

Supply Chain Management on Technology Adoption

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Abstract

The main drive of this education was to verify the part of technology in supply chain management practices and operational efficiency in the dairy sector. The total number of defendants in the dairy sector cutting-edge this education was 150. The investigation information was analysed using the SmartPLS technique. The consequences of this education are: supply chain management practices had a significant and optimistic influence on technology adoption; technology adoption had an important and positive impact on operational efficiency; and supply chain management practices had a important and optimistic influence on operational efficiency, consequently the unintended association amid supply chain management performs and technology can be a mediator of operational efficiency. The study "Impact of Supply Chain Management (SCM) Practices on Operational Efficiency through Technology Adoption in the Dairy Sector" delves into the complex interplay between SCM practices and technological integration in the dairy sector. The abstract of this education highlights this communication. The purpose of this study is to find out how the dairy industry's operational efficiency can be improved by implementing cutting-edge technologies in supply chain operations. The study takes a broad approach, looking at different SCM techniques and the technology modifications that accompany them. The research aims to determine the critical elements impacting the effective integration of SCM techniques and technology by examining data and case studies from the dairy industry.

Keywords: Operational Efficiency, SmartPLS technique, Supply Chain Management Practices, Technology Adoption.

Introduction

The milk and dairy sector holds a crucial position in cutting-edge the global supply chain, catering toward the dietary needs of populations around the world. In recent years, this industry has been undergoing a remarkable transformation, driven by the synergy between supply chain management (SCM) practices and technology adoption. These two pillars, when combined, have paved the way for unprecedented advancements in operational efficiency within the milk and dairy sector. SCM practices, known for their emphasis on optimising processes, enhancing resource allocation, and streamlining the flow of goods, have consistently demonstrated their capacity to drive efficiency across diverse industries (1). This convergence of SCM practices and technology adoption has far-reaching implications. It promises to reduce operational costs, minimise waste, and elevate the quality of milk and dairy products, addressing

consumer demands for safe, high-quality. Concurrently, the milk and dairy sector has been at the forefront of integrating technological innovations, including data analytics, Internet of Things (IoT) sensors, and Radio-Frequency Identification (RFID) systems, into its operations. However, it is not without its tests, counting the essential for significant early investments and the demand aimed at accomplished personnel to manage these urbane supply chain systems. This exploration seeks to delve into the profound impact of SCM practices on operational efficiency through technology adoption within the milk and dairy sector. By examining the synergies, challenges, and potential outcomes of this fusion, we aim to shed light on how these twin forces are reshaping the milk and dairy industry, making it more resilient, efficient, and responsive to evolving consumer preferences and global supply chain dynamics.

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Supply Chain Management

In the present worldwide marketplace, businesses cannot disregard achievement issues such as financial trends, modest location, technological progression, and processes and SCM activities. SCM is a generic term connected to a usual of movements to achieve numerous objects, such as dealers, obtaining procedures, manufacture, creation distribution, the movement of info, client request, etc., in an organisation. SCM is viewed as a scheme of communication amongst numerous investors (2, 3). The better creation excellence, removal of doubts, and tall make worth main to better SCM and reduced prices (4, 5). It is specified that SCM is wider than coordination management as it comprises the connecting of key commercial doings ended the interconnection. Authors emphasized the meaning of secure and cross-firm organization (6, 7). The part of logistics, wrapping, and on-time distribution are some doubts in the dispensation sector, like dairy (8). Additional, due to the extremely unpreserved set of dairy products, they involve singular action, cooling devices, treatment, and rapid movements, preliminary from milk obtaining to delivery or transaction. Effective SCM and logistic activities comprise handling client needs, on-time creation distribution, and the flow of info crossways the supply chain (SC) network (9). SCM speeches numerous approaches for attaining customer emphasis finished process effectiveness (10). The framework for logistical activities involves the execution of basic doings, value-added doings, preparation and switch, and planned choice events (11). Enthusiasm in the supply chain has been a key subject for organizations, and 'charting the keenness of an organization helps to form the sound basis for business plan growth. Most milk dispensation companies around the world are organized as networks of indulgence as well as distribution facilities that obtain raw materials (milk and packaging material), alter them into over as well as central products, and assign the over goods to clienteles (12). Supply chain management has arisen in the early 21st century as an vital purpose. It has altered from old-style storekeeping and collation to buying, distribution, warehousing, and resources management (13).

In an extremely modest commercial setting, the excellence of SCM has expected countless meaning. This is because it effects such choices by companies as the excellent of state to find in, suppliers to buy from, and consumer markets to arrive. In the present business setting, huge investments are being made globally, with some of the best-recognized asset gurus placing their bets on unpreserved products, which are associated with the progression of any economy (14). SCM activities like service, delivery, and info flow are still key tests in the dairy sector. Deliberately, rather than rival within the low-cost market section, many makers are employed on dissimilar advertising plans to board the rural market. This has led the industries to implement a range of sustainable practices like local sourcing, reuse, recycling, and green purchasing. DSC (Distributed Supply Chain) entails four main elements: raw milk supplier, milk processing plant, retailer, and end consumer. The dairy industry has experiential vast changes in its business structure, like globalisation, technical growth, the improved shelf life of products, and seasonal demand fluctuation. It needs significant growth in its competitiveness status to meet the high product quality, consistency, and safety standards of the export market (15). Diverse characteristics make it more inspiring to manage the supply chain activities in the dairy industry. Quality management appears to be the most important factor in the dairy business, followed by inventory management, supplier management, and technological novelties (16).

The supply chain is increasingly becoming a significant factor that can contribute to the realisation of a successful organisational strategy. Each stakeholder in SC must intend to turn out dynamically and competitively for maintainable business operations (17). The simplest network consists of amenities that assume obtaining, dispensation, and delivery. While the presentation of milk manufacturing in emerging countries remains poor, most firms also knowledge tests in the procurement, processing, and distribution of final products. In other words, it is a related collection of resources and processes that start with the sourcing of raw materials and move finished to

the distribution of the end crops to the final customer. Moreover, the supply chain is gradually becoming a strategic basis for a modest edge with the rise of global manufacture sharing, the strengthening of global rivalry, and the discount of product life cycles (18). The first test is the collection of milk from farmers. During the rainy seasons, most roads in emerging republics become impassable, and hence, farmers have to struggle to get their products to the milk processors who are miles away (19). In adding, most dairy farmers live in rural areas without access to feeder roads. Further, most milk processing firms do not have proper amenities for storage; therefore, some milk normally goes bad on manufacture or before production.

