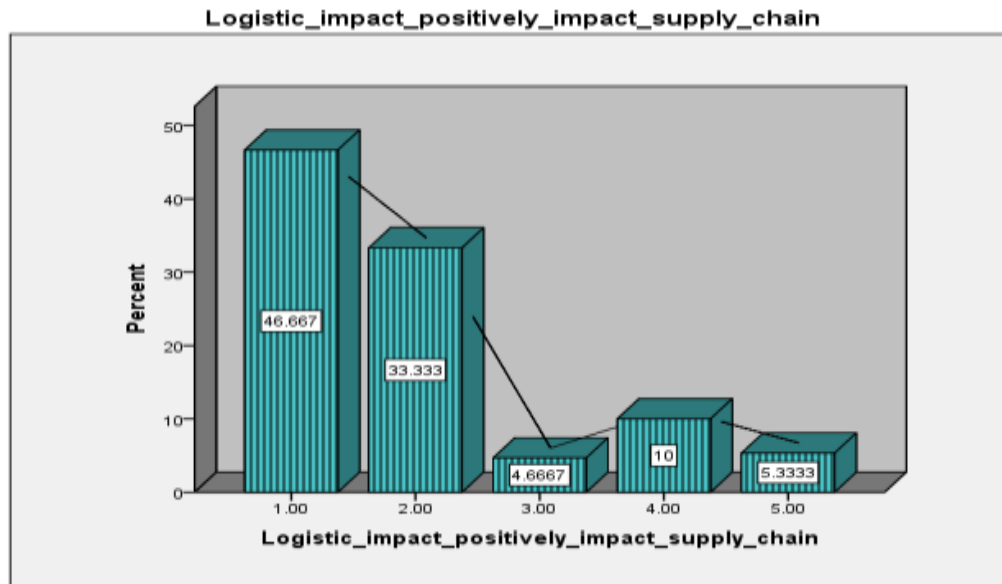|		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	70	46.7	46.7	46.7
	2.00	50	33.3	33.3	80.0
	3.00	7	4.7	4.7	84.7
	4.00	15	10.0	10.0	94.7
	5.00	8	5.3	5.3	100.0
	Total	150	100.0	100.0	

Figure 4.2. Logistics impacted positively on the supply chain in pharmaceutical industries in Saudi Arabia.

Logistics improve structure and performance criteria of supply chain operations in pharmaceutical industries in Saudi Arabia. Based on frequency analysis, it has been observed that 47% and 34% of responses emphasized on positive responses. Consideration of positive responses revealed management of effective logistic operations on supply chain management in pharmaceutical industries. Further, contradictory results have been represented by considering 10% of responses accumulated from the survey process.

Systematic Pharmaceutical Services Through IT Or Logistics Technologies in Supply Chain Management in Saudi Arabia.

Table 4.3. Systematic pharmaceutical through IT logistics for supply chain management in Saudi Arabia.

Statistics

Systematic_pharmaceutical_through_IT_logistics

N	Valid	150
	Missing	0
Mean		2.0600
Median		2.0000
Mode		2.00
Std. Deviation		1.18848

Systematic_pharmaceutical_through_IT_logistics

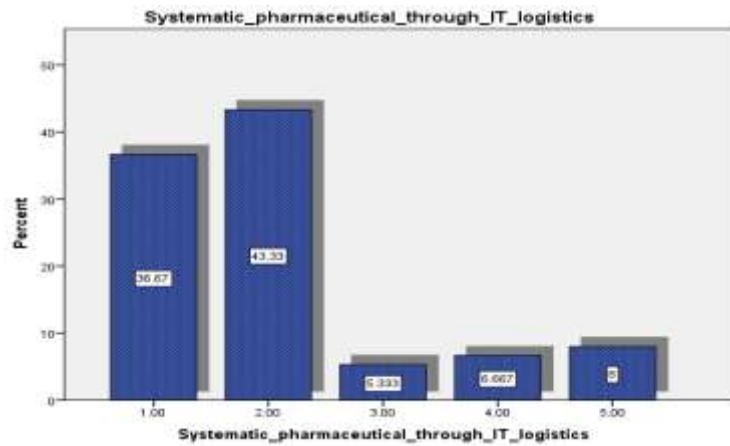|		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	55	36.7	36.7	36.7
	2.00	65	43.3	43.3	80.0
	3.00	8	5.3	5.3	85.3
	4.00	10	6.7	6.7	92.0
	5.00	12	8.0	8.0	100.0
	Total	150	100.0	100.0	

Figure 4.3. Systematic pharmaceutical through IT logistics for supply chain management in Saudi Arabia.

Employees at pharmaceutical companies can modify service patterns and control outcomes by needs, according to 45% of respondents. For favorable responses, Table 4.3 showed a standard deviation of 2.00. Furthermore, according to frequency tables, 44% and 40% of respondents agreed that the development of IT logistics would help supply chain management methodical approaches. According to these results, effective supply chain management improves customer service and operational control, which is consistent with Saudi Arabia's Vision 2030 for increased performance in the pharmaceutical sector.

Cold chain distribution increases complexity in supply chain transferring processes for pharmaceutical industries in Saudi Arabia.

Table 4.4. Cold distribution processes affected supply chain management transferring activities for pharmaceutical industries in Saudi Arabia.

Statistics

Cold_distribution_affected_
supply_chain_transferring

N	Valid	150
	Missing	0
Mean		1.8800
Median		2.0000
Mode		2.00
Std. Deviation		1.02924

Cold_distribution_affected_supply_chain_transferring

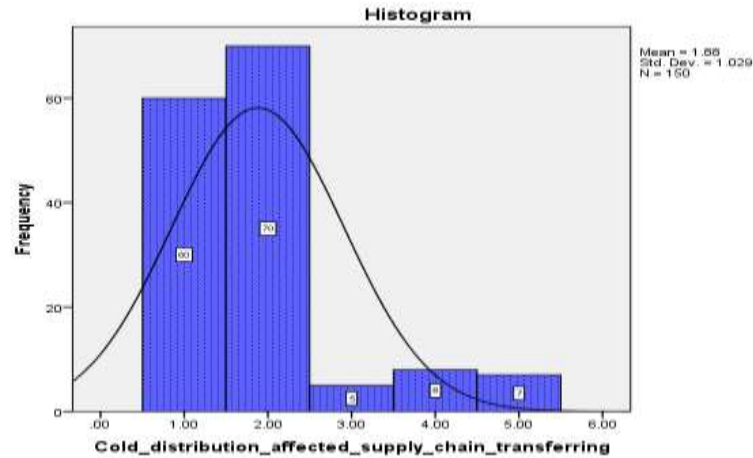|		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	60	40.0	40.0	40.0
	2.00	70	46.7	46.7	86.7
	3.00	5	3.3	3.3	90.0
	4.00	8	5.3	5.3	95.3
	5.00	7	4.7	4.7	100.0
	Total	150	100.0	100.0	

Figure 4.4. Cold distribution processes affected supply chain management transferring activities for pharmaceutical industries in Saudi Arabia.

Cold distribution procedures impede operational development and supply chain management. Out of 150 participants, Figure 4.4 shows that 86% of respondents agree that cost distribution has an impact on supply chain operations, while 15 managers disagree. Insufficient attention to cost allocation compromises the effectiveness of IT and logistics, impeding organizational structure and performance assessment.

Question 5: How far do you agree that Saudi Arabia's Vision 2030 is reliable for supply chain operations in pharmaceutical industries?

Table 4.5. Saudi Arabia vision 2030 improves reliability for reliable for supply chain operations in pharmaceutical industries.