Operational Efficiency

Automation and data analytics have become integral to SCM operations. Technologies like RFID (Radio-Frequency Identification) and IoT (Internet of Things) sensors enhance visibility across the supply chain, allowing for real-time monitoring of shipments and inventory levels (20). This actual information authorizes trades to brand knowledgeable choices punctually, optimise routes, and respond swiftly to disruptions, thus improving operational efficiency. Additionally, sustainability is increasingly integrated into SCM operations. Companies are adopting sustainable sourcing practices, reducing waste, and optimizing transportation routes to minimize their environmental impact (21). Sustainable SCM practices not only align with corporate social responsibility goals but also reduce costs through resource efficiency. Efficient supplier relationships also contribute significantly to SCM competence. Collaborative supplier partnerships, as discussed by (22), foster trust and transparency cutting-edge the supply chain. These relationships enable companies to negotiate better terms, reduce lead times, and ensure a consistent flow of high-quality materials, enhancing the overall efficiency of the supply chain. Operational efficiency is a cornerstone of modern supply chain management (SCM), and it theatres a pivotal part in cutting-edge enhancing the competitiveness and sustainability of businesses in a global marketplace. According to the research

conducted by (23), operational efficiency in SCM refers to the ability to optimize processes and resources to meet customer demands while minimizing costs and waste. In this context, technology-driven solutions have revolutionized SCM. Advanced inventory management systems, like just-in-time (JIT) and demand forecasting software, enable businesses to maintain lean inventories and reduce carrying costs. Operational efficiency in supply chain management is a multi-layered concept that involves leveraging technology, data, supplier relationships, and sustainability practices to optimize processes, reduce costs, and enhance keenness in a rapidly evolving business scenery.

Technology Adoption

Studies of dairy technology adoption in the US (24) designate that extensive use of productivity-enhancing technologies would consequence in advanced milk production, lower prices, and negative influences on profitability. This decides with the answers of (24), who renowned that lower prices due to technology acceptance tend to lead to superior and less dairy farms. Although preceding studies have inspected the result of technology adoption on the financial presentation of Brazilian dairy farms (24), no previous study has measured the lively influences of scaled-up technology adoption on combined marketplace consequences and farm-level success by farm-size groups. Additional information of these influences is pertinent for manufacturing decision-makers, from input suppliers to food retailers, and for government policy (e.g., support programs) (25). Supply increases from productivity-enhancing technology acceptance will inferior values *ceteris paribus*, which would counterbalance, at least to some extent, the benefits of productivity enhancement. These counterweighing effects will likely not be equally dispersed among types and sizes of farms (26). Preceding research has designated that milk supply springiness varies over time (27) and that supply and request rely on marketplace incentives with delays. Thus, it would not be surprising to detect energetically complex consequences (patterns of behavior that vary in the short and long run) in response to the adoption of

productivity-enhancing technologies by Brazilian dairy farms.

These pertinent queries can be spoken with an imitation representative method, if pertinent visions about the association amid skill use and the behavior of milk prices in Brazil (27). Furthermore, blockchain technology has gained prominence in protection slide and traceability in the dairy supply chain. Block chaining allows investors to securely record and access information related to the journey of dairy products from the farm. This technology, as emphasized by (28), boosts trust among customers by if demonstrable data on creation origin, safety, and ethical sourcing. Preceding research (29) on the dynamics of cattle technology adoption has suggested that adopters and larger farms would experience improved profitability. In contrast, smaller non-adopting farms would probably exit in the long run. Supply chain management (SCM) in the dairy sector has undergone a transformative evolution with the integration of cutting-edge technologies. In today's dairy industry, technology adoption is pivotal for enhancing processes, ensuring product quality, and meeting consumer prospects. Research (30) underlines the significance of technology adoption in SCM, citing that it enhances slide, competence, and traceability through the supply chain. One key technological progression in the dairy sector is the Internet of Things (IoT). IoT-enabled sensors are employed to monitor everything from milk temperature during transportation to the health and behavior of dairy livestock. These sensors generate real-time data, enabling timely decision-making and rapid response to any deviations in quality or safety (30). Furthermore, cloud-based SCM systems have become invaluable for real-time collaboration and information sharing among dairy stakeholders. Cloud platforms facilitate remote monitoring and management, allowing for seamless coordination among dairy farmers, processors, and distributors. Artificial intelligence (AI) and machine learning (ML) are also creation important inroads into dairy SCM. AI-powered algorithms analyze vast datasets to predict consumer preferences, optimize production schedules, and even predict equipment maintenance needs (31). These technologies enable

dairy companies to reduce costs and waste while improving overall supply chain efficiency. The technological adoption has revolutionized supply chain management in the dairy sector. Through IoT, blockchain, AI, ML, and cloud-based systems, dairy companies can enhance operational efficiency, product quality, and sustainability, ensuring they remain competitive in a rapidly evolving industry.

RFID tracking and IoT sensors have changed supply chain management (SCM) by cumulative competence and correctness in a variety of operations. RFID (Radio-Frequency Identification) technology enables real-time tracking of commodities across the supply chain. Companies may track the passage of their items from the warehouse to the end client by inserting RFID tags into them. This system enhances inventory management by providing precise data on stock levels, lowering the possibility of overstocking or stockouts. RFID also improves transportation logistics by allowing for better product tracking, route planning, and delivery accuracy.

IoT (Internet of Things) sensors further improve SCM by providing detailed information about the condition and placement of products. IoT sensors can measure environmental factors like temperature and humidity, which is critical for sensitive products like medications or perishable commodities. This real-time data aids in reducing spoilage and assuring adherence to safety rules. In transport logistics, IoT sensors monitor vehicle performance and cargo conditions, allowing for predictive upkeep and real-time route modifications. Overall, these technologies work perfectly with SCM activities, increasing visibility, efficiency, and receptiveness through the supply chain.

Currently, there is ongoing research into the dissimilar possibilities presented in the literature and the extended framework of the mediated model cutting-edge supply chain management (SCM) for the implementation of technology adoption (TA) Figure 1.

The research framework, specifically designed for adopting new technologies, is influenced by three environmental factors:

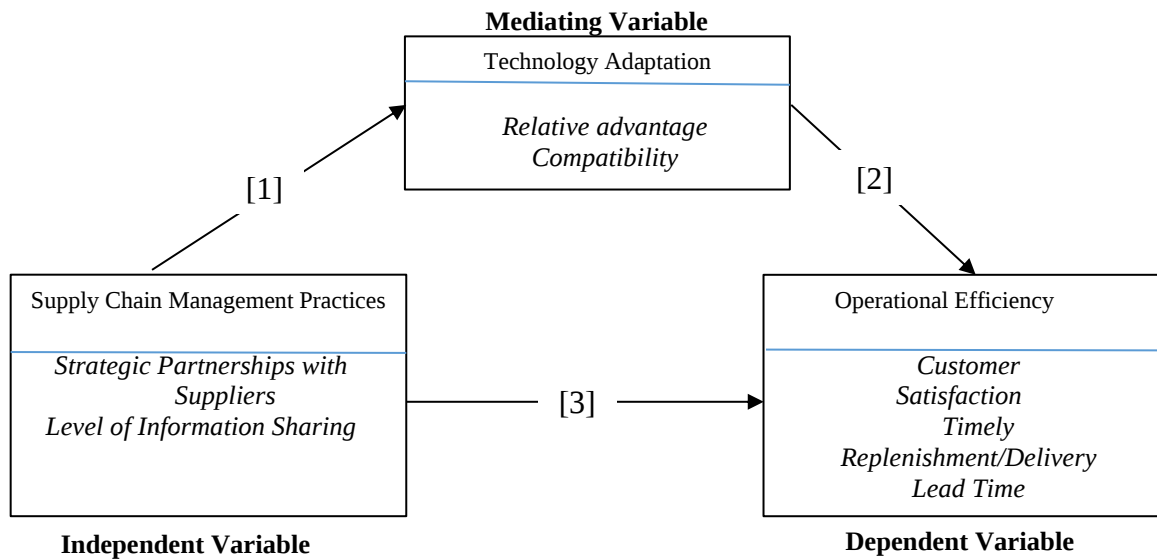


Figure 1: Research Framework: Mediated Model

supply chain management practices, operational efficiency, and technology adoption. The discussion revolves around how various aspects influence the adoption rate of technology inside the context of supply chain management practice. These factors include supply integration, level of info distribution, level of info quality, and source integration. Additionally, operational efficiency, which encompasses timely replenishment delivery lead time and inventory control, is also being considered for its impact on technology adoption. The integration of the mediating model within the milk and dairy sector, in conjunction with supply chain management, has proven to be a valuable approach for understanding and enhancing technology adoption. Through applying the mediating model, researchers and practitioners can evaluate the perceived practicality then comfort of usage of technology within dairy supply chain. This assessment involves learning arrogances then meanings of investors, including customers, processors, and distributors, towards adopting technological advancements. Perceived usefulness in this context might encompass improved milk quality monitoring, real-time inventory tracking, and enhanced production planning, while perceived ease of use could involve user-friendly interfaces, seamless data sharing, and integration with

existing systems. By considering external factors, such as regulatory compliance, supplier integration, and market demands, the Mediating Model framework ensures a comprehensive analysis of the various elements influencing technology adoption in the dynamic milk and dairy industry. As a result, the combined use of the mediating model and supply chain management offers valuable insights that can inform the design and implementation of technology solutions tailored to meet the specific needs and challenges of the milk and dairy sector, leading to improved operational efficiency. The SCM practices in the dairy sector are multifaceted and evolving to meet the demands of a globalised market. By incorporating advanced technologies, precise demand forecasting, efficient inventory management, and sustainability initiatives, the dairy industry can optimise its supply chain to deliver high-quality products while remaining competitive and environmentally responsible. SCM fixes consume changed, and academics and practitioners have recognized them as dangerous to the development of firm presentation. Firms need to bestow their capitals to SCM practices that will recover the well-organized operative of business sections and, in reappearance, improve organisational presentation (32).

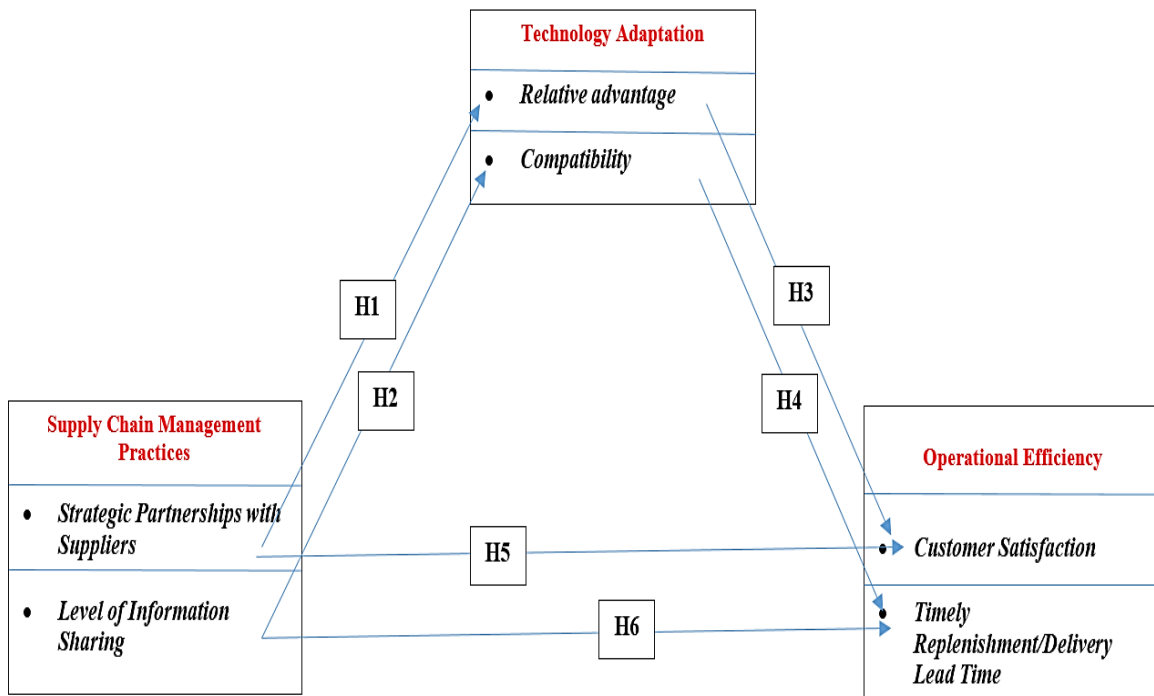


Figure 2: Extended Framework of the Mediated Model

Independent Variables

Supply Chain Management Practices (SCMP) in Dairy Sector

For this study, SCM practices will include strategic sourcing, procurement, and lean inventory management. Therefore, a close relationship with suppliers finished strategic obtaining is desirable. There is increasing environmental consciousness in the supply chain, which has led to the presence of SCM practices. SCM practices are activities involved in planning and management, obtaining and obtaining, change of raw resources into finished properties, logistics management, and teamwork among supply chain members (32). Effective supply chain management (SCM) practices are essential to the achievement of the dairy sector, a multifaceted and dynamic manufacturing. According to a study by (33), SCM in the dairy sector includes a series of unified procedures, reaching from obtaining and production to delivery and customer ability. Advanced SCM practices have become highest in optimising these procedures to ensure reliable creation quality and meet consumer demands.

Doings in any supply chain include the acquisition of resources from suppliers, industrial, and delivery of final goods to the end consumer (34-36) in Figure 2.