Statistics

Saudi_Arabia_2030_reliable_supply_chain

N	Valid	150
	Missing	0
Mean		1.9400
Median		2.0000
Mode		1.00
Std. Deviation		1.18282

Saudi_Arabia_2030_reliable_supply_chain

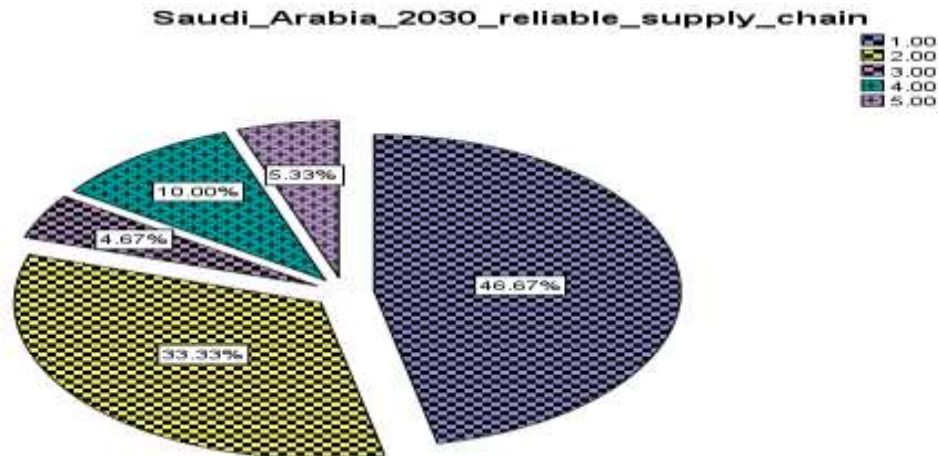|		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	70	46.7	46.7	46.7
	2.00	50	33.3	33.3	80.0
	3.00	7	4.7	4.7	84.7
	4.00	15	10.0	10.0	94.7
	5.00	8	5.3	5.3	100.0
	Total	150	100.0	100.0	

Figure 4.5. Saudi Arabia Vision 2030 manages reliability for reliability for supply chain operations in pharmaceutical industries.

The vision of Saudi Arabia 2030 helps in managing reliability and controlling significant levels of performance through which clarity in business performance can be reorganized properly. It was observed those 70 out of 150 participants as managers and 50 out of 150 participants working as managers in pharmaceutical industries strongly agreed on the facts of considering Saudi Arabia's 2030 Vision to increase reliability in supply chain operations within the industrial domain. On the other hand, 27 out of 150 participants (almost 15%) have firmly rejected the imposition of reliability context for increasing resiliencies in supply chain operations under Saudi Arabia Vision 2030 in pharmaceutical industries. would lead to managing success rates and avoiding critical issues that can create advantages depending on the required analysis. It would develop possible changes in supply chain operations according to the current situation. For instance, Novo Nordisk can use this vision to improve its distribution procedures and net zero plans by 2045 through which flexibility and reliability within this business can be reorganized successfully (Novo Nordisk, 2022).

Do you prefer to use Saudi Arabia vision 2030 for better usage in improving qualities and change management processes in pharmaceutical industries?

Table 4.6. Saudi Arabia Vision 2030 improves qualities and change management processes for supply chain operations in pharmaceutical industries.

Statistics

Saudi_Arabia_2030_improve_qualities_of_supply_chain

N	Valid	150
	Missing	0
Mean		1.8800
Median		2.0000
Mode		2.00
Std. Deviation		1.02924

Saudi_Arabia_2030_improve_qualities_of_supply_chain

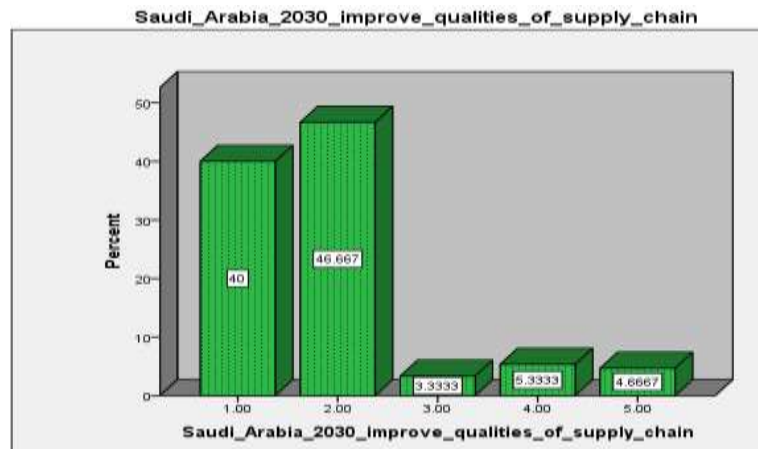|		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	60	40.0	40.0	40.0
	2.00	70	46.7	46.7	86.7
	3.00	5	3.3	3.3	90.0
	4.00	8	5.3	5.3	95.3
	5.00	7	4.7	4.7	100.0
	Total	150	100.0	100.0	

Figure 4.6. Saudi Arabia's Vision 2030 improves qualities and changes management.

Processes for supply chain operations in pharmaceutical industries change management. Processes and quality improvement through Saudi Arabia vision2030 create opportunities. in managing supply chain operations depending on needs. As shown in Table 4.6, the value of the standard deviation obtained was 2.00. indicated consideration of option 2 "Agree "as in Figure 4.6. From the above frequency analysis, it has been. observed that almost 60%and 40% of participants out of 150 have. accepted facts of improving qualities and change. management process of the pharmaceutical industry. Under Saudi Arabia Vision 2030, imposing a change management process in the supply chain. operations improve the quality of medicine processing and healthcare services effectively.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.000[a]	1.000	1.000	.00000

a. Predictors: (Constant), Cold_distribution_affected_supply_chain_transferring, Logistic_impact_positively_impact_supply_chain, Systematic_pharmaceutical_through_IT_logistics

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	157.840	3	52.613	.	.[b]
	Residual	.000	146	.000		
	Total	157.840	149			

a. Dependent Variable: Saudi_Arabia_2030_improve_qualities_of_supply_chain

b. Predictors: (Constant), Cold_distribution_affected_supply_chain_transferring, Logistic_impact_positively_impact_supply_chain, Systematic_pharmaceutical_through_IT_logistics

Figure 4.7. Regression analysis.

Regression

In line with Vision 2030 aims, logistics, and IT service management play a major role in supply chain decisions in the pharmaceutical industry in Saudi Arabia. The results of the regression analysis showed that technology, supply chain, and logistics all had a perfect match (R square = 1.000) as independent factors influencing dependent variables. As evidenced by an adjusted R square greater than 0.7 and a significant ANOVA test (p < 0.05), the study confirms the null hypothesis by supporting a strong link between these parameters. This emphasizes how important IT and logistics are to the pharmaceutical industry's growth under Vision 2030 by promoting supply chain efficiency and strategic decision-making.

Table.

Correlations

		Logistic_impact_positively_impact_supply_chain	Systematic_pharmaceutical_through_IT_logistics	Cold_distribution_affected_supply_chain_transferring	Saudi_Arabia_2030_reliable_supply_chain	Saudi_Arabia_2030_improve_qualities_of_supply_chain
Logistic_impact_positively_impact_supply_chain	Pearson Correlation	1	.957**	.915**	1.000**	.915**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	150	150	150	150	150
Systematic_pharmaceutical_through_IT_logistics	Pearson Correlation	.957**	1	.939**	.957**	.939**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	150	150	150	150	150
Cold_distribution_affected_supply_chain_transferring	Pearson Correlation	.915**	.939**	1	.915**	1.000**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	150	150	150	150	150
Saudi_Arabia_2030_reliable_supply_chain	Pearson Correlation	1.000**	.957**	.915**	1	.915**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	150	150	150	150	150
Saudi_Arabia_2030_improve_qualities_of_supply_chain	Pearson Correlation	.915**	.939**	1.000**	.915**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	150	150	150	150	150

**. Correlation is significant at the 0.01 level (2-tailed).

Correlation

By clarifying the connections between independent variables, correlation analysis makes it easier to interpret data accurately. Results highlight two-tailed predictive values and show significant levels at both the 0.01 and 0.05 levels. Under Vision 2030, there is a strong correlation between supply chain management, logistics, and technology in Saudi Arabia's pharmaceutical business, as evidenced by correlation values ranging from 0.155 to a significant 1.000. Conversely, correlation coefficients below 0.05 indicate weaker relationships. Recent research indicates a noteworthy positive correlation (0.789), indicating that the pharmaceutical companies in Saudi Arabia can enhance their supply chain and logistics, thereby approaching ideal performance (near 1), as envisioned in Vision 2030.