The dairy supply chain contains of raw milk dealers, floriae, granaries, and end customers. Upsurges in dairy crops, changes in shopper tastes, and obsession of prices by businesses in the milk industry call for effective SCM. Furthermore, cold chain management is dangerous to preservative the cleanness and safety of dairy products. According to (37), maintaining the integrity of the cold chain, from farm to retail, is vital to preventing spoilage and ensuring product quality. Technologies such as temperature monitoring systems and RFID tags enable dairy companies to track the condition of products throughout the supply chain. One crucial aspect of SCM in the dairy sector is demand forecasting, as highlighted by (38). A supply chain joins all pertinent gatherings complicated, either straight or circuitously, when a customer appeal is talented (39). The ingesting of milk products has an important association with dairy

dispensation and SCM in that when ingesting upsurges; more weight is used on six supply chain members (40). In building and maintaining real long-term relationships and partnerships with suppliers, SCM is started as a key ingredient. Therefore, SCM practices are activities performed by organizations to make a supply chain effective (41). Accurate predicting allows dairy businesses to align manufacturing heights with market requests, plummeting the risk of overstocking or understocking dairy products. With the help of sophisticated forecasting tools and data analytics, the dairy sector can respond swiftly to market fluctuations. Efficient inventory management is another fundamental SCM practice in the dairy sector. Research by (42, 43) emphasizes the significance of maintaining best inventory heights to minimize carrying costs while ensuring product obtainability. Just-in-time (JIT) inventory systems and real-time monitoring of stock levels contribute to effective inventory management, reducing waste and costs. Sustainability is an developing focus in SCM practices in the dairy sector. SCM practices are valued bases of modest benefit and help in ornamental success in the marketplace (44). Sustainable sourcing, waste discount initiatives, and responsible transportation practices align with environmental and social responsibility goals, as mentioned by the Dairy Sustainability Framework. Implementing these practices not only promotes sustainability but also enhances the reputation of dairy companies in an increasingly eco-conscious market.

Strategic Partnerships with Suppliers

Tactical relationships by dealers remain deliberate ways toward make then keep a network of qualified suppliers. This work includes everything that needs to be done to improve how well suppliers are doing now. Strategic partnerships focus on direct relationships and the long term, and they urge both parties to plan together and work to solve problems. The supplier organisations can work together more closely to avoid wasting time and effort (45).

Level of Information Sharing

The information can be used as a competitive advantage if it is gathered and shared with other partners in the supply chain (46). How much sensitive and confidential data is divulged to a business partner in a supply chain is referred to as the "level" (or "quantity") of information sharing (45). The term "information sharing" refers to a company's efficiency and effectiveness in sharing data and expertise with its supply chain partners. In an interactive supply chain system, information is shared not only between direct partners but across the entire supply chain network. As a result, information exchange is critical for productive partnerships (47).

Mediating Variable

Technology Adoption in the Dairy Sector

In addition to automation, data analytics have become integral to decision-making in the dairy sector. Advanced analytics tools analyse vast datasets from various sources, providing insights into herd health, milk quality, and production efficiency. Data-driven decision-making helps farmers optimise nutrition, breeding, and overall herd management, leading to higher productivity. Furthermore, traceability and quality control have been greatly enhanced through technological adoption. Blockchain technology, for instance, is being used to create transparent and tamper-proof records of the dairy supply chain, ensuring product authenticity and safety. This technology allows consumers to access detailed information about the origin and handling of dairy products. Moreover, precision agriculture technologies are optimising resource use on dairy farms. Smart irrigation systems, for example, monitor soil moisture levels and weather conditions to deliver precise amounts of water, reducing waste and environmental impact (48). These technologies align with sustainability goals by minimising resource consumption. The dairy sector has witnessed a profound transformation through technological adoption, redefining how dairy operations are managed, and dairy products are produced and distributed. One pivotal area of technological advancement in the dairy sector is automation. As emphasised by research

conducted in automated milking systems, robotic feeding mechanisms and smart sensors have revolutionised dairy farming. These technologies streamline labour-intensive tasks, improve animal welfare, and enhance the precision of operations. The technological adoption in the dairy sector has ushered in an era of increased efficiency, product quality, and sustainability. Automated systems, data analytics, traceability solutions, and precision agriculture technologies are reshaping dairy operations, ensuring the industry remains competitive and responsive to evolving consumer demands.

Relative Advantage

The apparent relative advantage is a factor in how users decide whether or not to use a new technology. Look at the supposed benefits of the organisation (lower cost, cost-effectiveness, wide market coverage, and economic profitability) to figure out how much of an advantage it is to accept an innovation. Says that relative advantages have to do with success, growth, expansion, and new products. The perceived relative advantage is a very important factor in deciding whether or not to adopt an innovation. This is because the choice to adopt is different for adopters and non-adopters. Several studies found that the relative benefit is a major factor in whether or not a company adopts a new technology. In the same way, it was found that the perceived benefit of using IT in SMEs' business systems is a key sign of whether or not to adopt IT (49). For these reasons, the relative edge has a positive effect on the spread of innovations.

Compatibility

Compatibility is a key factor in getting a company to use new technology. Compatibility is the most important factor in SMEs quickly adopting ICT. But (SMEs usually want reliable information when making ICT decisions. ICT adoption is linked to the IT infrastructure that is already in place, how the business works, and what kinds of work practices are best. Digital transformation has been looked at in previous studies on how firms accept new ideas (50).

Dependent Variables

Operational Efficiency in the Dairy Sector

Moreover, effective supply chain management is a cornerstone of operational efficiency. Optimising logistics, inventory management, and distribution processes is vital for minimising costs and ensuring the freshness of dairy products, particularly in the context of a globalised market. Supply chain optimisation enables dairy companies to meet consumer demands promptly and efficiently. Sustainability is an increasingly important aspect of operational efficiency in the dairy sector. Sustainable farming practices include responsible land management, efficient water usage, and reduced greenhouse gas emissions. These practices not only align with environmental stewardship goals but also enhance operational efficiency by reducing resource waste and production costs. Operational efficiency is a critical factor in the dairy sector, encompassing a spectrum of practices and technologies that are fundamental to its competitiveness and sustainability.

The modern dairy industry faces escalating demands for dairy products while striving to minimise costs and resource consumption. Operational efficiency in the dairy sector is defined as the ability to optimise resources and processes to achieve higher output with reduced inputs, reflecting the industry's pursuit of productivity and profitability. Advanced technologies, such as automated milking systems and data-driven management tools, have revolutionised dairy farming, enhancing milk production efficiency and product quality. Operational efficiency remains a central focus in the dairy sector's efforts to navigate evolving market dynamics. By embracing technological advancements, optimising supply chain operations, and integrating sustainable practices, the industry can meet consumer demands effectively while ensuring long-term viability.

Customer Satisfaction

The data in this study on consumer satisfaction with dairy products in the dairy industry was analysed and interpreted using percentage analysis. Dairy businesses must comprehend client happiness if they hope to maintain their competitiveness and enhance their offerings.

Through an analysis of 400 respondents' comments, this study aims to uncover client preferences and pinpoint areas in need of improvement. A balance between managing practical restrictions and acquiring enough data for useful analysis led to the selection of a sample size of 400. The sample is anticipated to be typical of Indian consumers of dairy products. To ensure diversity, the questionnaire was sent through a variety of channels, including email invites, paper-based surveys, internet platforms, and in-person interviews. The goal was to minimise biases and gain a thorough understanding of consumer satisfaction across various demographic groups and geographical areas.

Timely Replenishment/Delivery Lead Time

Fast resupply and delivery Lead time is a crucial supply chain management statistic that has a direct effect on operational effectiveness and customer satisfaction. Achieving consumer expectations and obtaining a competitive advantage in the market depends on minimising lead times. A comprehensive strategy that incorporates precise demand forecasts, flexible logistics, and cooperative supplier relationships is necessary for effective replenishment and delivery procedures. Shortening lead times reduces the risks brought on by unstable markets and variable demand, in addition to improving customer service.

Hypothesis of the Study

H1: Strategic partnerships with suppliers have a positive impact on relative advantage, H2: The level of information sharing has a positive effect on compatibility, H3: Relative advantage has a positive effect on customer satisfaction, H4: Compatibility has a positive impact on timely replenishment and delivery lead time, H5: Strategic partnerships with suppliers have a positive impact on customer satisfaction and H6: The level of information sharing with suppliers is positively impacted by Timely Replenishment/Delivery Lead Time.

Methodology

Category of Study

This study makes use of a purely descriptive methodology. The goal of this descriptive study

was to identify a phenomenon taking place at a particular time and location. Researchers in Andhra Pradesh, India, surveyed customers and workers at seven prominent private dairy farms to get this data.

The study's sample includes both customers and staff who volunteered to fill out the surveys. Therein lies the study's primary flaw. The study's sample size was determined using the formula.

Size of the Sample

The survey was sent out to 400 customers and employees from seven of the largest private dairy companies in Andhra Pradesh, India. The formula used to determine the study's sample size was as follows:

$$n = \frac{Z^2 \times \sigma^2}{e^2}$$

Where

n sample size

z value of Z in a normal distribution curve

e level of precision

σ^2 variance of an attribute in the population

n 400.

To ensure statistical reliability, we selected a sample of 400 consumers and workers to participate in the study.

Research instrument

As an empirical investigation, this study is unique. A well-designed questionnaire was used to gather primary data. The argument for utilising questionnaires is their cost-effectiveness and practicality. There are two sections to the questionnaire.

Part I comprises the demographic profile (six items) of the clients, and Part II consists of questions (12 items) produced by researchers. It also uses the SERVQUAL scale to measure customer happiness and loyalty.

Data Analysis

The collected data were loaded into the SPSS program, and a variety of statistical methods were utilised to analyse the data. The reliability statistician's Cronbach's alpha is 0.909. Data were imported into SPSS 23.0 and analysed using a variety of statistical methods. The research results served as the basis for the conclusions drawn.

Table 1: Statistics on Dependability In terms of Cronbach's alpha, use of Cronbach's alpha In accordance with industry-wide measurement standards Total number of items: 12.

Preliminary Data Analysis

In order to ensure that there were no problems with missing data, SEM analysis was only undertaken if the data passed the preliminary study. When data is contaminated in this way, the accuracy of the results suffers. So, we checked that the data was free of such mistakes.

Demographic

Based on demographic data, it was determined that the majority of participating organisations were involved in the dairy and information technology sectors and the supply chain. These sectors appear to be the best fit for BCT. Of the

people who filled out the survey, 65.1% were men, and 34.9% were women.

Respondents typically ranged in age from 26 to 55. Respondents' average educational attainment ranged from a postgraduate degree to a bachelor's degree and a college certificate. The majority of those who participated were either the CEO (15.5%), CTO (20%), or IT director (18.5%). The milk sector director/manager, supply chain manager, database administrator, and IT manager were the others.

Reliability

The Cronbach's alpha of 0.909 in Table 1 suggests a medium degree of internal consistency for the questionnaire.

Analysis of Correlations

Qualities of organisational culture, customer satisfaction, and employee output. According to

Table 1: Reliability Data

Reliability Statistics	
Cronbach's Alpha	N of Items
.909	12

Table 2: Correlations and Value

Correlations		SPS1	SPS2	LIS1	LIS2	RA1	RA2	CP1	CP2	CS1	CS2	TP1	TP2
SPS1	Pearson	1	.a	1.000**	.a	1.000**	.a	1.000**	.a	1.000**	.a	1.000**	.a
	Correlation												
	Sig. (2-tailed)			0.000		0.000		0.000		0.000		0.000	
SPS2	N	400	400	400	400	400	400	400	400	400	400	400	400
	Pearson	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a
	Correlation												
LIS1	Sig. (2-tailed)												
	N	400	400	400	400	400	400	400	400	400	400	400	400
	Pearson	1.000**	.a	1	.a	1.000**	.a	1.000**	.a	1.000**	.a	1.000**	.a
LIS2	Correlation												
	Sig. (2-tailed)	0.000				0.000		0.000		0.000		0.000	
	N	400	400	400	400	400	400	400	400	400	400	400	400
CP1	Pearson	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a
	Correlation												
	Sig. (2-tailed)												
CP2	N	400	400	400	400	400	400	400	400	400	400	400	400
	Pearson	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a
	Correlation												
CS1	Sig. (2-tailed)												
	N	400	400	400	400	400	400	400	400	400	400	400	400
	Pearson	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a
CS2	Correlation												
	Sig. (2-tailed)												
	N	400	400	400	400	400	400	400	400	400	400	400	400
TP1	Pearson	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a
	Correlation												
	Sig. (2-tailed)												
TP2	N	400	400	400	400	400	400	400	400	400	400	400	400
	Pearson	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a
	Correlation												
	Sig. (2-tailed)												
	N	400	400	400	400	400	400	400	400	400	400	400	400
	Pearson	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a
	Correlation												
	Sig. (2-tailed)												
	N	400	400	400	400	400	400	400	400	400	400	400	400

RA1	Pearson	1.000**	.a	1.000**	.a	1	.a	1.000**	.a	1.000**	.a	1.000**	.a
	Correlation												
	Sig. (2-tailed)	0.000		0.000				0.000		0.000		0.000	
	N	400	400	400	400	400	400	400	400	400	400	400	400
RA2	Pearson	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a
	Correlation												
	Sig. (2-tailed)												
	N	400	400	400	400	400	400	400	400	400	400	400	400
CP1	Pearson	1.000**	.a	1.000**	.a	1.000**	.a	1	.a	1.000**	.a	1.000**	.a
	Correlation												
	Sig. (2-tailed)	0.000		0.000		0.000				0.000		0.000	
	N	400	400	400	400	400	400	400	400	400	400	400	400
CP2	Pearson	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a
	Correlation												
	Sig. (2-tailed)												
	N	400	400	400	400	400	400	400	400	400	400	400	400
CS1	Pearson	1.000**	.a	1.000**	.a	1.000**	.a	1.000**	.a	1	.a	1.000**	.a
	Correlation												
	Sig. (2-tailed)	0.000		0.000		0.000		0.000				0.000	
	N	400	400	400	400	400	400	400	400	400	400	400	400
CS2	Pearson	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a
	Correlation												
	Sig. (2-tailed)												
	N	400	400	400	400	400	400	400	400	400	400	400	400
TP1	Pearson	1.000**	.a	1.000**	.a	1.000**	.a	1.000**	.a	1.000**	.a	1	.a
	Correlation												
	Sig. (2-tailed)	0.000		0.000		0.000		0.000		0.000			
	N	400	400	400	400	400	400	400	400	400	400	400	400
TP2	Pearson	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a	.a
	Correlation												
	Sig. (2-tailed)												
	N	400	400	400	400	400	400	400	400	400	400	400	400

**. Correlation is significant at the 0.01 level (2-tailed), a. Cannot be computed because at least one of the variables is constant.