DISCUSSION

Entrepreneurs in the pharmaceutical sector in Saudi Arabia demonstrate excellent analytical abilities and make innovative choices to successfully handle a range of difficulties.

Reorganizing operations is made possible by strategic and innovative choices, which also make it easier to create advantages and advance without running into major roadblocks.

Implementing IT and logistical operations helps to control value-added services by needs and to preserve reasonable assumptions.

The pharmaceutical businesses in Saudi Arabia can adjust methodical operations based on outcomes through innovative decision-making and development options, which uphold a balanced structure and promote synchronization.

Saudi Arabia's Vision 2030 offers dependable chances for companies to improve performance quality by their requirements.

The results of the study demonstrate how Novo Nordisk uses biotech patents to support several phases of formulation development and how Pfizer uses artificial intelligence (AI) in supply chain management to speed up the delivery of vaccines.

Prosperous entrepreneurs proficiently execute modifications to procedures inside the supply chain through logistics operations, augmenting efficiency and providing better customer service.

Ineffective standards, on the other hand, might limit supply chain management's flexibility by affecting overall processes and limiting planned operational modifications.

With Vision 2030, the pharmaceutical industries in Saudi Arabia have a way to advance their supply chain operations and logistics, allowing for major adjustments and dependability according to requirements or expectations, improving performance development procedures and flexibility without major problems.

CONCLUSION AND RECOMMENDATION

The study underscores the pivotal role of supply chain management in delivering reliable services or products to consumers. Leveraging logistics and IT technologies, businesses can enhance supply chain activities and performance development processes as needed. Saudi Arabian pharmaceutical industries adeptly analyze current situations to optimize systematic tasks, gaining advantages in operational control. Properly distributed systems enable employees to provide necessary customer support, ensuring business flexibility and success. Logistic operations and IT technologies, including automated systems, elevate performance capacities in Saudi Arabian pharmaceutical industries. Creative opportunities in decision-making accelerate supply chain speed, yet inflexible distributed systems may impede operational activities, increasing complexities. Thus, businesses, like Pfizer and Novo Nordisk, are urged to creatively modify supply chain operations through logistics, aligning with customer engagement and service development goals. This approach fosters quality improvements and innovations, enhancing business operations and customer relationships through efficient supply chain logistics

Recommendations

The study emphasizes that Saudi Arabian pharmaceutical industries must align with Vision 2030 by integrating technologically advanced logistics to streamline systematic validation processes. This innovation enables efficient management of processes and mitigates creative challenges during supply chain implementation. Business owners can establish a balanced structure to enhance performance speed and development. Effective decision-making processes are essential for improving supply chain quality, as noted by Ben et al. (2019), fostering procedural changes and maintaining structured performance. Creative decisions empower employees to uphold supply chain management structures and drive profitable outcomes, facilitating the execution of Vision 2030 seamlessly. Accountability lies in adhering to chain distribution processes to enhance supply chain quality, as advocated by Faridi and Malik (2020), reducing issues in logistics implementation and distribution. This approach strengthens the connection between IT and development activities, yielding profitable benefits and enhancing Saudi Arabia's Vision 2030 execution amid current circumstances, ensuring procedural integrity and quality in supply chain activities.

FUTURE SCOPE

The study's future scope involves exploring suitable IT solutions for flexible supply chain and logistics management, particularly in developing economies like Saudi Arabia. Amidst the ongoing COVID-19 pandemic, a focus on the pharmaceutical industry becomes imperative for managing emergencies and essential items efficiently. Publication of this research will aid decision-makers in Saudi Arabian pharmaceutical companies, guiding them in adopting appropriate logistics and supply chain functions. Additionally, it serves an academic purpose, laying the groundwork for future research endeavors, and offers professional consultancy to pharmaceutical merchants.

Conflict of Interest: There is No Conflict of Interest between the Authors.

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