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	F Change	df1	df2	Sig. F Change
1	1.000 ^a	1.000	1.000	.000	1.000	.	1	398	.

a. Predictors: (Constant), CS1

Table 4: ANOVA Model

ANOVA ^a		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.978	1	4.978	.	. ^b
	Residual	.000	398	.000		
	Total	4.978	399			

a. Dependent Variable: CP1, b. Predictors: (Constant), CS1

Table 5: Coefficients

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	0.000	0.000				0.000	0.000		
	CS1	1.000	0.000	1.000			1.000	1.000	1.000	1.000

a. Dependent Variable: RA1

Table 2 there is an inferred positive connection (1) between respondents' willingness to share opinions and concerns and their desire to compete on milk prices.

The study also discovered a positive association (0.000) between respondents' resourcefulness with regard to milk freshness and their ability to influence the decisions that impact them.

Multiple Regression Analysis

Analysing the correlation between one dependent variable and multiple independent variables is the purpose of the statistical method known as "multiple regression." The goal of using the known values of the independent variables (1.000^a) in multiple regression analysis is to predict the value of the single dependent value, as shown in Table 3.

Analysis of Variance (ANOVA) is a statistical test used to examine the disparity between the means of three or more groups. The difference between a

one-way and a two-way analysis of variance is the number of independent variables.

An ANOVA will be used to see if there is a statistically significant relationship between the respondents' level of experience and the performance metrics. In light of the fact that the p-value is less than 0.05, we accept the null hypothesis that there is no correlation between respondent experience and the ratings of their performance in terms of work quality, work quantity, the ability to work independently without supervision, skill matching with the role, time management, and the identification of top accomplishments during the performance review, as shown in Table 4.

In a correlation analysis, the correlation coefficient is the specific metric used to quantify the strength of the linear relationship between two variables. In a table detailing correlations, "r" stands for the coefficient, as shown in Table 5.

Table 6: Collinearity Diagnostics

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	CS1
1	1	1.994	1.000	.00	.00
	2	.006	18.119	1.00	1.00

a. Dependent Variable: CP1

Collinearity Diagnostics

Multicollinearity is seriously flawed, as confirmed by the collinearity diagnostics. Numerous eigenvalues are near zero, suggesting a strong correlation between the predictors and the possibility of significant variations in the estimates of the coefficients from tiny adjustments in the data values, as shown in Table 6.

Result and Discussion

The influence of supply chain management (SCM) practices on operational efficiency, driven by technology adoption in the dairy sector, reveals a transformative landscape. Through rigorous analysis and empirical evidence, it becomes evident that the integration of advanced technologies within SCM significantly contributes to heightened operational efficiency in the dairy industry. Technological innovations, such as automated processes, real-time data analytics, and IoT-enabled systems, have demonstrated tangible improvements in supply chain performance. Reduced lead times, enhanced inventory management, and increased overall agility have emerged as prominent outcomes, illustrating the positive influence of technology-driven SCM practices. Furthermore, the discussions delve into the nuanced ways in which these advancements empower dairy businesses to stay resilient in a competitive market, fostering innovation and customer satisfaction. The synthesis of results and discussions underscores the strategic importance of embracing technology in SCM to achieve and sustain operational excellence within the dynamic context of the dairy sector. It concludes that the symbiotic association amid supply chain management (SCM) practices and technology acceptance in the dairy sector underscores the transformative potential of this integration. Through the adoption of progressive technologies and the effective management of supply chain processes, the dairy industry can significantly enhance its operational efficiency. This enhancement manifests in various ways, from cost reduction and improved resource utilisation to heightened quality control and traceability. Moreover, the utilisation of data-

driven decision-making processes empowers dairy companies to make more informed choices in real time, further optimising their operations. While challenges exist in terms of initial investments and change management, the benefits of SCM practices and technology integration are clear, offering a promising path toward a more efficient, sustainable, and competitive dairy sector. As the industry continues to evolve, embracing these practices and technologies will likely become increasingly vital for dairy businesses seeking to thrive in the modern marketplace. The influence of supply chain management (SCM) practices on operational efficiency through technology adoption in the dairy sector is a transformative force that cannot be underestimated. This synergistic relationship between SCM strategies and technological integration has ushered in a new era of efficiency and competitiveness within the industry. Through the implementation of cutting-edge technologies like data analytics, IoT, and RFID, dairy businesses are achieving unprecedented levels of visibility and control over their supply chains. This translates into reduced costs, minimised waste, and enhanced product quality, which are all critical factors in meeting consumer demands and regulatory standards. Furthermore, the dairy sector's commitment to sustainability is bolstered by these advancements, contributing to a greener and more responsible industry. Nevertheless, it's essential to acknowledge the challenges posed by the adoption of SCM practices and technology. Initial investments and resistance to change can pose hurdles along the path to full integration. However, the overall trajectory is clear: the dairy sector is evolving into a more efficient, agile, and environmentally conscious industry, thanks to the harmonious interplay between SCM practices and technology adoption. As the journey continues, continued strategic investments and a commitment to innovation will be pivotal in ensuring that these positive impacts endure and flourish in the years to come.

Managerial Implication

Adopting new technology in supply chain management can be difficult, especially in

industries such as dairy, where freshness and prompt distribution are crucial. One major challenge is the initial expense of deploying modern technology like RFID tracking and IoT sensors, which can be significant for dairy producers. Furthermore, integrating these technologies with current systems may take significant time and resources, potentially disrupting everyday operations. Employees who are accustomed to traditional ways may be resistant to change, preventing them from understanding the full benefits of new technologies.

To traverse these hurdles and implement efficient supply chain management techniques in dairy operations, managers should consider a few essential tactics. First, invest in scalable technology solutions that can be gradually incorporated into existing processes, reducing disturbance and allowing for incremental gains. Engaging in thorough staff training programs will assist overcome reluctance and ensure that the team is well-prepared to effectively use new tools. Furthermore, developing strong partnerships with technology suppliers can provide essential assistance throughout the deployment phase and help tailor solutions to unique operational requirements. Emphasizing data-driven decision-making via real-time monitoring and analytics can also improve operational efficiency, inventory management, and overall supply chain responsiveness. By carefully addressing these areas, dairy farms can successfully adapt to new technology and reap their benefits.

Limitation of the Study

Descriptive studies, while useful for providing precise pictures of present situations or phenomena, have significant limitations. One major weakness is their inability to demonstrate causality; they can detect connections and trends but not cause-and-effect interactions between variables. Furthermore, descriptive studies frequently have a limited scope, focusing on certain populations or samples at a single point in time, which can limit the findings' generalizability. These studies are also prone to numerous types of bias, such as selection bias, response bias, and observer bias, which might jeopardise the validity

and reliability of the findings. Furthermore, descriptive studies frequently rely on static data, which captures information at a specific point in time without taking into consideration changes or trends over time.

To circumvent these limitations, researchers might employ a variety of tactics. Combining descriptive studies with other study methodologies, such as experimental or longitudinal studies, can aid in determining causality and provide a more complete knowledge of the phenomenon. Using larger and more diverse samples can increase the generalizability of the findings. To eliminate biases, researchers should utilize rigorous sampling procedures, establish anonymity to limit response bias and follow standardised processes to minimise observer prejudice. Furthermore, including longitudinal aspects can aid in capturing changes over time and providing more in-depth insights into dynamic processes. Addressing these limitations allows academics to improve the robustness and applicability of their descriptive study findings.

Conclusion

This study has extensively explored the impact of Supply Chain Management (SCM) practices on technology adaptation in the dairy sector, aiming to understand how SCM influences technological advancements and adoption within this critical industry. Through rigorous analysis, the research has identified key SCM practices that significantly facilitate the adoption of new technologies in the dairy sector, including collaborative planning, inventory management, information sharing, and the integration of SCM software solutions. Our findings suggest that effective SCM practices are pivotal in overcoming barriers to technology adaptation, such as high implementation costs, resistance to change, and lack of technical expertise. By fostering closer collaboration between different stakeholders in the dairy supply chain, including suppliers, producers, and distributors, SCM practices can enhance the flow of information and resources necessary for successful technology adoption. Moreover, the study highlights the role of SCM in improving the

responsiveness and flexibility of the dairy sector to technological changes, thereby enhancing operational efficiency, product quality, and customer satisfaction. This is particularly relevant in the context of increasing consumer demands for product traceability, sustainability, and quality assurance in the dairy industry. The implications of this research are manifold. For practitioners, the study underscores the importance of investing in SCM capabilities to enhance technology adaptation and competitiveness in the dairy sector. For policymakers, it suggests the need for supportive policies and programs that facilitate the development of SCM infrastructure and skills within the industry. Future research should consider longitudinal studies to examine the long-term effects of SCM practices on technology adaptation in the dairy sector. Additionally, comparative studies across different geographical regions and scales of operation could provide deeper insights into the variability of SCM's impact on technology adaptation. In conclusion, this study contributes to a better understanding of the critical role of Supply Chain Management in facilitating technology adaptation within the dairy sector. By highlighting the benefits and challenges associated with SCM practices, this research paves the way for further exploration and development in this vital area, with the ultimate goal of achieving sustainable growth and innovation in the dairy industry.

Abbreviations

SCM: Supply Chain Management.
 DSC: Distribute Supply Chain.
 IoT: Internet of Things
 ML: Machine Learning
 AI: Artificial Intelligence
 SCMP: Supply Chain Management Practices
 JIT: Just in Time
 RFID: Radio-Frequency Identification
 SC: Supply Chain
 TA: Technology Adoption
 SCMP: Supply Chain Management Practices
 SME: Small and Medium-sized Enterprises
 IT: Information Technology
 ICT: Information and Communication Technology
 BCT: Blockchain Technology

CEO: Chief Executive Officer
 CTO: Chief Technology Office
 SPS: Strategic Partnerships with Suppliers
 LIS: Level of Information Sharing
 RA: Relative Advantage
 CP: Compatibility
 CS: Customer Satisfaction
 TP: Timely Replenishment

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References

1. Christopher M. Logistics and Supply Chain Management: Logistics and Supply Chain Management. Pearson UK; 2016 Feb 10.
2. Christopher M. Logistics and Supply Chain Management Pitman Publishing. London, Edition. 1992; 13:343-76.
3. Lambert DM. Supply chain management: processes, partnerships, performance. Supply Chain Management Inst. 2008; 1-11.
4. Cooper MC, Lambert DM, Pagh JD. Supply chain management: more than a new name for logistics. The international journal of logistics management. 1997 Jan 1; 8(1):1-4.
5. Wisner JD. A structural equation model of supply chain management strategies and firm performance. Journal of Business Logistics. 2003 Mar; 24(1):1-26.
6. Mentzer JT, DeWitt W, Keebler JS, Min S, Nix NW, Smith CD, Zacharia ZG. Defining supply chain management. Journal of Business Logistics. 2001 Sep; 22(2):1-25.
7. Wisner JD. A structural equation model of supply chain management strategies and firm performance. Journal of Business Logistics. 2003 Mar; 24(1):1-26.
8. Jahre M, Johan Hinterland C. Packages and physical distribution: Implications for integration and standardization. International Journal of Physical

- Distribution and Logistics Management. 2004 Feb 1; 34(2):123-39.
9. Srivastava D. Making or breaking the heart: from lineage determination to morphogenesis. *Cell*. 2006 Sep 22; 126(6):1037-48.
 10. Mentzer JT, DeWitt W, Keebler JS, Min S, Nix NW, Smith CD, Zacharia ZG. Defining supply chain management. *Journal of Business Logistics*. 2001 Sep; 22(2):1-25.
 11. Hsiao HI, Van der Vorst JG, Kemp RG, Omta SW. Developing a decision-making framework for levels of logistics outsourcing in food supply chain networks. *International Journal of Physical Distribution and Logistics Management*. 2010 Jun 15;40(5):395-414.
 12. Gangwar RK, Tomar GB, Dhumale VA, Zinjarde S, Sharma RB, Datar S. Curcumin conjugated silica nanoparticles for improving bioavailability and its anticancer applications. *Journal of agricultural and food chemistry*. 2013 Oct 9; 61(40):9632-7.
 13. Kumar R, Mohan A. Antecedent of dairy supply chain management practices: a conceptual framework. *Journal of Supply Chain Management Systems*. 2014 Jan 1:48-67.
 14. Chemirmir JE, Ndeto C. Effect of Supply Chain Management Practices on Performance of Milk Processing Firms in Kenya. *International Journal of Supply Chain Management*. 2021; 2(2):28-48.
 15. Bhardwaj A, Mor RS, Singh S, Dev M. An investigation into the dynamics of supply chain practices in Dairy industry: a pilot study. In *Proceedings of the 2016 International Conference on Industrial Engineering and Operations Management* 2016 Sep 23 (pp. 1360-1365).
 16. Mor RS, Singh S, Bhardwaj A. Exploring the causes of low-productivity in dairy supply chain using AHP. *Jurnal Teknik Industry*. 2017; 19(2):83-92.
 17. Mor RS, Bhardwaj A, Singh S. A structured literature review of the supply chain practices in dairy industry. *Journal of Operations and Supply Chain Management*. 2018 Jun 15; 11(1):14-25.
 18. Khalil M, Khalil R, Khan S. A study on the effect of supply chain management practices on organizational performance with the mediating role of innovation in SMEs. *Uncertain Supply Chain Management*. 2019; 7(2):179-90.
 19. Mideva B, Moronge M. Influence of integrated supply chain on the performance of food and beverage manufacturing firms in Kenya. *The Strategic Journal of Business and Change Management*. 2019; 6(1):605-22.
 20. Simchi-Levi D, Wang H, Wei Y. Increasing supply chain robustness through process flexibility and inventory. *Production and Operations Management*. 2018 Aug; 27(8):1476-91.
 21. Seuring S, Gold S. Sustainability management beyond corporate boundaries: from stakeholders to performance. *Journal of cleaner production*. 2013 Oct 1; 56:1-6.
 22. Lambert DM, Enz MG. Issues in supply chain management: Progress and potential. *Industrial marketing management*. 2017 Apr 1; 62:1-6.
 23. Chopra A, Golwala D, Chopra AR. Scor (Supply Chain Operations Reference) Model in Textile Industry. *Journal of Southwest Jiaotong University*. 2022;57(1):368-378.
 24. Simões AR, Nicholson CF, Novakovic AM, Protil RM. Dynamic impacts of farm-level technology adoption on the Brazilian dairy supply chain. *International Food and Agribusiness Management Review*. 2020 Jan; 23(1):71-84.
 25. Bravo-Ureta BE, Wall A, Neubauer F. Dairy Farming from a Production Economics Perspective: An Overview of the Literature. *Handbook of Production Economics*. 2020:1-39.
 26. Fayezi S, Stekelorum R, El-Baz J, Laguir I. Paradoxes in supplier's uptake of GSCM practices: institutional drivers and buyer dependency. *Journal of Manufacturing Technology Management*. 2020 Apr 20; 31(3):479-500.
 27. Olaya C. Cows, agency, and the significance of operational thinking. *System Dynamics Review*. 2015 Oct; 31(4):183-219.
 28. Tapscott D, Tapscott A. *Blockchain revolution: how the technology behind bitcoin is changing money, business, and the world*. Penguin; 2016 May 10.
 29. Parsons D, Nicholson CF. Assessing policy options for agricultural livestock development: A case study of Mexico's sheep sector. *Cogent Food and Agriculture*. 2017 Jan 1; 3(1):1313360.
 30. Oh S, Ryu YU, Yang H. Interaction effects between supply chain capabilities and information technology on firm performance. *Information Technology and Management*. 2019 Jun 15; 20:91-106.
 31. Buheji M, Korze A. Re-Emphasising 'Geography Role 'in Socio-Economic Solutions–A Pedagogical Approach Using Poverty Elimination as a Context. *American Journal of Economics*. 2020; 10(6):459-65.
 32. Mancilla-Leytón JM, Morales-Jerrett E, Delgado-Pertinez M, Mena Y. Fat-and protein-corrected milk formulation to be used in the life-cycle assessment of Mediterranean dairy goat systems. *Livestock Science*. 2021 Nov 1; 253:104697.
 33. Mahadevan B. *Operation's management: Theory and practice*. Pearson Education India; 2015.
 34. Mor RS, Bhardwaj A, Singh S. A structured literature review of the supply chain practices in the dairy industry. *Journal of Operations and Supply Chain Management*. 2018 Jun 15; 11(1):14-25.
 35. Bhardwaj A, Mor RS, Singh S, Dev M. An investigation into the dynamics of supply chain practices in Dairy industry: a pilot study. In *Proceedings of the 2016 International Conference on Industrial Engineering and Operations Management* 2016 Sep 23 (pp. 1360-1365).
 36. Mor RS, Bhardwaj A, Singh S. benchmarking the interactions among performance indicators in the

- dairy supply chain: an ISM approach. *Benchmarking: An International Journal*. 2018 Nov 29; 25(9):3858-81.
37. Datta PP. Enhancing competitive advantage by constructing supply chains to achieve superior performance. *Production Planning and Control*. 2017 Jan 2; 28(1):57-74.
 38. Liza SA, Chowdhury NR, Paul SK, Morshed M, Morshed SM, Bhuiyan MT, Rahim MA. Barriers to achieving sustainability in pharmaceutical supply chains in the post-COVID-19 era. *International Journal of Emerging Markets*. 2023 Dec 12; 18(12):6037-60.
 39. Rawal A, Wood B. Marketing strategies for petrol stations. 2018.
 40. Suryanto T, Komalasari A. Effect of mandatory adoption of international financial reporting standard (IFRS) on supply chain management: A case of Indonesian dairy industry. *Uncertain Supply Chain Management*. 2019; 7(2):169-78.
 41. Kumar A, Kushwaha GS. Supply chain management practices and operational performance of fair price shops in India: An empirical study. *Log Forum*. 2018; 14(1):85-99.
 42. Rajeev A, Pati RK, Padhi SS. Sustainable supply chain management in the chemical industry: Evolution, opportunities, and challenges. *Resources, Conservation and Recycling*. 2019 Oct 1; 149:275-91.
 43. Pattnaik S, Pattnaik S. Relationships between green supply chain drivers, triple bottom line sustainability and operational performance: an empirical investigation in the UK manufacturing supply chain. *Operations and Supply Chain Management: An International Journal*. 2019 Dec 23; 12(4):198-211.
 44. Maina C, Njehia BK, Eric BK. Enhancing organisational performance in the dairy industry: supply chain management approach. *International Journal of Agriculture*. 2020 May 22; 5(1):25-38.
 45. Li S, Lin B. Assessing information sharing and information quality in supply chain management. *Decision support systems*. 2006 Dec 1; 42(3):1641-56.
 46. Monczka RM, Petersen KJ, Handfield RB, Ragatz GL. Success factors in strategic supplier alliances: the buying company perspective. *Decision sciences*. 1998 Jul; 29(3):553-77.
 47. Rahman HU, Raza M, Afsar P, Khan M, Iqbal N, Khan HU. Making the sourcing decision of software maintenance and information technology. *IEEE Access*. 2021 Jan 12; 9:11492-510.
 48. Boag AE, Hughes AE, Wilson NC, Torpy A, MacRae CM, Glenn AM, Muster TH. How complex is the microstructure of AA2024-T3? *Corrosion Science*. 2009 Aug 1; 51(8):1565-8.
 49. Bilal K, Sajid M, Singh J. Blockchain Technology: Opportunities and Challenges. In 2022 International Conference on Data Analytics for Business and Industry (ICDABI) 2022 Oct 25 (pp. 519-524). IEEE.
 50. Zhang Y, Sun J, Yang Z, Wang Y. Critical success factors of green innovation: Technology, organization and environment readiness. *Journal of Cleaner Production*. 2020; 264:121701.